CITY OF NEWTON
PURCHASING DEPARTMENT

CONTRACT FOR PUBLIC BUILDINGS

PROJECT MANUAL

GATH MEMORIAL POOL IMPROVEMENTS

INVITATION FOR BID #24-XX

Pre-Bid: July 13, 2023 at 9:00 a.m.

Filed Sub-Bid Opening: July 27, 2023 at 10:00 a.m.

General Contractor Bid Opening Date: August 9, 2023 at 10:00 a.m.

ARCHITECT.
BARGMANN HENDRIE + ARCHITYPE, Inc.
9 Channel Center Street, Suite 300,
Boston, MA 0221010
bha@bhplus.com

MAY 25, 2023 DRAFT

JULY 2023

Ruthanne Fuller, Mayor

CITY OF NEWTON
PROJECT MANUAL
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GATH MEMPRIAL POOL IMPROVEMENTS PROJECT

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CITY OF NEWTON

PURCHASING DEPARTMENT

INVITATION FOR BID #24-XX

The City of Newton (City) invites sealed bids in accordance with M.G.L. c. 149 from Contractors for

GATH MEMORIAL POOL IMPROVEMENTS PROJECT

Pre-bid will be held on site at: **July 13, 2023 at 9:00 a.m.,**
256 Albemarle Road, Newton, MA (Not Mandatory)

Walk Throughs are by Appointment* only and between 8:00am- 2:00pm on the following days: June 2, 5 - 9, June 12 – 16 and June 19 – 22, 2023

***Appointments are to be set up by contacting: Rafik Ayoub, Public Buildings Department Project Manager at (857) 404-4589**

Neither the Pre-Bid nor the Walk Through is mandatory.

Filed Sub-Bid Opening:	**Thursday, July 27, 2023 at 10:00 a.m.*** **Newton City Hall, Room 108**
General Bid Opening:	**Thursday, August 9, 2023 at 10:00 a.m.*** **Newton City Hall, Room 108**
Substantial Completion:	**No later than May 31, 2024**
100% Contract Completion:	**On or before August 5, 2024**

The GATH MEMORIAL IMPROVEMENTS PROJECT (Project) is being administered by the City and its Architect (Bargmann Hendire & Archetype, Inc.) and Owner's Project Mananger (Rafik Ayoub). Based on the Project dollar amount and the dollar amout of the filed sub-trades, there will be two bid openings, one for each of XX filed sub-bids and one for general bids.The City will first accept and open sub-bids, and then issue a filed sub-bid tabulation sheet so that general bidders may prepare their bids based on sub-bids from resposnible and eligible sub-bidders.

Forms for the General Bid and Sub-Bids are included in this Invitation For Bid 24-XX at pp. 8 and 25, respectively.
Sub-bids and bids will not be accepted nor may submitted sub-bids and bids be corrected, modified or withdrawn after the deadline for submission of sub-bids and bids. Following the submission deadline, all sub-bids and bids received within the time specified will be publicly opened and read aloud.

Contract Documents will be available **online at the City's website: www.newtonma.gov/bids or** for pickup at the Purchasing Department after: **10:00 a.m., July 6, 2023.** There will be no charge for the first copy of the contract documents. Award will be made to the bidder with the lowest total contract price, including any accepted alternates, that has been deemed responsible and eligible. **All bids shall be submitted as one ORIGINAL and two COPIES.**

All General Bids must be accompanied by a copy of a Prime/General Certificate of Contractor Eligibility issued by the Department of Capital Asset Management and Maintenance (DCAMM) and a Prime/General Contractor Update Statement completed and signed by the bidder. The category of work for which the Bidder must certified is: **General Building Construction. General bidders must also complete and submit the Item Sheets at pp. 10-15 below. The Item Sheet prices set rates for supplies and services not included in the General Bid but which may be requested by the City after execution of the contract. Item Sheet prices should NOT be included in the General Bid and will not be factored into the General Bid award.**

All Sub Trade Bids must be accompanied by a copy of a "Certificate of Eligibility" and Contractor "Update Statement" issued by the Department of Capital Asset Management and Maintenance (DCAMM). The xxxx (xx) categories of work for which the Sub Trade Bidders must be certified are**: Masonry; Miscellaneous and Ornamental Iron; Waterproofing, Dampproofing and Caulking; Roofing and Flashing; Metal Windows; Glass & Glazing; Tile; Acoustical Tile; Resilient Floors; Painting; Elevators; Fire Protection; Plumbing; Heating Ventilating Air Conditioning; Electrical Work.**

All bids must be accompanied by a bid deposit in an amount that is not less than five percent (5%) of the value of the bid, including all alternates. Bid deposits, payable to the City of Newton, shall be either in the form of a bid bond, or cash, or a certified check, or a treasurer's or cashier's check issued by a responsible bank or trust company. Bidders are reminded that the bid deposit covers the City for damages when a bidder withdraws its bid after the bid submission date. **Be advised that to the extent permitted by law the City will retain all bid deposits for withdrawn bids.**

All bids are subject to the provisions of M.G.L. c.149, §§44 A to 44J. **Wages are subject** to minimum wage rates determined by the Massachusetts Department of Labor Standards pursuant to M.G.L. c149, §§26 to 27H. The schedule of wage rates applicable to this contract is included in the bidding documents. In addition, the prevailing wage schedule will be updated annually for all public construction projects lasting longer than one (1) year or at each renewal, as applicable. You will be required to pay the rates set out in any updated prevailing wage schedule. Increases in prevailing wage schedules will not be the basis for change order requests. The successful bidder will be required to provide a Certificate of Insurance demonstrating current coverage of the type and amounts set forth in the Project Manual. The successful bidder will be required to furnish both a **Performance Bond and a Labor and Materials Payment Bond** in the amount of **100% of the contract total.**

Bidders attention is directed to the requirements of the City of Newton Supplemental Equal Employment Opportunity, Anit-Discriminitation and Affirmative Action Program and also to the Minority/Women Business Enterprise Plan, December 1999. Copies of the Plans and Program referred to in Sections 3.1 and 3.2 are available at: **www.newtonma.gov/purchasing.** In the event of conflict between any of the above listed policies, the stricter policy shall apply. If you download bids from the internet website **www.newtonma.gov/bids** I strongly suggest you email (purchasing@newtonma.gov) your company's NAME, ADDRESS, PHONE, FAX AND INVITATION FOR BID NUMBER, so that we may add you to the Bidders List and you will be notified of any/all addendums.

The City will reject any and all bids in accordance with the above referenced General Laws. In addition, the City reserves the right to waive any informalities in any or all bids, or to reject any or all bids (in whole or in part) if it be in the public interest to do so.

CITY OF NEWTON

Nicholas Read
Chief Procurement Officer
July 6, 2023

CITY OF NEWTON
DEPARTMENT OF PURCHASING
INSTRUCTIONS TO BIDDERS & SUB-BIDDERS

ARTICLE 1 - BIDDER'S REPRESENTATION

1.1 Each General and Filed Sub-Bidder (hereinafter referred to collectively as the "Bidder") by making a bid or sub-bid (hereinafter collectively referred to as "bid") represents that:

1. The Bidder has read and understands the Bidding Documents, Contract Forms, General Conditions, Conditions of the Contract, General Requirements and Project Specifications (collectively, referred to as the "Contract Documents") and the bid is made in accordance therewith.

2. The Bidder has been given the opportunity to visit the work site and is familiar with the local conditions under which the work has to be performed.

1.2 Failure to so examine the Contract Documents or visit the work site will not relieve any Bidder from any obligation under the bid as submitted.

ARTICLE 2 - REQUEST FOR INTERPRETATION

2.1 Bidders shall promptly notify the City of any ambiguity, inconsistency, or error which they may discover upon examination of the Contract Documents, the site, and local conditions.

2.2 Bidders requiring clarification or interpretation of the Contract Documents shall make a written request to the *Chief Procurement Officer*, at purchasing@newtonma.gov or via facsimile (617) 796-1227. The City will only answer such requests from Sub-Bidders if received **by Thursday, July 21 , 2023 at 12:00 noon** and from General Bidders if received **by Thursday, August 2, 2023 at 12:00 noon.**

2.3 Interpretation, correction, or change in the Contract Documents will be made by addendum which will become part of the Contract Documents. The City will not be held accountable for any oral communication.

2.4 Addenda will be emailed to every individual or firm on record as having taken a set of Contract Documents.

2.5 Copies of addenda will be made available for inspection at the location listed in the Invitation for Bids (IFB) where Contract Documents are on file, in addition to being available online at **www.newtonma.gov/bids**.

2.6 Bidders or proposers contacting ANY CITY EMPLOYEE regarding this IFB outside of the Purchasing Department, once the IFB has been released, may be disqualified from the procurement process.

2.7 Bidders downloading information off the internet web site are solely responsible for obtaining any addenda prior to the bid opening. If the Bidder makes itself known to the Purchasing Department, at purchasing@newtonma.gov or via facsimile (617) 796-1227, it shall be placed on the bidder's list. Bidders must provide the Purchasing Department with their company's name, street address, city, state, zip, phone, fax, email address and **INVITATION FOR BID #24-XX**.

ARTICLE 3 - MBE PARTICIPATION

3.1 Notice is hereby given that the Mayor's Affirmative Action Plan for the City of Newton in effect at the time of this solicitation is applicable to all construction contracts in excess of $10,000.00.

3.2 Notice is hereby given that the City of Newton Minority/Women Business Enterprise Plan and the Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program in effect at the time of this solicitation are applicable to all City contracts for goods and services in excess of $50,000.00.

3.3 Copies of the Plans and Program referred to in Sections 3.1 and 3.2 are available at: **www.newtonma.gov/purchasing**.

ARTICLE 4 - PREPARATION AND SUBMISSION OF BIDS

4.1 Bids shall be submitted on the "Form For Sub Bid #24-XX" or "General Bid Form #24-XX," attached.

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4.2 All entries on a Bid Form shall be made by typewriter or in ink.

4.3 Where so indicated on a Bid Form, sums shall be expressed in both words and figures. Where there is a discrepancy between the bid sum expressed in words and the bid sum expressed in figures, the words shall control.

4.4 Bid Deposits shall be submitted in the amount specified in the IFB. They shall be made payable to the City and shall be either in the form of cash, certified check, treasurer's or cashier's check issued by a responsible bank or trust company, or a bid bond issued by a surety licensed to do business in the Commonwealth of Massachusetts; and shall be conditioned upon the faithful performance by the principal of the agreements contained in the bid. Bidders are reminded that the bid deposit covers the City for damages when a bidder withdraws its bid after the bid submisssion date. **Be advised that to the extent permitted by the law the City will retain all bid deposits for withdrawn bids.**

Bid deposits of the three (3) lowest responsible and eligible Bidders shall be retained until the execution and delivery of the City-Contractor agreement.

4.5 Each Bid, including the bid deposit shall be enclosed in a sealed envelope with the following plainly marked on the outside:

* SUB-BID OR GENERAL BID FOR: **#24-XX**

* NAME OF PROJECT: **GATH MEMORIAL POOL IMPROVEMENTS PROJECT**

* BIDDER'S NAME, BUSINESS ADDRESS, AND PHONE NUMBER

*IF A FILED SUB-BID, THE CATEGORY OF WORK TO WHICH THE SUB-BID RELATES.

4.6 Date and time for receipt of sub-bids and bids is set forth in the Invitation for Bids.

4.7 Timely delivery of a sub-bid or bid at the location designated shall be the full responsibility of the Bidder. In the event that Newton City Hall is closed on the date or at the time that bids are due, the date and time for receipt of bids shall be on the next business day following that the Newton City Hall and the Purchasing Department are open.

4.8 Sub-bids and bids shall be submitted with one **original** and one **copy.**

4.9 Massachusetts law requires all employees who work on Massachusetts public works construction sites must have no Less than 10 hours of OSHA-approved safety and health training. See M.G.L. c.30, §39M(c), M.G.L. c.30, §39S(a)(1), M.G.L. c.149, §44E(2) & M.G.L. c.149, §44F(2).

1. This requirement will apply to any general bid or sub bid submitted.
2. This law directs the Massachusetts Attorney General to restrain the award of construction contracts to any contractor who is in violation to this requirement and to restrain the performance of these contracts by non-complying contractors.
3. The contractor and all subcontractors on this project must certify on the Bid Form compliance with the applicable requirement. Non-compliance with this law will disqualify the bidder.

ARTICLE 5 - ALTERNATES

5.1 Each Bidder shall acknowledge alternates (if any) in Section C on the Bid Form.

5.2 In the event an alternate does not involve a change in the amount of the base bid, the Bidder shall so indicated by writing "No Change", or "N/C" or "0" in the space provided for that alternate.

5.3 Bidders shall enter on the Bid Form a single amount for each alternate which shall consist of the amount for work performed by the Contractor.

5.4 The low Bidder will be determined on the basis of the sum of the base bid and the accepted alternates.

ARTICLE 6 - WITHDRAWAL OF BIDS

6.1 Any bid may be withdrawn prior to the time designated for receipt of bids on written or electronic request. Electronic withdrawal of bids must be confirmed over the Bidder's signature by written notice postmarked on or before the date and time set for receipt of bids.

6.2 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids.

6.3 No bids may be withdrawn within sixty (60) days, Saturdays, Sundays and legal holidays excluded, after the opening of the bids.

ARTICLE 7 - CONTRACT AWARD

7.1 Sub Bids shall be submitted on Form For Sub Bid #24-XX at pp. 25-34 below. With respect the the sub-bid for Resilient Flooring, the City has included an Add Alternate,* which shall be reflected in the General Bid. The City shall award the contract to the General Bidder submitting either (i) the lowest Base Bid or (ii) the lowest Base Bid plus the Alternate Bid, as the City may elect. General Bidders may, if properly certified in a sub trade, self perform that subtrade. Prior to the the opening of the general bids, the City shall receive and screen all filed sub-bids and provide a tabulation sheets to all contractors that have notified the City that they intend to submit a general bid in order that they may select sub-bidders for inclusion in their bids. The City of Newton will award one (1) the contract to the responsible and eligible General Bidder submitting the lowest Total Base Bid Price or lowest Base Bid plus the Alternate Bid for labor and materials as set forth in Bid Form For General Bid #24-XX (pp. 8-24 below). A contract will be awarded within sixty (60) days, Saturdays, Sundays, and legal holidays excluded, after the opening of bids.

7.2 The City reserves the right to waive minor informalities in or to reject any or all Bids if it be in the public interest to do so.

7.3 The City reserves the right to reject any bidder who has failed to pay any local taxes, fees, assessments, betterments, or any other municipal charge, unless the bidder has a pending abatement application or has entered into a payment agreement with the collector-treasurer.

7.4 As used herein, the term "lowest responsible and eligible Bidder" shall mean the Bidder (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who has met all the requirements of the invitation for bids; (3) who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (4) who, where the provisions of section eight B of chapter twenty-nine apply, shall have been determined to be qualified thereunder.

7.5 Subsequent to the award and within five (5) days, Saturday, Sundays and legal holidays excluded, after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the City a contract in the form included in the Contract Documents in such number of counterparts as the City may require.

7.6 In the event that the City receives low bids in identical amount from two or more responsive and responsible Bidders, the City shall select the successful Bidder by a blind selection process chosen by the City such as flipping a coin or drawing names from a hat. The low Bidders who are under consideration will be invited to attend and observe the selection process.

ARTICLE 8 - TAXES

8.1 The Bidder shall not include in this bid any tax imposed upon the sale or rental of tangible personal property in this Commonwealth, such as any and all building materials, supplies, services and equipment required to complete the work.

8.2 The City is exempt from payment of the Massachusetts Sales Tax, and the Bidder shall not include any sales tax on its bid. The City's exemption Number is E-046-001-404.

ARTICLE 9 – PROPRIETARY SPECIFICATIONS

9.1 The City has used a proprietary specification to describe the supply listed in the specifications. Such specifications are permitted under M.G.L. c. 30, §39M(b), provided that the City state in writing that use of the proprietary specification is in its best interest and that it will accept an "equal" of the item specified. An item is considered equal if (i) it is at least equal in quality, durability, appearance, strength, and design; (ii) will perform the intended function at least equally; and (iii) conforms substantially, even with deviations, to the detailed requirements contained in the specifications. Bidders wishing to provide an equal item should do so with their bids. The City shall have the sole right to determine whether or not said item is equal

9.2 The required determination and justification have been duly prepared, and a copy may be requested in accordance with Massachusetts Public Records Law, M.G.L. c. 66, §10.

END OF SECTION

CITY OF NEWTON

PURCHASING DEPARTMENT

BID FORM FOR GENERAL BID #24-XX

GATH MEMORIAL POOL IMPROVEMENTS PROJECT

TO THE AWARDING AUTHORITY:

A. The undersigned proposes to furnish all labor and materials required to
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GATH MEMORIAL POOL IMPROVEMNTS PROJECT

in Newton, Massachusetts in accordance with the accompanying plans and specifications for the contract price specified below, subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda number(s) _____, _____, _____, _____,

C. The TOTAL BASE BID PRICE* is: $_____

TOTAL BASE BID PRICE in words _____

On any change order, the General Contractor will be allowed only (i) a ten percent (10%) mark up for Overhead and Profit (O&P) for its work and (ii) a five percent (5%) mark up for O&P on sub-contractors' work.

The sub-contractors will be allowed a ten percent (10%) mark up for O&P for their work.

For both the General Contractor and sub-contractors, any increase in the cost of a bond will be added to the change order at direct cost.

COMPANY:_____

The sub-division of the TOTAL BASE BID PRICE is as follows:

Item 1. The work of the General Contractor, being all work other than that covered by Item 2

Total of Item 1: $ _____

Item 2. Sub-bids as follows:

Sub-Trade	**Name of Sub-bidder**	**Amount**	**Bond Required ? (Yes or No)**
Masonry	_____	$ _____	____
Ornamental and Miscellaneous Iron	_____	$_____	____

Waterproofing Dampproofing and Caulking _____ $ _____ ___

Painting _____ $ _____ ___

Plumbing _____ $ _____ ___

Electrical Work _____ $ _____ ___

Total of Item 2: $_____

TOTAL BASE BID PRICE (Sum of Item 1 + Item 2):** $_____

_____

(TOTAL BASE BID PRICE in words)

_____

(TOTAL BASE BID PLUS ALTERNATE BID PRICE in words)

COMPANY:_____

D. On any change order, the General Contractor will be allowed only (i) a ten percent (10%) mark up for Overhead and Profit (O&P) for its work and (ii) a five percent (5%) mark up for O&P on sub-contractors' work.

The sub-contractors will be allowed a ten percent (10%) mark up for O&P for their work and (ii) a five percent (5%) mark up for O&P on sub-sub contractors' work.

For both the General Contractor and sub-contractors, any increase in the cost of a bond will be added to the change order at direct cost

E. General Bidder Item Sheets. General bidders must complete and submit the Item Sheets below. The Item Sheet prices set rates for supplies and services not included in the General Bid but which may be requested by the City after execution of the contract. Item Sheet prices should NOT be included in the General Bid and will not be factored into the General Bid award. **T**he General Bidder shall insert unit prices for each item in ink, in both words and figures, and show a total item price (unit price x estimated quantities). In the event a discrepancy between the written words and figures, the written words shall govern. In the event an error in an item total, the corrected total obtained by multiplying the unit price time the respective quantities shall stand as the bidder's total bid price.

The General Bidder is required to review any related plans, conduct a full site review, and read all the provisions in the document before inserting prices.

***The estimated quantities shown here are based solely upon a reasonable assessment of the project parameters, thus the General Bidder is advised that the actual quantities may vary substantially as field conditions may necessitate. Regardless of the amount of actual quantities, the quoted unit prices shall always apply.**

There is no separate labor charge under this bid: unit prices shall include full compensation for all labor, materials, tools and equipment, and all incidentals necessary to complete the work as specified herein.

Finishes and Related Interior Work

ITEM 1: PATCHING OR REPAIR OF EXISTING GWB OR PLASTER FINISH OF WALLS OR PARTITIONS TO REMAIN. THE SUM OF: _____ DOLLARS AND _____ CENTS ($ _____) PER **SF**	**1**	**SF**	$ _____
ITEM 2: FLASH PATCHING OF SUBFLOORS FOR EPOXY FLOORING, RESILIENT FLOORING OR CARPET. THE SUM OF: _____ DOLLARS AND _____ CENTS ($ _____) PER **SF**	**1**	**SF**	$ _____

Exterior Envelope Work

Excavation, Earthwork and Sitework

ITEM 3: EARTH FILL – COMMON BORROW THE SUM OF: _____ DOLLARS AND _____ CENTS ($ ____) PER **CY**	**1**	**CY**	$ _____
ITEM 4: STRUCTURAL FILL, INCLUDING PLACEMENT THE SUM OF: _____ DOLLARS AND _____ CENTS ($ ____) PER **CY**	**1**	**CY**	$ _____
ITEM 5: DENSE GRADED COMPACTED AGGREGATE BASE THE SUM OF: _____ DOLLARS AND _____ CENTS ($ _____) PER **CY**	**1**	**CY**	$ _____

ABATEMENT WORK

(The unit costs represented below are for the removal and disposal of additional asbestos containing materials. The City of Newton and the City's Industrial Hygiene Consultant shall review and approve any additional work prior to commencement of such work.) Costs are taken from ASBESTOS REMEDIATION Specification: 022820

Unit Price No.	Work Item Description	Unit of Measure		Additions		Deductions
23	Pipe Insulation	LF	$	25.00	$	20.00
24	Hard Joint Insulation	LF	$	25.00	$	20.00
25	Ceiling and wall Demoli-tion	SF	$	2.00	$	1.50
26	Interior Caulking	SF	$	5.00	$	4.50
27	Flooring Materials*	SF	$	4.50	$	3.75

* In some cases, the finish floor tile and mastic may have been applied over an older layer of floor tile and mastic. This unit cost represents the removal of all layers of material in a given area.

The above unit prices shall include all labor, materials, dewatering, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the provisions of the Section 11.3 CHANGES DUE TO OVERRUNS OR UNDERRUNS IN QUANTITIES of the Agreement and other requirements of the General Conditions.

F. Prompt Payment Discounts. Bidders are encouraged to offer discounts in exchange for an expedited payment. Payments may be issued earlier than the general goal of within 30 days of receipt of the invoice only when in exchange for discounted prices. Discounts will not be considered in determining the low responsible bidder.

Prompt Payment Discount_____%_____Days Prompt Payment Discount____%__Days Prompt Payment Discount_____%_____Days

G. The undersigned has completed and submits herewith the following documents:

- Bidder's Qualifications and References Form, 2 pages
- Certificate of Non-Collusion, 1 page
- Signed Bid Form, 2 pages
- A five percent (5%) bid deposit.
- Debarment Letter, 1 page

H. The undersigned agrees that each of the above named sub-bidders will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidders as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1 of this bid.

I. The undersigned agrees that if s/he is selected as general contractor, s/he will promptly confer with the awarding authority on the question of sub-bidders; and that the awarding authority may substitute for any sub-bid listed above a sub-bid filed with the awarding authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respective sub-bids and be in every way as responsible for them and their work as if they had been originally named in this general bid, the total contract price being adjusted to conform thereto.

J. The undersigned agrees that, if s/he is selected as general contractor, s/he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.

K. The undersigned hereby certifies that s/he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that s/he will comply fully with all laws and regulations applicable to awards made subject to M.G.L. c.30, §39M.

L. The undersigned certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully

completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration ("OSHA") that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States OSHA that is at least 10 hours in duration. The undersigned understands that any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

M. The undersigned further certifies that s/he intends to comply with the City of Newton Minority/Women Business Enterprise Plan, dated December 19, 1999 to further expand business opportunities for minority firms.

N. The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of M.G.L. c29, §29F or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date : _____ _____

(Name of General Bidder)

BY:_____

(Signature)

_____

(Printed Name and Title of Signatory)

_____

(Business Address)

_____

(City, State Zip)

_____

E-mail address

_____ / _____

(Telephone) / (FAX)

NOTE: If the bidder is a corporation, indicate state of incorporation under signature, and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

The General Bidder is required to review any related plans, conduct a full site review, and read all the provisions in the document before inserting prices.

O. Prompt Payment Discounts. Bidders are encouraged to offer discounts in exchange for an expedited payment. Payments

may be issued earlier than the general goal of within 30 days of receipt of the invoice only when in exchange for discounted prices. Discounts will not be considered in determining the low responsible bidder.

Prompt Payment Discount _____%_____Days
Prompt Payment Discount_____%_____ Days
Prompt Payment Discount _____%_____Days

P. The undersigned has completed and submits herewith the following documents:

- ☐ General Bidder's Qualifications and References Form, 2 pages
- ☐ DCAMM Certificate of Eligibility, Form CQ 7, Supplied by Bidder
- ☐ DCAMM Update Statement, Form CQ-3, Supplied by Bidder
- ☐ Certificate of Non-Collusion, 1 page
- ☐ Signed Bid Form, 10 pages
- ☐ Certificate of Tax Compliance, 1 page
- ☐ Certificate of Foreign Corporation (if applicable), 1 page
- ☐ IRS W9 Form, 1 page
- ☐ Debarment Letter, 1 page
- ☐ A five percent (5%) bid deposit.

Q. The undersigned agrees that each of the above named sub-bidders will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidders as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1 of this bid.

The undersigned agrees that if s/he is selected as general contractor, s/he will promptly confer with the awarding authority on the question of sub-bidders; and that the awarding authority may substitute for any sub-bid listed above a sub-bid filed with the awarding authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respectivesub-bids and be in every way as responsible for them and their work as if they had been originally named in this general bid, the total contract price being adjusted to conform thereto.

R. The undersigned agrees that, if s/he is selected as general contractor, s/he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price.

S, The undersigned hereby certifies that s/he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that s/he will comply fully with all laws and regulations applicable to awards made subject to M.G.L. c.30, §39M.

T. The undersigned certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration ("OSHA") that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States OSHA that is at least 10 hours in duration. The undersigned understands that any employee found on a worksite subject to this section without documentation of successful completion of a course

in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

U. The undersigned further certifies that s/he intends to comply with the City of Newton Minority/Women Business Enterprise Plan, dated December 19, 1999 to further expand business opportunities for minority firms.

V. The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of M.G.L. c29, §29F or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date : _____

_____
(Name of General Bidder)

BY:_____
(Signature)

_____
(Printed Name and Title of Signatory)

_____
(Business Address)

_____
(City, State Zip)

_____
E-mail address

_____/_____
(Telephone) (FAX)

NOTE: If the bidder is a corporation, indicate state of incorporation under signature, and affix corporate seal; if a partnership, give full names and residential addresses of all partners; and if an individual, give residential address if different from business address.

END OF SECTION

CITY OF NEWTON

GENERAL BIDDER'S QUALIFICATIONS AND REFERENCES FORM

All questions must be answered, and the data given must be clear and comprehensive. Please type or print legibly. If necessary, add additional sheet for starred items. This information will be utilized by the City for purposes of determining bidder responsiveness and responsibility with regard to the requirements and specifications of the Contract.

1. FIRM NAME: _____

2. WHEN ORGANIZED: _____

3 INCORPORATED? _____ YES _____ NO DATE AND STATE OF INCORPORATION: _____

4. IS YOUR BUSINESS A **MBE**? _____YES _____NO **WBE**? _____YES _____NO or **MWBE**? _____YES _____NO

* 5. LIST ALL CONTRACTS CURRENTLY ON HAND, SHOWING CONTRACT AMOUNT AND ANTICIPATED DATE OFCOMPLETION:

_____

_____

_____

_____

_____

* 6. HAVE YOU EVER FAILED TO COMPLETE A CONTRACT AWARDED TO YOU?
_____ YES _____ NO
IF YES, WHERE AND WHY?

_____

_____

* 7. HAVE YOU EVER DEFAULTED ON A CONTRACT? _____ YES _____ NO
IF YES, PROVIDE DETAILS.

_____

_____

* 8. LIST YOUR VEHICLES/EQUIPMENT AVAILABLE FOR THIS CONTRACT:

_____

_____

_____

_____

_____

_____

_____

* 9. IN THE SPACES FOLLOWING, PROVIDE INFORMATION REGARDING CONTRACTS COMPLETED BY YOUR FIRM SIMILAR IN NATURE TO THE PROJECT BEING BID. A MINIMUM OF FOUR (4) CONTRACTS SHALL BE LISTED. PUBLICLY BID CONTRACTS ARE PREFERRED, BUT NOT MANDATORY.

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____

DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #: ____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

_____

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #: (____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

_____

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON:_____ TELEPHONE #: (____)_____
CONTACT PERSON'S RELATION TO PROJECT?:_____
(i.e., contract manager, purchasing agent, etc.)

_____
PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #:(____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

10. The undersigned certifies that the information contained herein is complete and accurate and hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the City in verification of the recitals comprising this statement of Bidder's qualifications and experience.

DATE: _____ BIDDER: _____

SIGNATURE: _____

PRINTED NAME: _____ TITLE: _____

END OF SECTION

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee club, or other organization, entity, or group or individuals.

_____
(Signature of individual)

_____
Name of Business

CERTIFICATION OF TAX COMPLIANCE

Pursuant to MG c. 62C, § 49A and requirements of the City of Newton, the undersigned acting on behalf of the Contractor certifies under the penalties of perjury that the Contractor is in compliance with all laws of the Commonwealth relating to taxes including payment of all local taxes, fees, assessments, betterments and any other local or municipal charges (unless the Contractor has a pending abatement application or has entered into a payment agreement with the entity to which such charges were owed), reporting of employees and contractors, and withholding and remitting child support.*

_____ _____

**Signature of Individual
or Corporate Contractor (Mandatory)

*** Contractor's Social Security Number
(Voluntary) or Federal Identification Number

Print Name:_____

By: _____ Date: _____
Corporate Officer
(Mandatory, if applicable)

Print Name:_____

* The provision in this Certification relating to child support applies only when the Contractor is an individual.

** Approval of a contract or other agreement will not be granted until the City receives a signed copy of this Certification.

*** Your social security number may be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing or tax payment obligations. Providers who fail to correct their non-filing or delinquency will not have a contract or other agreement issued, renewed, or extended.

CERTIFICATE OF FOREIGN CORPORATION

The undersigned hereby certifies that it has been duly established, organized, or chartered as a corporation under the laws of:

(Jurisdiction)

The undersigned further certifies that it has complied with the requirements of M.G.L. c. 30, §39L (if applicable) and with the requirements of M.G.L. c. 156D, §15.03 relative to the registration and operation of foreign corporations within the Commonwealth of Massachusetts.

Name of person signing proposal

Signature of person signing proposal

Name of Business (Please Print or Type)

Affix Corporate Seal here

City of Newton

Purchasing Department
Nicholas Read *Chief Procurement Officer*
1000 Commonwealth Avenue
Newton Centre, MA 02459-1449
purchasing@newtonma.gov

Telephone
(617) 796-1220
Fax:
(617) 796-1227
TDD/TTY
(617) 796-1089

Mayor
Ruthanne Fuller

Date

Vendor

Re: Debarment Letter for Invitation For Bid 23-XX

As a potential vendor on the above contract, the City requires that you provide a debarment/suspension certification indicating that you are in compliance with the below Federal Executive Order. Certification can be done by completing and signing this form.

PART 1 - Debarment:

Federal Executive Order (E.O.) 12549 "Debarment and Suspension" requires that all contractors receiving individual awards, using federal funds, and all sub-recipients certify that the organization and its principals are not debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency from doing business with the Federal Government.

I hereby certify under pains and penalties of perjury that neither I nor any principal(s) of the Company identified below is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.

_____ (Name)
_____ (Company)
_ _____ (Address)
_____ (Address)

PHONE _____ FAX _____
EMAIL _____

_____Signature

_____Date

If you have questions, please contact Nicholas Read, Chief Procurement Officer at (617) 796-1220.

Form **W-9**
(Rev. October 2007)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/Sole proprietor ☐ Corporation ☐ Partnership
☐ Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶
☐ Other (see instructions) ▶

X Exempt payee

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

or

Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Date ▶ Name

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

Cat. No. 10231X Form **W-9** (Rev. 10-2007)

CITY OF NEWTON
PURCHASING DEPARTMENT

BID FORM FOR SUB-BID #23-XX

To all General Bidders Except those Excluded:

On any change order, the General Contractor will be allowed only (i) a ten percent (10%) mark up for Overhead and Profit (O&P) for its work and (ii) a five percent (5%) mark up for O&P on sub-contractors' work.

The sub-contractors will be allowed a ten percent (10%) mark up for O&P for their work and (ii) a five percent (5%) mark up for O&P on sub-sub contractors' work.

For both the General Contractor and sub-contractors, any increase in the cost of a bond will be added to the change order at direct cost.

B. This sub-bid includes addenda numbered_____

C. This sub-bid

may be used by any general bidder except:

_____
_____

may only be used by the following general bidders:

_____
_____

[To exclude general bidders, insert "X" in one box only and fill in blank following that box. Do not answer C if no general bidders are excluded.}

D. The undersigned agrees that, if he is selected as a sub-bidder, he will, within 5 days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the general contractor, execute with such general bidder a subcontract in accordance with the terms of this sub-bid, and contingent upon the execution of the general contract, and, if requested so to do in the general bid by the general bidder, who shall pay the premiums therefor, or if prequalification is required pursuant to section 44D 3/4, furnish a performance and payment bond of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority, in the full sum of the subcontract price.

E. The names of all persons, firms and corporations furnishing to the undersigned labor or labor and materials for the class or classes or part thereof of work for which the provisions of the section of the specifications for this sub-trade require a listing in this paragraph, including the undersigned if customarily furnished by persons on his own payroll and in the absence of a contrary provision in the specifications, the name of each such class of work or part thereto and the bid price for such class of work or part thereof are:

Name	Class of Work	Bid price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Do not give bid price for any class or part thereof furnished by undersigned.]

F. The undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on the hereinbefore described plans, specifications and addenda and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated, if satisfactory to the awarding authority.

G. The undersigned further agrees to be bound to the general contractor by the terms of the hereinbefore described plans, specifications, including all general conditions stated therein, and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the owner.

H. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specifications: –

1. Have been in business under present business name _____ years.

2. Ever failed to complete any work awarded?_____

3. List one or more recent buildings with names of the general contractor and architect on which you served as a sub-contractor for work of similar character as required for the above-named building.

	Building	Architect	General Contractor	Amount of Contract
(a)	_____	_____	_____	_____
(b)	_____	_____	_____	_____
(c)	_____	_____	_____	_____

4. Bank reference _____

I. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that he will comply fully with all laws and regulations applicable to awards of subcontracts subject to section forty-four F.

The undersigned further certifies under penalties of perjury that this sub-bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date : _____

_____
(Name of Sub Bidder)

BY:_____
(Signature)

_____
(Printed Name and Title of Signatory)

_____
(Business Address)

_____
(City, State Zip)

_____
E-mail address

_____
(Telephone) (FAX)

CITY OF NEWTON

SUB-BIDDER'S QUALIFICATIONS AND REFERENCES FORM

All questions must be answered, and the data given must be clear and comprehensive. Please type or print legibly. If necessary, add additional sheet for starred items. This information will be utilized by the City for purposes of determining bidder responsiveness and responsibility with regard to the requirements and specifications of the Contract.

1. FIRM NAME: _____

2. WHEN ORGANIZED: _____

3 INCORPORATED? _____ YES _____ NO DATE AND STATE OF INCORPORATION: _____

4. IS YOUR BUSINESS A **MBE**? _____YES _____NO **WBE**? _____YES _____NO or **MWBE**? _____YES _____NO

* 5. LIST ALL CONTRACTS CURRENTLY ON HAND, SHOWING CONTRACT AMOUNT AND ANTICIPATED DATE OFCOMPLETION:

_____

_____

_____

_____

_____

* 6. HAVE YOU EVER FAILED TO COMPLETE A CONTRACT AWARDED TO YOU?
_____ YES _____ NO
IF YES, WHERE AND WHY?

_____

_____

* 7. HAVE YOU EVER DEFAULTED ON A CONTRACT? _____ YES _____ NO
IF YES, PROVIDE DETAILS.

_____

_____

* 8. LIST YOUR VEHICLES/EQUIPMENT AVAILABLE FOR THIS CONTRACT:

_____

_____

_____

_____

_____

_____

_____

* 9. IN THE SPACES FOLLOWING, PROVIDE INFORMATION REGARDING CONTRACTS COMPLETED BY YOUR FIRM SIMILAR IN NATURE TO THE PROJECT BEING BID. A MINIMUM OF FOUR (4) CONTRACTS SHALL BE LISTED. PUBLICLY BID CONTRACTS ARE PREFERRED, BUT NOT MANDATORY.

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____

DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #: ____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

_____

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #: (____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

_____

PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON:_____ TELEPHONE #: (____)_____
CONTACT PERSON'S RELATION TO PROJECT?:_____
(i.e., contract manager, purchasing agent, etc.)

_____
PROJECT NAME: _____
OWNER: _____
CITY/STATE: _____
DOLLAR AMOUNT: $ _____ DATE COMPLETED: _____
PUBLICLY BID? _____YES _____ NO
TYPE OF WORK?: _____
CONTACT PERSON: _____ TELEPHONE #:(____)_____
CONTACT PERSON'S RELATION TO PROJECT?: _____
(i.e., contract manager, purchasing agent, etc.)

10. The undersigned certifies that the information contained herein is complete and accurate and hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the City in verification of the recitals comprising this statement of Bidder's qualifications and experience.

DATE: _____ BIDDER: _____

SIGNATURE: _____

PRINTED NAME: _____ TITLE: _____

END OF SECTION

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee club, or other organization, entity, or group or individuals.

_____
(Signature of individual)

_____
Name of Business

CERTIFICATION OF TAX COMPLIANCE

Pursuant to MG c. 62C, § 49A and requirements of the City of Newton, the undersigned acting on behalf of the Contractor certifies under the penalties of perjury that the Contractor is in compliance with all laws of the Commonwealth relating to taxes including payment of all local taxes, fees, assessments, betterments and any other local or municipal charges (unless the Contractor has a pending abatement application or has entered into a payment agreement with the entity to which such charges were owed), reporting of employees and contractors, and withholding and remitting child support.*

_____ _____

**Signature of Individual
or Corporate Contractor (Mandatory)

*** Contractor's Social Security Number
(Voluntary) or Federal Identification Number

Print Name:_____

By: _____ Date: _____
Corporate Officer
(Mandatory, if applicable)

Print Name:_____

* The provision in this Certification relating to child support applies only when the Contractor is an individual.

** Approval of a contract or other agreement will not be granted until the City receives a signed copy of this Certification.

*** Your social security number may be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing or tax payment obligations. Providers who fail to correct their non-filing or delinquency will not have a contract or other agreement issued, renewed, or extended.

CERTIFICATE OF FOREIGN CORPORATION

The undersigned hereby certifies that it has been duly established, organized, or chartered as a corporation under the laws of:

(Jurisdiction)

The undersigned further certifies that it has complied with the requirements of M.G.L. c. 30, §39L (if applicable) and with the requirements of M.G.L. c. 156D, §15.03 relative to the registration and operation of foreign corporations within the Commonwealth of Massachusetts.

Name of person signing proposal

Signature of person signing proposal

Name of Business (Please Print or Type)

Affix Corporate Seal here

City of Newton

Purchasing Department
Nicholas Read *Chief Procurement Officer*
1000 Commonwealth Avenue
Newton Centre, MA 02459-1449
purchasing@newtonma.gov

Telephone
(617) 796-1220
Fax:
(617) 796-1227
TDD/TTY
(617) 796-1089

Mayor
Ruthanne Fuller

Date

Vendor

Re: Debarment Letter for Invitation For Bid 23-XX

As a potential vendor on the above contract, the City requires that you provide a debarment/suspension certification indicating that you are in compliance with the below Federal Executive Order. Certification can be done by completing and signing this form.

PART 2 - Debarment:

Federal Executive Order (E.O.) 12549 "Debarment and Suspension" requires that all contractors receiving individual awards, using federal funds, and all sub-recipients certify that the organization and its principals are not debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency from doing business with the Federal Government.

I hereby certify under pains and penalties of perjury that neither I nor any principal(s) of the Company identified below is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.

_____ (Name)
_____ (Company)
_ _____ (Address)
_____ (Address)
PHONE _____ FAX _____
EMAIL _____

_____Signature

_____Date

If you have questions, please contact Nicholas Read, Chief Procurement Officer at (617) 796-1220.

Form **W-9**
(Rev. October 2007)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: ☐ Individual/Sole proprietor ☐ Corporation ☐ Partnership
☐ Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶
☐ Other (see instructions) ▶

X Exempt payee

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

or

Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Date ▶ Name

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

Cat. No. 10231X Form **W-9** (Rev. 10-2007)

CONTRACT FORMS

The awarded bidder will be required to complete and submit documents substantially similar in form to the following.

These forms may need to be modified on account of changed circumstances, and are provided for informational purposes only.

INDEX

THE CITY OF NEWTON (the **City**) , a municipal corporation of the Commonwealth of Massachusetts, acting through its Commissioner of Public Buildings and its Chief Procurement Officer, but without personal liability to either, and
_____of __

(The **Contractor**) hereby mutually agree as follows:

ARTICLE 1 - THE CONTRACT DOCUMENTS

1.1 The Contract Documents form the contract between the **City** and the **Contractor** and are incorporated into this Contract by this reference. The Contract Documents represent the final and entire integrated agreement between the parties with respect to the Work under the Contract Documents. The Contract Documents supersede all prior oral or written agreements, if any, between the parties, and any statement, representation, promise or inducement not set forth in the Contract Documents is null and void, and not binding on either the **City** or the **Contractor**. The Contract Documents shall not in any way create a relationship of any kind between the **Architect** and the **Contractor**, or between the **City** and any Subcontractor, or Supplier, or any other person. The **Architect** shall, however, be entitled to performance and enforcement of obligations under the Contract which are consistent with the **Architect's** authority and responsibilities under the Contract Documents.

1.2. The Contract Documents, on the date when the **City** executes this Contract and which are attached to this Contract consist of the following:

This Contract, fully executed by the **City** and the **Contractor**, including:
Addenda_____ through _____.

The Project Manual for **GATH MEMORIAL POOL PROJECT AT 256 ALBEMARLE ROAD,** Wage Rate Requirements and Wage Rate Schedule including any updated prevailing wage rate schedules as applicable, General Conditions, and Technical Specifications, and Drawings, bearing the title, **GATH MEMORIAL POOL PROJECT AT 256 ALBEMARLE ROAD** dated May 15, 2023.

Advertisement for Bids and Instructions to Bidders.

Performance and Payment Bonds, fully executed by the **Contractor,** and the corresponding sureties.

The **Contractor's** Bid Form.

The Contract Documents itemized in this paragraph 1.2 are included with this Contract.

1.3 Other Contract Documents which will be issued after the date when the **City** executes this Contract consist of:

Change Orders signed by the **City**, regardless of whether or not they are signed by the **Contractor**.

Change Authorizations signed by the **Official**, regardless of whether or not they are signed by the **Contractor**.

Contract Amendments executed by both parties.

1.4 There are no Contract Documents other than those listed in this Article 1. The Contract Documents may be modified or supplemented as provided in the General Conditions.

ARTICLE 2 - GENERAL DESCRIPTION OF THE WORK

2.1 The **Contractor** shall furnish all of the materials and perform all of the Work required by the Contract Documents listed in Article 1.

ARTICLE 3 - THE ARCHITECT

3.1 The **City** has retained BH & A Architects PC, 10 Post Office Square, Boston Massachusetts 02109. to act as the **City's** representative, assume all duties and responsibilities of and have the rights and authority assigned to the **Architect** in the Contract Documents with respect to completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIME

4.1 Contract Time shall commence upon **Contractor's** receipt of Notice to Proceed. Such notice shall be provided upon the execution of this Contract by the Mayor of the **City** and the **Contractor** shall bring the Work to Substantial Completion on **May 31, 2024**, and to Final Completion on or before **August 5, 2024** as indicated in the Invitation for Bid. The **Contractor** represents to the **City** that the Contract Time is sufficient to perform the original scope of work in accordance with the Contract Documents.

4.2 The **City** and the **Contractor** recognize that the Contract Time(s) so specified are of the essence of this Contract, and the **City** will suffer financial losses if the Work is not completed within the Contract Time(s) specified plus any extensions authorized by Change Order. Accordingly, if the **Contractor** fails to complete the Work, or designated part of the Work, within the corresponding Contract Times, he shall pay the **City** liquidated damages in accordance with paragraph 4.2.1.

4.2.1 The **Contractor** agrees to allow the **City** to deduct from progress payments and retention and to pay to the **City** as liquidated damages, and not as a penalty, the amount of One Thousand, Five Hundred Dollars and No/Cents ($1,500.00) for each calendar day that expires after the Contract Time specified in paragraph 4.1 for Substantial Completion until the Work is Substantially Complete. The **Contractor** further agrees to allow the **City** to deduct from progress payments or retention and to pay to the **City** as liquidated damages, and not as a penalty, the amounts designated subject to the terms and conditions specified, for each day that expires after each of the Contract Time(s) specified for Substantial Completion or Partial Completion of each of those separable parts of the Work until each of the parts is so substantially or partially complete.

ARTICLE 5 - CONTRACT PRICE

5.1 The **City** shall pay and the **Contractor** shall accept, as full compensation for everything furnished, done by or resulting to the Contract in carrying out this Contract, subject to additions and deductions in the Contract Documents, the not to exceed Contract Price of _____
_____ DOLLARS
($_____). The **Contractor** agrees that the Contract Price complies with prevailing wage requirements and is sufficient to properly staff the Work within the Contract Time.

5.2 This Contract is subject to the availability of an appropriation therefor.

5.3 If the Contract is funded under a grant with the Federal Government, it is being executed without further appropriation pursuant

to M.G.L. Chapter 44, Section 53A.

5.4 If the amount of the City Comptroller's certification of available funds is less than the not to exceed Contract Price stated above, the City shall not be liable for any claims or requests for payment by the **Contractor** which would cause total claims or payments under this Contract to exceed the amount so certified by the City Comptroller.

5.5 Unless otherwise expressly provided in a writing incorporated herein by reference the amount certified by the City Comptroller as available funds under this Contract may be increased or decreased by the **Official** upon written notice to the **Contractor** bearing the written approval of such change by the Mayor of the City.. Such notice shall be sent or delivered to the **Contractor** at the **Contractor's** business address and shall take effect not less than seven (7) days after the date of such delivery or mailing. In the event of such decrease, the **Contractor** shall be compensated for services rendered to the effective date of such reduction, in accordance with the rates of compensation specified in this Contract.

5.6 Payments by the **Owner** to the **Contractor** will be made in current funds on the basis of the prices indicated on the **Contractor's** Bid Form, subject to the conditions governing payments to the **Contractor** given in the Contract Documents.

ARTICLE 6 - CONTRACTOR'S REPRESENTATIONS

6.1 The **Contractor** has not given, offered or agreed to give any person, corporation or other entity any gift, contribution or offer of employment as an inducement for, or in connection with, the award of this Contract.

6.2 No Subcontractor to or Subcontractor of the **Contractor** has given, offered or agreed to give any gift, contribution or offer of employment to the **Contractor**, or to any other person, organization, or entity as an inducement for, or in connection with, the award to the Subcontractor of a contract by the **Contractor.**

6.3 No person, corporation or other entity, other than a bona fide full-time employee of the **Contractor** has been retained or hired by the **Contractor** to solicit for or in any way assist the **Contractor** in obtaining this Contract upon an agreement or understanding that such person, corporation or other entity by paid a fee or other consideration contingent upon the award of this Contract to the **Contractor**.

ARTICLE 7 - MISCELLANEOUS

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

7.2 The **Contractor** shall perform all Work under this Contract as an independent contractor. The **Contractor** shall not be considered an agent of the **City**, nor shall his Subcontractors be considered agents of the **City**.

7.3 The **City** and the **Contractor** each binds itself, its partners, successors, assigns and legal representatives to the other party to this Contract, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

7.4 This Contract and the Contract Documents shall be governed by the Laws and Regulations of the Commonwealth of Massachusetts.

7.5 The **City** reserves the right to correct any error in any progress payment that may have been paid. The **City** reserves the right, should proof of defective Work be discovered after final payment, to claim and recover from the **Contractor** and his surety, or either of them, sufficient sums to correct or remove and replace the defective Work.

7.6 Any waiver by the **City** of any provision of the Contract Documents shall be specific and in writing, and shall apply only to the particular matter and not to other similar or dissimilar matters. Any waiver of any breach of this Contract shall not be held to be a waiver of any other or subsequent breach.

7.7 Nothing contained in this Contract shall in any manner authorize, empower or constitute the **Contractor**, his Subcontractors or Suppliers as agent(s) of the **City**; to assume or create any obligation or responsibility whatsoever, express or implied, on behalf of or in the name of the **City**; or to bind the **City** in any manner or make any representation, warranty, covenant, agreement or

commitment on behalf of the **City**. The **Contractor** shall perform all Work under this Contract as an independent contractor. This contract does not create and shall not be construed as creating, any rights enforceable by any person not a party to the Contract.

7.8 This Contract supersedes all prior oral or written agreements, if any, between the parties and constitutes the entire, integrated agreement between the parties with respect to the Work to be performed under the Contract Documents.

7.9 If any provision(s) of the Contract Documents is/are invalid, illegal or unenforceable, all other provisions of the Contract Documents shall nevertheless remain in full force and effect. If any provision of the Contract Documents is inapplicable to any person or circumstance, that provision shall nevertheless remain applicable to all other persons and circumstances.

7.10 It is the intent of the **City** and the **Contractor** that all provisions of Law required to be inserted or referenced in the Contract Documents are in fact inserted or referenced in the Contract Documents. If any provision of Law is not so inserted or referenced, or is inserted or referenced improperly, then each such provision shall be considered inserted or referenced in proper form at no increase in Contract Price or Contract Time.

7.11 The duties, obligations, criteria or procedures imposed by the Contract Documents and the rights and remedies made available are in addition to, and not in any way a limitation of, any rights and remedies which are otherwise allowed or imposed by Law, except that in the event a specific part or detailed requirement of a provision, criterion or procedure in the Contract Documents and a specific part or detailed requirement of a provision, criterion or procedure imposed by Law conflict, the specific part or detailed requirement of such provision, criterion procedure imposed by Law shall govern. All other specific parts or detailed requirements in the provisions, criteria or procedures of the applicable Law and the Contract Documents shall remain in full force and effect and be read with the controlling specific part or detailed requirement. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

7.12 The **Contractor** shall not sell, assign, transfer or otherwise convey any of his rights and shall not delegate any of his duties under this Agreement without the prior and express written consent of the **City** and the Surety. In its sole discretion the **City** may refuse to consent to any proposed assignment or delegation. Any attempted sale, assignment, transfer, conveyance or delegation in violation of this paragraph shall be void and shall relieve the **City** of any further liability under the Contract Documents but shall not relieve the **Contractor's** sureties of any liability. If the **City** consents in writing to an assignment, unless specifically stated to the contrary in the consent, the assignment shall not release or discharge the **Contractor** from any duty or responsibility set forth in the Contract Documents, and shall not release or discharge the Surety under the Bonds required by the Contract Documents.

7.13 This Contract shall be binding on the **City**, the **Contractor** and all of their respective successors and legal representatives and, if the **City** has consented to an assignment or delegation as provided in paragraph 7.12, assigns and delegates.

7.14 Unless otherwise specified in the Contract Documents, any notice or communication shall be in writing, and shall be deemed to have been given as of the time of actual receipt.

7.15 Unless otherwise specified in writing, any notice or other communication to the **City** or **Contractor** shall be duly served if delivered to the intended individual in person or to a member of the firm or entity, or to an officer of the corporation for which it was intended, at the corresponding address designated in this Agreement.

7.16 Any notice or other communication to the sureties furnishing the Performance and Payment Bonds shall be sufficiently given if delivered to the intended individual in person or to a member of the firm or entity, or to an officer of the corporation for which it was intended, at the address designated in the corresponding Bond.

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ARTICLE 8 – AVAILABILITY OF APPROPRIATION

8.1 This Contract is subject to an appropriation being available therefor.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed in quintuplicate under seal the day and year first above written.

CONTRACTOR

By_____

Print Name_____

Title_____

Date_____

Affix Corporate Seal Here

City funds in the amount of $_____
are available in account #:

_____

I further certify that the Mayor, or her designee is authorized to execute contracts and approve change orders.

By _____
Comptroller of Accounts

Date_____

CITY OF NEWTON

By_____
Chief Procurement Officer

Date _____

By_____
Commissioner of Public Buildings

Date _____

Approved as to Legal Form and Character

By _____
Associate City Solicitor

Date _____

CONTRACT AND BONDS APPROVED

By _____
Mayor, or her designee

Date _____

CERTIFICATE OF AUTHORITY - CORPORATE

1. I hereby certify that I am the Clerk/Secretary of _____
(insert full name of Corporation)

2. corporation, and that _____
(insert the name of officer who signed the **contract and bonds**.)

3. is the duly elected_____
(insert the title of the officer in line 2)

4. of said corporation, and that on _____
(insert a date that is ***ON OR BEFORE*** the date the officer signed the **contract and bonds**.)

at a duly authorized meeting of the Board of Directors of said corporation, at which all the directors were present or waived notice, it was voted that

5. _____ the _____
(insert **name** from line 2) (insert **title** from line 3)

of this corporation be and hereby is authorized to execute contracts and bonds in the name and on behalf of said corporation, and affix its Corporate Seal thereto, and such execution of any contract of obligation in this corporation's name and on its behalf, with or without the Corporate Seal, shall be valid and binding upon this corporation; and that the above vote has not been amended or rescinded and remains in full force and effect as of the date set forth below.

6. ATTEST: _____ *AFFIX CORPORATE SEAL HERE*
(Signature of **Clerk or Secretary**)*

7. Name: _____
(Please print or type name in line 6)*

8. Date: _____
(insert a date that is ***ON OR AFTER*** the date the officer signed the **contract and bonds**.)

* The name and signature inserted in lines 6 & 7 must be that of the Clerk or Secretary of the corporation.

CITY OF NEWTON, MASSACHUSETTS

PERFORMANCE BOND

Know All Men By These Presents:

That we, _____, as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the City of Newton as Obligee, in the sum of dollars **($**_____**)** to be paid to the Obligee, for which payments well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said PRINCIPAL has made a contract with the Obligee, bearing the date of ____ _, 2023 for the construction of _____ in Newton, Massachusetts.
(Project Title)

Now, the condition of this obligation is such that if the PRINCIPAL and all Sub-contractors under said contract shall well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of said contract on its part to be kept and performed during the original term of said contract and any extensions thereof that may be granted by the Obligee, with or without notice to the SURETY, and during the life and any guarantee required under the contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the SURETY of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise, it shall remain in full force, virtue and effect.

In the event, that the contract is abandoned by the PRINCIPAL, or in the event that the Obligee terminates the employment of the PRINCIPAL or the authority of the PRINCIPAL to continue the work said SURETY hereby further agrees that said SURETY shall, if requested in writing by the Obligee, take such action as is necessary to complete said contract.

In Witness Whereof, the PRINCIPAL and SURETY have hereto set their hands and seals this ___day of _____ 2023.

PRINCIPAL	SURETY
_____	_____
BY_____ (SEAL)	BY _____ (ATTORNEY-IN-FACT) (SEAL)
_____ (Title)	
ATTEST: _____	ATTEST: _____

CITY OF NEWTON, MASSACHUSETTS

PAYMENT BOND

Know All Men By These Presents:

That we,_____, as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the City of Newton as Obligee, in the sum of _____ dollars ($_____) to be paid to the Obligee, for which payments well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said PRINCIPAL has made a contract with the Obligee, bearing the date_____ of _____, 2023, for the construction of _____ (Project Title) in Newton, Massachusetts.

Now, the conditions of this obligation are such that if the PRINCIPAL and all Sub-contractors under said contract shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the SURETY of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, provisions of M.G.L. c.30, §39A, and M.G.L. c.149, §29, as amended, then this obligation shall become null and void; otherwise it shall remain in full force, virtue and effect.

In Witness Whereof, the PRINCIPAL and SURETY have hereto set their hands and seals this _____day of _____ _____,2023.

PRINCIPAL	SURETY
_____	_____
BY_____ (SEAL)	BY_____ (ATTORNEY-IN-FACT) (SEAL)
_____ (Title)	
ATTEST: _____	ATTEST: _____

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ARTICLE 1 - CONTRACT DOCUMENTS

1.1 Use of Terms:

1.1.1 The following terms used in this Section or elsewhere in the Contract Documents, shall have these meanings:

Addendum – A written modification, clarification, correction or other change to the Contract Documents issued by the Official prior to the date stated for the receipt of bids.

Application for Payment - The form furnished by the **Official** to be used by the **Contractor** in requesting payment, and which shall enclose the affidavit required in the Contract Documents.

Architect - The individual, partnership, corporation, joint venture, or any combination thereof, named as **Architect** in the agreement who will have the rights and authority assigned to the **Architect** in the Contract Documents. The term **Architect** means the **Architect** or its authorized representative.

Business Day - Any day except Saturdays, Sundays and legal holidays observed by the **City**. The term "day" means a calendar day.

Change Authorization - A written order executed by the **City** directing the **Contractor** to make changes in the Work or giving the basis for a potential change in Contract Price or Contract Time for incorporation into the Contract Documents by Change Order.

Change Order - A written instrument which when fully executed by the **City** amends the Contract Documents to provide for changes in the Work, or in Contract Price or Contract Time.

City - The City of Newton, a municipal corporation in the Commonwealth of Massachusetts, acting by its Public Buildings Commission, represented by the Director of the Public Buildings Department or his authorized representative.

Claim - A written demand of assertion by the **City** or **Contractor**, which is properly certified according to the requirements of Paragraph 15.2.1, seeking an adjustment in Contract Price and payment of monies due, an extension or shortening in Contract Time, the adjustment or interpretation of Contract terms, or any other relief arising under or relating to the Contract, after a determination by the **Architect** or **City** under the appropriate provision of the Contract Documents.

Contract/Contract Documents – This Agreement, fully executed; the Certificate of Authority; all Addenda; the Letter of Award; the Project Manual including MWBE/AA Requirements, Wage Rate Requirements and Wage Rate Schedule including any updated prevailing wage rate schedules as applicable, Supplementary Conditions; the General Conditions; the Drawings; the Specifications; the Invitation for Bids; the Contractor's bid; all bonds submitted; All Change Authorizations and Change Orders when fully executed.

Contract Time – The time commencing upon the date of execution of the Contract by the Mayor of the City and continuing through the date of Final Completion.

Contract Price – The not to exceed lump sum price representing full compensation for everything furnished, done by or resulting to the **Contractor** in carrying out the Contract.

Contractor - Person or firm named "The Contractor" in the Agreement with whom the **City** has awarded and entered into the Agreement.

Correction Period - The period of time within which the **Contractor** shall in accordance with the Contract Documents, either correct, or if rejected, remove and replace, defective Work.

Date for Commencement of the Contract Time - The date when the Contract Time starts to run.

Day – A calendar day.

Defective Work - Work that is unsatisfactory, deficient or damaged, does not conform to the Contract Documents, or does not meet the requirements of any inspection, test or approval.

Drawings – The graphic and pictorial part of the Contract Documents depicting the Work including plans, elevations, sections, details, schedules and diagrams Drawings shall not serve nor be used as Shop Drawings.

Final Acceptance - The **Official's** written notice to the **Contractor** accepting the Work, following the **Official's** concurrence with the **Architect's** determination that the Work has been completed and is acceptable.

Laws - Laws, including statutes, by-laws, rules, regulations, codes, resolutions and ordinances, or orders.

M.G.L. - Massachusetts General Laws.

Notice of Claim – A clearly marked written notice that states the general nature of the Claim delivered by the party making the Claim to the other party no later than thirty (30) days after the determination giving rise to the Claim.

Official - The Commissioner of the Public Buildings Department, acting on behalf of the **City** in the execution of the Agreement, or his/her authorized representative.

Owner - The City of Newton: see definition for "City".

Partial Utilization - Use by the **City** of a portion of the Work before reaching Substantial Completion for all the Work.

Progress Schedule – The Schedule which shows the **Contractor's** approach to planning, scheduling, and execution of the Work.

Project - The total construction of which the Work may be the whole, or a part, as indicated in the Contract Documents.

Site – The land on which the Project is located, indicated on the Site Drawings and showing its physical position in relation to the adjacent lands.

Specifications - Parts of the Contract Documents consisting of written requirements for technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and performance of related services.

Sub-agreement – A subcontract or purchase order awarding part of the Work to a Subcontractor or Supplier.

Subcontractor - A person having a Sub-agreement for performing labor at the site, or for performing labor and furnishing materials/equipment. *Filed sub-bid Subcontractor is one who performs a sub trade for which the City requested filed sub-bids.*

Submittals - Includes Shop Drawings, brochures, samples, and all those other documents required for submission by the Contract Documents. The term *Shop Drawings* includes drawings, diagrams, illustrations, standard schedules, performance charts, instructions, and other data prepared by or for the **Contractor** to illustrate some part of the Work, or by a Supplier and submitted by the **Contractor** to illustrate items of materials or equipment.

Substantial Completion - Either the Work has been completed except for Work items representing less than one percent (1%) of the adjusted Contract Price, or completed and opened to public use except for minor incomplete or unsatisfactory items that do not materially impair the usefulness of the Work required by the Contract.

Supplier - A manufacturer, fabricator, distributor, materialman or vendor having a Sub-agreement for furnishing materials and equipment and/or not for performing labor at the site.

Total Float - Number of Business Days by which Work may be delayed from its Early Dates without necessarily extending the Contract Times. *Contract Float* is the number of Business Days between the **Contractor's** anticipated date for early completion of all or part of the Work and the corresponding Contract Time.

Underground Utilities - All pipelines, conduits, ducts, cables, wells, tanks, tunnels, and appurtenances, or other similar facilities, installed underground to furnish: water, electricity, gases, steam, petroleum products, telephone, communications, cable TV, sewerage and drainage removal, traffic, or control systems.

Work - The entire completed construction, or its various parts, as specified in the Contract Documents. Work is the result of performing and furnishing all services, obligations, responsibilities, labor, materials, equipment, temporary facilities, and incidentals necessary to complete the scope under the Contract Documents. Whenever the term "execution" is used with reference to the Work, it includes the performance and/or furnishing of the Work.

1.1.2 Any period of time in days will be computed to exclude the first and include the last day. If the last day falls on a non-Business Day, it shall be omitted from the computation. The term "registered mail" includes certified mail with return receipt requested. The term "person" means individuals, firms, partnerships, corporations, receivers, trustees, joint ventures, and any combinations of them. The term "State" or "Commonwealth" means the Commonwealth of Massachusetts.

1.1.3. Other terms used in this Section shall have the meanings assigned to them elsewhere in the Contract Documents, and if not assigned and where the context will permit, as used or defined in Massachusetts General Laws (M.G.L.).

1.2 Interpretations:

1.2.1. Whenever the term "the **Contractor**" is used concerning an action, obligation or event, it shall cover, even if not expressly stated, actions or obligations of, events involving, any Subcontractor, Supplier, or anyone for whom any of them may be liable, unless the context requires otherwise.

1.2.2. Whenever a provision obligates the **Contractor** to reimburse the **City** for certain costs incurred, the **City** is entitled to withhold a corresponding set-off against any payment, and to amend the Contract Price accordingly.

1.2.3. Whenever a provision covering delay, extension, or acceleration which in the Contract Documents covers delay, rescheduling, extended performance, disruption, interference, inefficiency, productivity, and production losses, acceleration, or hindrance and associated cost(s) for which the **City** is not responsible, or which is not unreasonable under the circumstances, or which was within the contemplation of the parties, specifies that "the **City** shall authorize the necessary change in Contract Time **only**", the authorized change in Contract Time shall be the **Contractor's** sole and exclusive remedy with respect to the **City** for any such delay, extension, or acceleration, however caused, resulting from the event contemplated by that provision.

1.2.4 A provision requiring the **Contractor** to "defend, indemnify and hold harmless the **City** and the **Architect..**" or covering claims against or liability of the **City** and/or the **Architect**, shall include the **City** and **Architect**, their respective consultants, agents, directors, officers, shareholders and employees and any combination of any of them, and the **City's** agencies or department issuing permits covering the Work. A provision requiring the **Contractor** to so defend, indemnify and hold harmless the **City** and **Architect** shall also require the **Contractor** to defend, indemnify and hold harmless the **City** and **Architect**, as interpreted, from and against all of the specified claims, including those caused in part by the negligence or other liability-creating conduct or omissions of the **City** or **Architect**. The **Contractor** shall not be required to indemnify the **City** or **Architect** against liability for loss or damage resulting from the sole negligence of the **City** or **Architect**.

1.2.5 Any reference to an Article or paragraph in these General Conditions, without identification of the particular Section, shall mean a reference to these General Conditions. Terms capitalized in these General Conditions include terms defined in paragraph 1.1.1 or paragraph 1.1.3.

1.2.6 Each Article in this Section contains sub-articles, numbered as this sub-article 1.2 is numbered; parts, numbered as this part 1.2.6 is numbered; and sub-parts - all of which are considered "paragraphs". A reference to a paragraph means a reference to the entire sub-article, a part, or a sub-part, or any combination of them, depending on the intent of the reference.

1.3 Applicable Law:

1.3.1 This Contract is made subject to all laws of the Commonwealth of Massachusetts.

1.3.2 If the Contract Documents contain any unlawful provisions, such unlawful provisions shall be of no effect. Upon the application of either party, the unlawful provision shall be considered stricken from the Contract Documents without affecting the remainder of the Contract Documents.

1.3.3 All provisions of law required to be inserted in the Contract Documents shall be and are inserted herein. If through mistake, neglect, oversight or otherwise, any such provision is not herein inserted or inserted in improper form, upon the application of either party, the Contract Documents shall be changed by the **City**, at no increase in Contract Price or extension in Contract Time, so as to strictly comply with the law and without prejudice to the rights of either party hereunder.

1.4 Intent of the Contract Documents:

1.4.1 It is the intent of the Contract Documents to describe and provide for a functionally complete Project, or Work, to be constructed in accordance with the Contract Documents. In addition to the work expressly called for in the Drawings and Specifications, any other Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be provided, at no increase in Contract Price or extension in Contract Time, and without requiring any changes in the Work, whether or not specifically called for.

1.4.2 Except as otherwise provided in the Contract Documents, words which have an accepted technical or trade meaning used to describe any Work, materials or equipment, shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, whether specifically or by implication, shall mean the latest standard specification, manual, code in effect at the date established for receipt of Sub-Bids, unless otherwise expressly stated.

1.4.3 Except as provided by the requirements of M.G.L. Chapter 149, Section 44F, the Divisions and Sections of the Specifications and the identification of any Drawings shall (a) not control the **Contractor** in delineating Work to be performed by specific suppliers, and (b) be complementary, and anything mentioned or shown in a Division or in a specific Drawing shall be of like effect as if shown in all divisions of the specifications and all Drawings.

1.4.4 Whenever the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of similar effect are used to describe a requirement, direction, review or judgment of the **Architect** (or the **City**) as to the Work, it is intended that the requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents. No use of any such term or adjective mentioned above, or provision of any standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the **Official**, the **Contractor**, or the **Architect**, or any of their consultants, agents or employees from those assigned in the Contract Documents, nor shall it be effective to assign to the **Official** or the **Architect**, or any of their consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of the Contract Documents.

1.5 Priority of the Contract Documents:

1.5.1 The Contract Documents are complementary, and anything mentioned or shown in a part of the Contract Documents shall be of like effect as if shown in all parts of the Contract Documents. In resolving conflicts, the Contract Documents shall be given the priority determined by the **Architect**, with regard to matters affecting the design of the Work, and the **Official**, with regard to all other matters, to be consistent with their intent and necessary to produce the intended result. Subject to such interpretation by the **Architect** or **Official**, the Contract Documents shall be interpreted on the basis of the following priorities, the first listed having the highest priority:

.1 Change Orders, Change Authorizations, and written amendments to the Contract, those dated later taking precedent over those dated earlier;

.2 Owner-Contractor Agreement;

.3 General Conditions;

.4 Technical Specifications; and

.5 Drawings.

1.5.2 If the issue of priority involves the Technical Specifications and the Drawings, figured dimensions shall govern over scaled dimensions. Work not particularly shown, identified, sized, or located shall be the same as similar Work that is shown or specified. Detail Drawings shall govern over general Drawings, larger scale Drawings take precedence over smaller scale Drawings and Contract Drawings govern over Shop Drawings. Whenever notes, specifications, dimensions, details, or schedules in the Specifications or in the Drawings, or between the Specifications and the Drawings, or between Change Order or Change Authorization Drawings and Contract Drawings, conflict, the higher performance requirement shall be furnished by the **Contractor** at no increase in the Contract Price or the Contract Time.

1.5.3 Compliance with these priority conditions shall not justify any changes in the Work, or any increase in Contract Price or Contract Time, unless any such compliance results in Work that may not reasonably be inferred from the Contract Documents as being required to produce the intended result.

1.6 Information and Instructions for Contract Documents:

1.6.1 The **Contractor** shall carefully study all contract Documents and other instructions from the **Architect** and the **Official** as they are delivered, and procure from the **Architect** such special information, detailed drawings, etc., as may be necessary for the proper performance of the Work.

1.6.2 Where drawings show outline or descriptive representations of repetitive features, the **Contractor** shall construe them in exact accordance with the corresponding features which are common to similar items or materials and which are completely drawn and specified.

1.6.3 Where the statement "Consult Drawing No. __" or "Refer to Drawing No. __" occurs in the Specifications, such references to a Drawing have been made solely for the convenience of the **Contractor** to help identify the item under consideration and to locate the typical detail of such item in the set of Contract Drawings. It is not the intention of such references, however, to list each and every Drawing on which a certain item may occur.

1.7 Ownership and Use of the Contract Documents:

1.7.1 Unless otherwise provided in the Supplementary Conditions, the **Official** shall furnish to the **Contractor** one (1) copy of the Contract Documents at no cost.

1.7.2 Neither the **Contractor**, nor any Subcontractor or Supplier shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other Contract Documents, and they shall not reuse any of them on extensions of the Project or any other project without prior written consent of the **City** and the **Architect**. The **Contractor**, Subcontractors and Suppliers are granted a limited license to use and reproduce portions of the Contract Documents as appropriate for use in the execution of the Work. Copies made under this license shall bear the copyright notice shown on the Contract Documents.

1.7.3 All work papers, questionnaires and other written material prepared or collected by the **Contractor** in the course of completing the Work to be performed under this Contract shall at all times be the exclusive property of the **City**. The **Contractor** shall not use such materials for any purposes other than the purpose of this Contract without the prior written consent of the **Official**.

1.8 Relationship with the City:

1.8.1 The **Contractor** is retained solely for the purpose of and to the extent set forth in the Contract Documents. The **Contractor's** relationship to the **City** during the term of this Contract shall be that of an independent Contractor. The **Contractor** shall have no capacity to involve the **City** in any contract nor to incur any liability on the part of the **City**. The **Contractor**, its agents or employees shall not be considered as having the status or pension rights of an employee; provided that the **Contractor** shall be considered an employee for the purpose of M.G.L. Chapter 268A (the Conflict of Interest Law). The **City** shall not be liable for any personal injury to or death of the **Contractor**, its agents or employees.

1.8.2 The **Contractor** shall be solely responsible for construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work unless the Contract Documents give other specific instructions concerning these matters. Where the terms and conditions for the delivery or provision of goods or services by the **Contractor** to the City are expressly set forth in the Contract Documents or are incorporated herein by reference, those terms and conditions shall be complied with by the **Contractor**.

1.8.3. Before they can be binding on the Parties, all amendments to the Contract must be in writing and signed by the **Official** and the **Contractor,** approved as to the availability of a sufficient appropriation and filed with the City Comptroller, and signed by the Mayor of the City.

ARTICLE 2 - THE CITY - GENERAL PROVISIONS

2.1 The City May Stop the Work:

2.1.1 If the Contractor fails to correct work which is not in accordance with the requirements of the Contract Documents or, If the Work is *defective*, or the **Contractor** fails to provide sufficient skilled workers or suitable materials or equipment, or fails to execute Work so that in the judgment of the **City** the completed Work will conform to the Contract Documents, the **City** may order the **Contractor** to stop all or part of the Work in question, until the problem has been corrected. This right of the **City** to stop the Work shall not create or impose any duty on the **City** to exercise this right for the benefit of the **Contractor** or any other party. The **Contractor** shall remain responsible for maintaining progress, and shall not be entitled to any increase in

Contract Time or Contract Price, and the **Contractor** shall reimburse the **City** for all direct, indirect or consequential costs incurred by the **City** and attributable to such an order to stop the Work.

2.2 Availability of Lands (Including Properties):

2.2.1 The Contract Documents indicate the lands upon which the Work is to be performed, including rights-of-way and easements for access that are furnished by the **City**.

2.2.2 Any additional lands, rights-of-way and easements not furnished that the **Contractor** deems necessary shall be obtained by the **Contractor** at no increase in Contract Price or Contract Time. The **Contractor** shall obtain and submit to the **City** all required permits from the State, the proper Federal Government agency, Public Governmental Body or public utility or form the property owner(s) for the use of lands and access so obtained.

2.3 Reference Points:

2.3.1 The **City** through the **Architect** shall provide reference points and the **Contractor** will stake such points and will verify them in the field if requested to do so. The **Contractor** shall be responsible for laying out the Work, protecting and preserving those reference points, and he shall make no changes at all without the prior written approval of the **Architect**. The **Contractor** shall: report to the **Architect** whenever any reference point is lost or destroyed or requires relocation due to necessary changes in grades or locations; be responsible for the accurate replacement or relocation of any lost or destroyed reference points by professionally qualified personnel; and assume any resultant cost or delay.

2.4 Clerk of the Works:

2.4.1 A Clerk of the Works may be engaged by the **City** for this Project. In the event that a **Clerk of the Works** is so engaged, he/she shall not, have any authority to order any changes in the Work, nor to make any decision relating to arrangement, design or construction, or to the disposition of materials or workmanship, or to the conduct of the Work without the written authorization of the **Official**.

2.4.2 The **Clerk of the Works** shall have access to the premises and all areas of the Project at all times. The **Contractor** shall provide full cooperation to the Clerk in the performance of his/her duties.

2.5 Limitations on the City's Responsibilities

2.5.1 The **City** is not responsible for the **Contractor's** means, methods, techniques, sequences or procedures applicable to the Work; nor for safety precautions and programs related to safety. The **City** is not responsible for the **Contractor's** failure to execute the Work in accordance with the Contract Documents; nor for the acts or omissions of the **Contractor** or of any Subcontractor, any Supplier or anyone for whose acts the **Contractor** or any of the Subcontractors or Suppliers may be liable.

2.5.2 Neither the **City** nor the **City's** consultants are responsible for the acts or omissions of the **Contractor** or of any Subcontractor, any Supplier, or anyone for whose acts the **Contractor** or any of the Subcontractors or Suppliers may be liable.

2.5.3 The **City's** authority to review any of the **Contractor's** Progress Schedules, or the **City's** decision to raise or not to raise any objections about such Progress Schedule Submittals, shall not impose on the **City** any responsibility for the timing, planning, scheduling or execution of the Work, nor in any way give rise to any duty or responsibility on the part of the **City** to exercise this authority for the benefit of the **Contractor**, any Subcontractor or Supplier, or any other party.

2.5.4 Neither the **City's** authority to review the **Contractor's** certificates and policies of insurance as set forth in the Instructions to Bidders, nor the **City's** decision to raise or not to raise any objections about those certificates and policies, shall in any way give rise to any duty or responsibility on the part of the **City** to exercise this authority for the benefit of the **Contractor**, any Subcontractor or Supplier, or any other party.

2.6 No Waiver of Legal Rights:

2.6.1 The **City** reserves the right to correct any error in any progress payment that may have been paid. The **City** reserves the right, should proof of *defective* Work be discovered after final payment, to claim, and recover from the **Contractor** and his surety, or either of them, sufficient sums to correct, or remove and replace, the *defective* Work.

2.6.2 Any waiver by the **City** or the **Official** of any provision of the Contract Documents shall be in writing, and shall apply only to the particular matter concerned and not to other similar or dissimilar matters. Any waiver of any breach of this Contract shall not be held to be a waiver of any other or subsequent breach.

2.7 Miscellaneous Provisions:

2.7.1 Written communications from the **Official** to the **Contractor** will in general be issued directly to the **Contractor** with copy to the **Architect**. Written communications from the **Contractor** to the **Official** shall be issued to the **Official** with copy to the **Architect**.

2.7.2 Any written direction or interpretation issued by the **Architect** to the **Contractor** must contain the formal endorsement thereon by the **Official**, or the **Official's** representative, for it to be considered valid or effective.

2.7.3 If the **City** retains another person for the Project or the Work who is not the **Architect's** agent or employee, the duties, responsibilities and limitations of authority of that person will be provided in the Supplementary Conditions.

2.7.4 The **City** shall make payments to the **Contractor** as provided in the Contract Documents, and as required by Law.

2.7.5 The **City** may issue unilaterally, or negotiate, at the **City's** discretion, Change Orders and Change Authorizations as provided in Article 11 of the General Conditions. Except as recognized under paragraph 11.1.3, only the **City** is empowered under the Contract Documents to order or cause changes in the Work.

2.7.6 The **City** may unilaterally delay all or any part of the Work and correspondingly adjust or negotiate adjustments in Contract Price or Contract Time, as provided in Article 11 of the General Conditions. Except as recognized in paragraph 7.5, only the **City** is empowered under the Contract Documents to order or cause **City**-caused delays to all or any part of the Work.
2.7.7 Decisions for which the **City** is responsible under the Contract Documents shall be made promptly and, in any event, within thirty (30) days after receipt of written submission but if a decision requires extended investigation and study, it will be made as permitted by M.G.L. Chapter 30, Section 39P.

2.8 Rights to Data

2.8.1 All data consisting of, but not limited to plans, drawings designs, specifications, computer programs, technical reports and operating manuals delivered, developed or produced or paid under the requirements of the Contract Documents shall be the property of the **City**. The **City** maintains all rights to such data including the right to use, duplicate, and disclose, it in whole or in part, in any manner and for any purpose. If that data is copyrightable, the **Contractor** may copyright it subject to the right of the **City**. The **City** reserves a royalty-tree, nonexclusive and irrevocable license to use, duplicate, publish and disclose such data, in whole or in part, and to authorize others to do so. The **City** shall include provisions to implement, maintain and effectuate the provisions of these rights in all Sub-agreements which produce copyrightable data.

2.9 Contractor Evaluation

2.9.1 As required by M.G.L. Chapter 149, §§44D(7) and (16) and 810CMR 8.00 *et seq*., the **City** will submit a completed Standard Contractor Evaluation Form to the Division of Capital Asset Management (DCAM) for the **Contractor** and each Subcontractor, with a copy to the Contractor/Subcontractor. The evaluation will be submitted within 70 days for the **Contractor** and within 90 days for the Subcontractors from the completion of the Project or from the date of termination of the Contractor or Subcontractor. At approximately 50% completion of the Project the **City** will advise the **Contractor** of the **City's** preliminary evaluation for informational purposes. The Standard Contractor Evaluation Form will rate the performance of the **Contractor** and Subcontractors, and will be completed by the **City's** Project Manager. The **City** will not negotiate the contents of the Contractor Evaluation Form or the Project rating for any reason.

ARTICLE 3 - THE ARCHITECT-GENERAL PROVISIONS

3.1 General:

3.1.1. In the event of the termination of the employment of the **Architect**, the **City** may appoint an **Architect** whose status under the Contract Documents shall be that of the former **Architect**. Nothing in these Contract Documents shall create a contractual relation between the **Architect** and the **Contractor**.

3.1.2. The **Architect** will make on-site observations at appropriate intervals to observe the quality of in-progress and completed Work, and to determine whether the Work is being executed so that the Work, when completed, will be in accordance with the Contract Documents. Based on those on-site observations, the **Architect** will endeavor to guard the **City** against *defective* Work and will keep the **Official** informed of the progress of the Work.

3.1.3. The **Architect** will have authority to disapprove or reject Work that the **Architect** believes to be *defective* Work. When the **Contractor** has been notified by the **Architect** of rejection of *defective* work, the **Contractor** shall take prompt action to correct the *defective* work.

3.1.4 On-site observations by the **Architect** or any project representatives of the **City** shall not relieve the Contractor from the obligation to perform the Work in accordance with the Contract Documents, or represent acceptance of defective work, nor give rise to any duty on their part to make the observations for the benefit of the **Contractor** or any other person.

3.2 Interpretations: Time for Decisions, Approval:

3.2.1. The **Architect** will be the initial interpreter of the requirements for the Contract Documents, and in such capacity will render determinations as to the acceptability of Work performed, subject to the provisions of paragraph 3.2.4. Unless otherwise provided in the Contract Documents, notices, proposals, or other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents shall be referred initially to the **Architect** in writing with a request for a written decision, which the **Architect** will render within a reasonable time. Once given, the **Architect's** determination shall be final and binding on the **Contractor** unless the **Contractor** delivers to the **Official** written notice of a claim within thirty (30) days after receipt of such determination, in which case the provisions of Article 15 will apply.

3.2.2. When functioning as interpreter and making determinations the **Architect** will not be liable for any interpretation or determination rendered in good faith. The rendering of an interpretation or other determination by the **Architect** about any notice, request or other matter will be a requisite to the exercise by the **Contractor** of any rights or remedies the **Contractor** may otherwise have under the Contract Documents or by Law concerning any claim, dispute or other similar matter.

3.2.3 A decision on interpretation of the Specifications, approval of equipment, material or any other approval, or progress of the work, shall require that the decision be made promptly and, in any event, no later than thirty (30) days after the written submission for decision; but if such decision requires extended investigation and study, the **Official** or **Architect** shall, within thirty (30) days after the receipt of the submission, give written notice of the reasons why the decision cannot be made within the thirty (30) day period and the date by which the decision will be made.

3.2.4 In giving instructions, the **Architect** shall not have the authority to direct any change in the Work, whether or not involving extra cost, without the prior written authorization of the **Official** in each instance.

3.3 Limitations on the Architect's Responsibilities

3.3.1 Neither the **Architect's** authority to act under this Article 3 or elsewhere in the Contract Documents nor any decision made by the **Architect** in good faith to exercise or not to exercise such authority shall give rise to any duty or responsibility of the **Architect** to the **Contractor**, any Subcontractor, any Supplier, any surety for any of them, or any other person.

3.3.2 The **Architect** is not responsible for the **Contractor's** means, methods, techniques, sequences or procedures applicable to the Work, or safety precautions and programs concerning safety. The **Architect** is not responsible for the **Contractor's** failure to perform or furnish the Work in accordance with the Contract Documents. Nor is the **Architect** responsible for the acts or omissions of the **Contractor** or of any Subcontractor, any Supplier, or of anyone for whose acts any of them may be liable.

3.4 Clarifications and Interpretations; Unit Price Work:

3.4.1 The **Architect** will issue, within a reasonable period of time, written clarifications or interpretations of the requirements of the Contract Documents, as the **Architect** may determine necessary, which shall be consistent with or reasonably inferable from the intent of the Contract Documents.

3.4.2. The **Architect**, subject to a prior review with the **Official**, will make determinations about the actual quantities and classes of Unit Price Work done by the **Contractor**.

3.4.3. Any clarification, interpretation or determination by the **Architect** under this paragraph 3.4 shall be final and binding on the **Contractor** unless the **Contractor** delivers to the **City** written notice of a change as provided in paragraph 11.1.3 within thirty (30) days after receipt of that decision.

ARTICLE 4 -THE CONTRACTOR -GENERAL PROVISIONS

4.1 General Responsibility

4.1.1. The **Contractor**, all Subcontractors, and all parties employed on the Work, shall perform their Work in a good and workman like manner and in accordance with the Contract Documents.

4.1.2. The **Contractor** shall not assign the whole or any part of the work under this Contract or any monies due or to become due hereunder without prior written consent of the Official. In the event that the **Contractor** assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the **Contractor** shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

4.1.3. The **Contractor** shall conform to all determinations and directions of the **Official** in accordance with provisions of the Contract Documents concerning all questions which may arise relating to the Work.
4.1.4 The Contractor shall comply with and give all notices required by laws, ordinances, codes, rules and regulations and lawful orders of public authorities applicable to performance of the Work.

4.2 Review of the Contract Documents:

4.2.1. Before undertaking each part of the Work, the **Contractor** shall study and compare the Contract Documents with each other, verify pertinent figures and applicable field measurements, and coordinate related requirements for dependent Work such as location, dimensions, fit, completeness, consistency, etc.

4.2.2. The **Contractor** shall notify the **Architect** in writing of any conflict, error or omission in the Contract Documents the **Contractor** recognizes, and shall obtain a written interpretation or clarification from the **Architect** before proceeding with any affected Work. Unless authorized by the **Official** in writing, any work done by the **Contractor** prior to obtaining that interpretation or clarification which is directly or indirectly affected by same, will be at the **Contractor's** risk and the **Contractor** shall bear all resulting costs and delays. The **Contractor** shall be responsible for any costs or delays resulting from any unnecessary requests for clarification submitted to the **Architect** by the **Contractor** that can be determined from the Contract Documents.

4.2.3. If the **Contractor** performs Work which involves a conflict, error or omission, he shall assume responsibility for that performance and shall bear all resulting costs and delays, as long as he actually recognized the conflict, error, or omission or if he should have reasonably have recognized it by reason of, but not limited to, the **Contractor's** Bid estimate or usage of the trade.

4.3 Supervision and Project Management:

4.3.1. The **Contractor** shall supervise and direct the Work competently, applying the skills, expertise and attention necessary to perform the Work in accordance with the Contract Documents. The **Contractor** shall be solely responsible for any means, methods, techniques, sequences and procedures applicable to the Work, unless a specific means, method, techniques, sequence or procedure is indicated in or required by the Contract Documents. The Contractor shall be responsible to the **City** for acts and omissions of the Contractors' employees, subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the **Contractor** or any of its subcontractors. The **Contractor** shall be responsible to see that the finished Work complies accurately with all of the Contract Documents and all approved Submittals.

4.3.2. The **Contractor** shall at all times keep on the site a competent resident superintendent, properly licensed, for the entire Work and a competent foreman for each specialty trade. The superintendent shall not be assigned or replaced without written notice to the **Official**. If the **Official** objects to the **Contractor's** superintendent, whether initially or otherwise, the **Contractor** shall submit a replacement superintendent at no increase in Contract Price or Contract Time. The superintendent shall be the **Contractor's** representative at the site and have authority act on his behalf.

4.3.3. The **Contractor's** project superintendent and similar authorized representatives of any Subcontractor, Supplier or other person or organization shall attend all meetings, as requested by the **Official** or the **Architect** at no increase Contract Price. Such meetings shall include attendance at weekly construction progress meetings.

4.3.4. The **Contractor** shall, upon written request of the **Official**, remove from **City** premises and replace all individuals in the **Contractor's** employ whom the **Official** determines to be disorderly, careless or incompetent or to be employed in violation of the terms of the Contract Documents.

4.4 Personnel, Materials and Equipment:

4.4.1 The **Contractor** shall provide competent, properly licensed, suitably qualified and reliable personnel to survey and lay out the Work and furnish and perform the Work as required by the Contract Documents. The **Contractor** shall at all times enforce strict discipline and maintain good order at the site.

4.4.2. Unless otherwise provided in the Contract Documents, the **Contractor** shall furnish, pay for and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water (including water for testing, flushing, and construction), sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

4.4.3. All materials and equipment shall be of good quality and new, unless otherwise allowed, and the **Contractor** shall furnish satisfactory evidence (including reports of required tests) as to their kind and quality. Materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned following the manufacturer's and Supplier's instructions, unless otherwise provided in the Contract Documents. All materials and equipment shall be properly protected against damage throughout the furnishing and performance of the Work so that they remain of good quality and in the as-new condition. For each item, the **Contractor** shall furnish complete information as to preventive maintenance and operating requirements, parts lists in sufficient detail to facilitate ordering replacements, and any applicable special condition. Should the manner or method of installation, specified performance or test results be contrary to the manufacturer's recommendations, the **Contractor** shall promptly notify the **Architect** in writing of that conflict before proceeding with that Work; otherwise, he shall be deemed to have certified that Specifications will be met by the materials or equipment.

4.5 Wage Rates:

4.5.1. The rate per hour of the wages to be paid to mechanics and apprentices, teamster, chauffeurs, and laborers in the Work to be performed under this Contract shall be not less than the rate of wages in the schedule entitled "Schedule of Prevailing Wage Rates," as determined by the Department of Labor and Workforce Development of the Commonwealth of Massachusetts. This schedule shall continue to be the minimum rate of wages for said employees during the life of this Contract. The **Contractor** shall keep posted on the site of the Work a legible copy of said schedule of Minimum Wage Rate and Health and Welfare Fund and Pension Fund Contributions. Apprentices employed pursuant to this determination of wage rates must be registered and approved by the State Apprenticeship Council. Wherever rates for journeymen or apprentices are not listed, and if any other labor is not included in this list, the **Contractor** shall insert the rates of all those employed on the Work.

4.5.2. The **Contractor** shall pay to any reserve police officers employed by him, if any, the prevailing wage rate paid regular City of Newton police officers. Such police officers shall be covered by Worker's Compensation Insurance and Employer's Liability Insurance by the **Contractor**.

4.5.3. The **Contractor** shall keep on file at the site the wage rates and classifications of all labor employed in the work in order that they may be available for inspection by the **Official** or the **Architect**.

4.6 Working Hours:

4.6.1. No laborer, workman, mechanic, foreman, or inspector working within the Commonwealth in the employ of the **Contractor**, Subcontractor, or others shall be required or permitted to work more than 8 hours in any one day, or more than 48 hours in any one week, or more than 6 days in any one week, except in cases of emergency.

4.6.2. Unless otherwise required under the Contract Documents, or directed in writing by the **Official**, all Work shall be performed during the regular working hours. However, if the **Contractor** desires to carry on the work outside of regular working hours or on Saturdays, Sundays, federal legal holidays, or City recognized holidays, he may submit application to the **Official** no less than 48 hours in advance to date and time of such work. The Contractor shall allow ample time to enable satisfactory arrangements to be made for inspecting work in progress and shall bear all costs with respect thereto, including the cost of the **City's Clerk of the Works**. Any approval by the **Official** of the **Contractor's** request for carrying out Work outside of regular working hours, overtime or shift Work, or any schedule acceleration measures will not be grounds for any increase in Contract Price or an extension in Contract Time. The Contractor shall also be aware of the time restrictions imposed on construction activities by the City's Noise Ordinance, Sec. 20-13 of the City of Newton Revised Ordinances, and shall apply for permits for exemptions when work will exceed the time restrictions.

4.7 Equal Employment Opportunity:

4.7.1. The **Contractor** shall assume, and shall require each Subcontractor to assume, the obligation to take whatever affirmative actions are necessary to ensure that employees and applicants for employment under this Contract, are treated equally irrespective of race, color, religious creed, national origin, sex, gender identity, sexual orientation, age or ancestry. The term "treated"

shall mean and include without limitation the following: recruited, whether by advertising or other means; compensated, whether in the form of rates of pay or otherwise; selected for training including apprenticeship; promoted; upgraded; demoted; downgraded; transferred; laid-off; and terminated.

4.7.2. Neither the **Contractor** nor any Subcontractor shall discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, sex, gender identity, sexual orientation, age, or ancestry.

4.7.3. The **Contractor** and all Subcontractors shall carry out the requirements pertaining to equal employment with the diligence that they apply to any other part of the Contract.

4.8 Lodging, Boarding, and Trading of Employees:

4.8.1. Every employee in the Work shall be allowed to lodge, board and trade where and with whom he/she elects and the **Contractor** shall not directly or indirectly require as a condition of employment in the Work that an employee shall lodge, board, or trade at a particular place or with a particular person.

4.9 Preference in Employment:

4.9.1. The **Contractor** and each Subcontractor shall give preference in the employment of mechanics and apprentices, teamsters, chauffeurs and laborers, first to the citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement of their employment, and who are veterans as defined in M.G.L. Chapter 4, Section 7, clause 43, and who are qualified to perform the Work to which the employment relates; and secondly, to citizens on the Commonwealth generally, and if they cannot be obtained in sufficient numbers, then to citizens of the United States; and shall give preference to veterans and citizens who are residents of the City of Newton.

4.10 Substitutes or "Or-Equal" Items:

4.10.1. Whenever materials or equipment are described in the Contract Documents by using a brand name, make, manufacturer, supplier or specification, the naming or specification of the item is intended to denote the essential characteristics of the item desired pursuant to M.G.L. Chapter 30, Section 39M(b). Unless words indicating that no substitution is permitted are used, items from prospective suppliers may be accepted by the **Official** if sufficient information is submitted by the **Contractor** in his written application for the substitution to allow the **Official** to determine whether the material or equipment proposed (1) will perform at least equally well the functions and achieve the results called for by the general design concept, (2) is at least of equal materials of construction, quality and necessary essential design features, (3) is suited to the same use as that named or specified, (4) conforms substantially to the desired detailed requirements for that item, including but not limited to, durability, strength, appearance, aesthetics (where aesthetics are essential), safety, service, useful life, reliability, economy of operation and ease of maintenance, (5) evidences a proven record of performance, (6) will yield net savings to the **City**, and (7) will not impact the Construction Progress Schedule and will not extend any Contract Time(s).

4.10.2. Each application for a substitution shall certify that the proposed substitute will meet each of the first six (6) criteria itemized in paragraph 4.10.1, and that the evaluation and acceptance by the **Official** of the proposed substitute will not prejudice completion of the Work within the limits of the Construction Progress Schedule and the Contract Time. Each application shall certify whether or not acceptance of the substitute will require a change in any of the Work or any of the means, methods, techniques, sequences or procedures applicable to the Work indicated in or required by the Contract Documents, or in work performed by the **City** or others, and whether or not incorporation or use of the substitute is subject to payment of any license fee or royalty. All variations of the substitute from the item named or specified shall be identified (operation, materials, or construction finish, thickness or gauge of material, dimensions, loads, tolerances, deleted/added features, etc.), and information regarding available maintenance, repair and replacement service will be indicated.

4.10.3. The application shall contain an itemized estimate of all costs that will result directly or indirectly from evaluation and acceptance of the proposed substitute, including, but not limited to costs and delays of redesign, or claims of other contractors affected by the substitute, and changes in operating, maintenance, repair, replacement or spare part costs. The **Contractor** is solely responsible for verifying that substitutes are in accordance with the Contract Documents, and that dimensions, arrangement, design and construction details, and all other features of substitutes are suited to the specified purpose. The **Contractor** assumes full responsibility for the time and cost required to make substitute items conform to the requirements of the Contract Documents, or to implement any changes in the Work or in other work which may be required because of or to accommodate the substitute, or both.

4.10.4. If a substitute item differs from that named or specified, and that difference was not expressly identified in the **Contractor's** written application, or it results in changes to the Work or in the function or general design concept, the **City** has authority to require removal and replacement of the substitute.

4.10.5. The **Official's** decision regarding a substitution will be made within the time allowed in M.G.L. Chapter 30, Section 39P. A proposed substitute will be accepted as equivalent or "or-equal" to that named or specified if it meets the substitution criteria and if the deduction proposed by the Contractor reflects the net difference in cost, provided, however, that one hundred percent (100%) of the net savings benefits the **City**. No substitute will be utilized, ordered, or installed without the **Official's** prior written acceptance. Whether or not the **Official** accepts a proposed substitute, the **Contractor** shall reimburse the **City** for any associated extra costs of the **City** resulting from the substitute, including but not limited to, related charges of the **Architect** made necessary by the evaluation and acceptance (or rejection) of each proposed substitute.

4.10.6. An item will be considered equal to the item so named or described if (1) it is at least equal in quality, durability, appearance, strength and design: (2) it will perform at least equally well the function imposed by the general design for the Work; and (3) if conforms substantially, even with deviations, to the detailed requirements for the item in the Specifications, pursuant to M.G.L. Chapter 30, Section 39M (b).

4.11 Schedule Submittals:

4.11.1. Within fifteen (15) days after execution of the Contract, the **Contractor** shall submit to the **Architect** "revision 0" of the Schedule of Values. No line item on the Schedule of Values shall exceed $25,000.00 unless acceptable to the **official**. In addition, in fulfillment of the **Contractor's** obligations to commence, prosecute and complete the Work within the Contract Time, the **Contractor** shall submit with the first Application for Payment "Revision 0" of the **Contractor's** Progress Schedule and the **Contractor's** schedule of Shop Drawing submissions.

4.11.2. The **Contractor** shall correct, adjust or modify those schedules returned as "Revise and Resubmit", and shall resubmit Revision "0" schedules within the times specified. The **Contractor's** Revision "0" Progress Schedule shall be utilized to the fullest extent when making proposals or claims for changes in Contract Time or Contract Price.

4.11.3. The **Contractor** shall keep the **Official** informed of progress of the Work by submitting monthly Progress Schedules, which shall stay current with the **Contractor's** approach to Work remaining, be employed when reporting on progress or schedule recovery actions and facilitate the evaluation of payments. The **Contractor** shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with the **City**. No Work shall be delayed or postponed pending resolution of any disputes or disagreements. The **Contractor** shall exercise reasonable precautions, efforts and measures to avoid or mitigate situations that would cause delays.

4.11.4. After checking and verifying that an issue of revision of the Progress Schedule complies with the applicable requirements and procedures in the Contract, the **Contractor** shall, within the times specified, submit to the **Architect** four (4) copies, or in the alternative, five (5) copies for use by the **Official** and the **Architect** plus additional copies as required by the **Contractor** of that Submittal bearing the **Contractor's** stamp of approval as representation to the **City** that the **Contractor** has determined or verified all data on that Progress Schedule, and that the **Contractor** and the Subcontractors and Suppliers have reviewed and coordinated the sequences in that Progress Schedule with the requirements of the Work.

4.11.5. Early Dates in the Progress Schedules shall be based on proceeding with all or part of the Work exactly on the date when the Contract Time for the Work, or designated part of the Work, commences to run. Late Dates shall be based on completing all or part of the Work exactly on the corresponding Contract Time, unless the **Contractor** anticipates early completion of all or part of the Work (subject to those provisions governing use of Contract Float by the **City**). Where sequences of Work are indicated in or are required by the Contract Documents, the Progress Schedule shall disclose in detail the **Contractor's** approach to conforming with those sequences of Work.

4.11.6. Progress Schedule Submittals are intended to show the overall priority and sequencing of Activities with which the **Contractor** intends to accomplish the Work or Work remaining to comply with the Contract Times and those sequences of Work indicated in or required by the Contract Documents; show how the **Contractor** anticipates foreseeable events or site conditions that may in any manner affect the cost, progress, schedule, performance, and furnishing of the Work; reflect the means, methods, techniques, sequences, and procedures applicable to the Work chosen by the **Contractor**; and accurately record how completed Work was performed as to sequencing and timing.

4.11.7. The **Official's** and **Architect's** review of a Progress Schedule may result in comments relating to: conformance with the Contract Time(s) and those sequences of Work indicated in or required by the Contract Documents, selection of Milestones and recording of Milestone Times, and conformance with the Technical Specifications and any other information given in the Contract Documents which may have a significant bearing on the use of the Progress Schedule to resolve issues affecting Contract Price or Contract Time. However, whether or not any objections are noted, no such review or objections shall be effective to change the duties or responsibilities of the **City** or **Architect** or to impose on either of them a responsibility for the accuracy of any such Progress Schedule details, the correctness of all of which shall remain the sole responsibility of the

Contractor.

4.12 Project Photographs:

4.12.1. Before the **Contractor** commences any work at the site, and on the first work day of each month thereafter until Substantial Completion of the Work, the **Contractor** shall, at his expense, have exterior and interior digital photographs with disc storage taken by a competent commercial photographer from different viewpoints, as directed by the **Official** or **Architect**. The **Official** and **Architect** shall have the right to increase or decrease the number of photographs required at each period, maintaining an overall average number of exposures per period.

4.12.2. All prints of digital photographs shall be "8 x 10" size. The prints shall bear the date and time of day of the exposure, name of project, the specific location, description of view, and name and address of the photographer. The digital photo disc and one glossy print shall be submitted to the **Official** and one glossy print of each shall be delivered to the **Architect**, all within fifteen (15) days after the exposures are made.

4.12.3. If the **Contractor** fails to provide the photographs as required by the Contract Documents, the **City** shall be entitled to a corresponding cost set-off against the **Contractor's** next Application for Payment, or may choose to have the photograph taken by another photographer, and correspondingly charge those associated costs to the **Contractor**.

4.13 Shop Drawing, Samples and Printed Data:

4.13.1. The **Contractor** shall submit to the **Architect** within fifteen (15) days after the Date for Commencement of Contract Time, his Shop Drawing Log and completed Shop Drawing Submission Schedule, in the form specified by the **Official**, and shall update, and resubmit this Schedule each month to the **Architect** in accordance with the requirements of the Contract Documents.

4.13.2. Submissions of Shop Drawings, samples and printed data shall state the Project name, Specifications Sections, and paragraph numbers which apply to the items submitted. The **Contractor** shall submit Shop Drawings, samples, and printed data in sufficient time to permit checking, resubmission, rechecking, approval and subsequent fabrication and delivery. Failure on the **Contractor's** part to do so will not justify an increase in Contract Time.

4.13.3. Submittals made by the **Contractor** which are not required by the Contract Documents may be returned without action, in the **Architect's** sole discretion.

4.13.4. The **Architect's** review and approval of a technical Submittal will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The **Architect's** review and approval of a technical Submittal shall not extend to means, methods, techniques, sequences or procedures applicable to the Work except where a specific means, method, technique, sequence or procedure is indicated in or required by the Contract Documents or to safety precautions or programs related to safety, nor shall the **Architect's** review impose on the **Architect** any responsibility for the accuracy of engineering design(s) furnished by the **Contractor**, including but not limited to dimensions, quantities, performance of equipment and systems, or any other similar matters, the correctness of all of which shall remain the sole responsibility of the **Contractor**. Approval of a separate item, or partial Submittal, shall not mean approval of the item's assembly or Submittals not yet reviewed.

4.13.5. Shop Drawings or other technical Submittals consisting of drawings and specifications involving architecture, professional engineering, land surveying or landscape architecture, shall only be prepared by a registrant within the specific discipline involved.

4.13.6. The **Architect** shall be entitled to rely upon the accuracy or completeness of any designs, calculations or certifications made by licensed or certified professionals accompanying a specific Submittal, whether or not that stamp or written certification is required by the Contract Documents.

4.14 Shop Drawing Submittals:

4.14.1 After complying with the requirements in paragraph 4.14.4 and 4.14.5 and all applicable procedures in the Specifications, the **Contractor** shall, in accordance with the Progress Schedule, submit to the **Architect** four (4) copies, or in the alternative, five (5) copies for use by the **Official** and the **Architect** plus additional copies as required by the **Contractor** of all Shop Drawings, which shall bear a stamp or specific written indication (called "written approval") that the **Contractor** has satisfied his responsibilities under the Contract Documents with respect to the review of the submission. Shop Drawings without the **Contractor's** written approval will be returned for resubmission. All submissions shall be identified as the **Architect** may require.

4.14.2. The **Contractor** shall also submit to the **Architect** with such diligence so as to not delay the Work, all other technical Submittals such as samples, test results, test procedures, etc. that are required by the Contract Documents. All samples shall have been checked and be accompanied by a specific written indication that the **Contractor** has satisfied his responsibilities with respect to the review of the submission, and by a certificate guaranteeing that the item complies with the Contract Documents. Additional provisions governing the submission of other technical Submittals are given in the technical Specifications.

4.14.3. At the time of each submission, the **Contractor** shall give the **Architect** specific written notice of each variation of the Submittal from the requirements of the Contract Documents and in addition, shall cause a specific notation of each variation to be made on each Shop Drawing, sample or other technical Submittal submitted for review and approval.

4.14.4. The **Contractor** shall check, stamp with his approval, and submit to the **Architect**, until approved by the **Architect**, with such promptness as to cause no delay in the Work, all Shop Drawings and all other Submittals required by the Contract Documents. At the time of submission, the **Contractor** shall inform the **Architect** in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents, or on resubmitted Shop Drawings, to revisions, other than the corrections requested by the Architect on previous submissions.

4.14.5. Before each submission, the **Contractor** shall determine and verify all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers and other similar data as to correctness and completeness, and he shall have reviewed and coordinated each technical Submittal with other technical Submittals and with the requirements of the Contract Documents. Technical Submittals of a Subcontractor or Supplier such as the location, dimensions, fit, completeness, consistency, integration, etc. shall be coordinated with those of other Subcontractors or Suppliers, and be so represented in the **Contractor's** written approval before submission to the **Architect**.

4.14.6. Shop Drawings that are received from the **Contractor** will be the only Shop Drawings considered for review by the **Architect**. By approving and submitting Shop Drawings, the **Contractor** thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and other similar data, and that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents. Shop Drawings not so checked and approved will be returned to the **Contractor** without being examined by the **Architect**.

4.14.7. A technical Submittal will be returned within fifteen (15) days, or later if Total Float is available in the Progress Schedule, as either "Approved", "Approved as Noted", "Revise and Resubmit" or an appropriate combination. If a Submittal cannot be returned within that period, the **Architect** shall within fifteen (15) days after receipt, give written notice of the date by which that Submittal will be returned. The **Contractor** shall revise and correct Submittals returned as "Correct and Resubmit", and resubmit them to the **Architect** for his review and return - directing specific attention in writing to any revisions other than the corrections called for by the **Architect** on previous Submittals.

4.14.8. The Shop Drawings shall be clear, complete, and accurate, and shall give all information necessary or requested in individual Sections of the Specifications, and also show adjoining work and details of connections thereto.

4.14.9. Shop Drawings shall be submitted in a proper sequence reflecting the logical sequence and relative priority of the various phases of Work to ensure the preparation of a properly coordinated set of Shop Drawings.

4.14.10. The **Contractor** shall, at his expense, prepare and submit composite Shop Drawings showing the work under all affected trades, upon request of the **Architect**, with no change in Contract Price or Contract Time.

4.14.11. The **Architect** will review and return Shop Drawings with reasonable promptness after his receipt of same, but only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The **Architect's** review and approval of Shop Drawings will not extend to the accuracy of other matters that may be contained in the Submittals, including but not limited to such matters as dimensions, quantities, performance of equipment and systems designed by the **Contractor**, engineering design(s) furnished by the **Contractor**, the **Contractor's** means, methods, techniques, sequences or procedures applicable to the Work except where a specific mean, method, technique, sequence, or procedure is indicated in or required by the Contract Documents or to safety precautions or programs related to safety, the correctness of which shall remain the sole responsibility of the **Contractor**. Approval of a separate item, or partial Submittal, shall not mean approval of the item's assembly or Submittals not yet received.

4.14.12. The **Architect** will make comments, if any are required, directly on the reproducible transparency and return the transparency to the **Contractor**. The **Contractor** shall incorporate the **Architect's** corrections onto the original drawings and resubmit a new reproducible transparency and two prints thereof to the **Architect** for his approval. This procedure shall be repeated until all corrections are made to the satisfaction of the **Architect**.

4.14.13. No review, return or approval of Submittals shall relieve the **Contractor** of responsibility for any variation from the

requirements of the Contract Documents unless the **Contractor** has in writing called attention to each variation at the time of submission and the **Official** has given written approval of each such variation by a specific written notation incorporated in or accompanying the approval or returned Submittal. No review, return or approval of Submittals shall relieve the **Contractor** from responsibility for errors or omissions in the Submittals or for having complied with the provisions of this Article 4.

4.14.14 Where a Shop Drawing, sample or other technical Submittal is required by the technical Specifications, any related Work performed by the **Contractor** prior to the **Official's** approval of the pertinent Submittal will be at the sole expense and responsibility of the **Contractor**.

4.14.15 Submittals are not Contract Documents. Technical Submittals are intended to demonstrate how the **Contractor** intends to conform to the design concept of the Project and the information given in the Contract Documents.

4.15 Samples:

4.15.1. The **Contractor** shall submit for the written approval of the **Architect** all samples required in the individual Sections of the Specifications. Samples shall be submitted in a proper sequence reflecting the logical sequence and relative priority of the various phases of the Work. Unless otherwise specified in the individual Specification sections, three (3) specimens of each sample shall be submitted.

4.15.2. Samples shall be of sufficient size to permit proper evaluation of material. Where variations in color or other characteristics are to be expected, samples showing the minimum range of variation shall be submitted. Materials exceeding the range of variation of the approved samples will not be approved on the Work.

4.15.3. Samples which can be conveniently mailed shall be sent directly to the **Architect**, accompanied by a transmittal notice stating the name of the Project, Specifications Section and Article number to which the sample refers and description of the item being submitted. The **Contractor** shall mail a copy of the transmittal notice to the **Official**.

4.15.4. All other samples shall be delivered at the field office of the **Clerk of the Works**, with sample identification tags attached and properly filled in. A transmittal notice of listing the delivered samples shall be submitted to the **Architect** and to the **Official** by the **Contractor**.

4.15.5. Costs associated with the delivery of samples shall be paid by the **Contractor**.

4.15.6. The **Architect** will with reasonable promptness review and give written approval of samples but only for conformance with the design concept of the Project and with the information given in the Contract Documents.

4.16 Printed Data:

4.16.1 The **Contractor** shall submit to the **Architect** six (6) copies of printed data as required in the Specifications, or if an electronic copy is available, one (1) hard copy and one (1) electronic copy. All such printed data shall be specific and identification of material or equipment submitted shall be clearly made in ink.

4.16.2 The **Contractor** shall resubmit six (6) copies of such data, or if an electronic copy is available, one (1) hard copy and one (10 electronic copy, until approved and, after approval, shall provide and distribute such number of copies as required for the **Contractor's** use.

4.17 Responsibilities for Repeat Submittals:

4.17.1 All costs incurred by the **City** and the **Architect** made necessary by the review of a particular Submittal after the second time review shall be borne by the **Contractor** without any increase in Contract Price or Contract Time**,** and shall either be reimbursed by the **Contractor** to the **City**, shall be deducted by the **City** from amounts which may become due to the **Contractor,** or will result in a credit Change Order to the City.

4.17.2 All time consumed by the resubmission and re-reviews of a particular Submittal shall not meet the requirements for increases in Contract Time or Contract Price.

4.18 Operating and Maintenance Instructions and Stock Items:

4.18.1 The **Contractor** shall collect all operating, service and maintenance instructions of all mechanical, electrical and manually operated equipment required by them under the Contract Documents, bind them into four (4) complete sets properly

formatted and indexed, and submit them to the **Architect** when the Work has reached 90% completion. Failure by the **Contractor** to provide these instructions will prevent subsequent Applications for payment from being approved.

4.18.2 Three (3) HARD copies and (3) CD copies of all operating and maintenance instructions shall be submitted. These instructions shall be arranged in loose-leaf notebooks of not more than 2" thickness and organized by trade. Each notebook shall be indexed and sorted by building feature or piece of equipment to make all information easily accessible. Each equipment section shall be prefaced by a summary sheet including an equipment description, manufacturer, manufacturer's representative, model number and all nameplate information, and location within the building.

4.18.3 Upon the date of Substantial Completion, the **Contractor** shall provide verbal instructions and demonstrations to the **Official** and other **City** representatives at the site concerning maintenance of all building features and equipment.

4.18.4 Upon the date of Substantial Completion, all maintenance stock items required to be supplied under this Contract shall be delivered to the job site by the **Contractor**. All maintenance stock shall be delivered to the job site in unopened containers and stored properly in accordance with manufacturer's instructions. The **Contractor** shall provide the **Official** with storage instructions for all spare maintenance stock supplied.

4.19 Record Documents:

4.19.1 From the sets of Contract Documents furnished by the **Official**, the **Contractor** shall reserve one set for record purposes. From this set, the **Contractor** shall detach and furnish the drawings of their Work for their record purposes at no charge to the mechanical, plumbing, fire protection, electrical and any other Subcontractors as may be required by the **Official**.

4.19.2 The **Contractor** shall maintain at the site one (1) record copy of all Drawings, Specifications, Addenda, Change Orders, Change Authorizations, field orders, test records, construction photos, and written interpretations/clarifications, in good order and annotated in a neat and legible manner using a contrasting, reproducible color to show all revisions made and dimensions noted during execution of the Work. These record documents together with a properly annotated record copy of all approved Submittals shall be available to the **Architect**, the **Official** and the **Clerk of the Works** for reference. Upon completion of the Work, these record documents and annotated Submittals shall be delivered to the **City**.

4.19.3 Upon Substantial Completion, the **Contractor** shall return the complete set of record documents including as-built drawings to the **Architect**. The **Architect** will review these documents and return them to the **Contractor** with any necessary comments. The **Contractor** shall revise the same with no change in Contract Price until satisfactory to the **Architect**, as evidenced by his approval endorsed thereon.

4.19.4 Upon receipt of the **Architect's** approval, the **Contractor** shall, at no increase in Contract Price, make deliver to the City three (3) hard copies of all record drawings including as-built drawings and three (3) CD with both pdfs and (3) AUTO CAD versions acceptable to the **Official** of all record drawings. The **Contractor** shall ensure that all as-built information shown on the record drawings is transferred onto said pdfs and AUTO CAD versions. The drafting shall be done by experienced drafters and shall match the original drawings.

4.19.5 The **Contractor**, shall also, at his expense, prepare one (1) hard copy of all record drawings and one (1) CD with both pdfs and AUTO CAD version acceptable to the **Official**, and submit the same to the **Architect** before the **Contractor** shall be entitled to Final Payment.

4.19.6 Each week, the **Contractor** shall submit to the **Architect** and **Clerk of the Works** daily reports recording: the labor work force and equipment utilized by the **Contractor** and Subcontractors; materials and equipment received; visits by Suppliers and others; specialty trade Work performed for each significant aspect of in-progress or completed Work within each major area of Work; the status of the Work at the Site; and other similar pertinent information.

4.20 Instruction Relating to Existing Conditions:

4.20.1 The **Contractor** represents that he has read the Contract Documents and is fully informed in regard to all provisions thereof, including without limitation, the drawings, Contract Time and the provisions for liquidated damages, and that he has visited the premises described in the Contract Documents and made his own examination of the place where the Work is to be performed and of all conditions pertaining to the Work and has made his own estimates. The **Contractor** agrees that he shall not hold the **City**, its agents or employees responsible for or bound by any schedule, time period, estimate, sounding, boring, or any plan of any thereof and shall assume all liability for the prosecution of the Work and shall bear all losses resulting to him in such prosecution of the Work. No claim for an increase in Contract Price or other damages or any other claim other than for an extension in Contract Time shall be made or asserted against the **City** by reason of any delays unless specifically allowed by the Contract Documents or required by law. The **Contractor** shall not be entitled to an increase in the Contract Price or to

compensation of any kind from the **City**, including extended site and home office overhead, for direct, indirect, consequential impact or other costs, expenses or damages, including but not limited to costs of acceleration or inefficiency arising because of delay, disruption or interference from any cause whatsoever. This provision shall not preclude recovery of damages by the **Contractor** for hindrances or delay due solely to fraud or bad faith on the part of the **City** or its agents. Otherwise, the **Contractor** shall be entitled only to a non-compensable extension to the Contract Time as the sole and exclusive remedy for such resulting delay, in accordance with and to the extent provided above.

4.20.2 Pursuant to M.G.L. Chapter 30, Section 39N, if, during the progress of the Work, the **Contractor** or the **City** discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the Contract Documents, either the **Contractor** or the **City** may request an equitable adjustment in the Contract Price applying to Work affected by the differing site condition. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a **Contractor**, or upon its own initiative, the **City** shall make an investigation of such physical conditions and, if they differ substantially or materially from those shown on the plans, or indicated in the Contract Documents, or from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the plans and Contract Documents and are of such a nature as to cause an increase or decrease in the cost or performance of the Work or a change in the construction methods required for the performance of the Work which results in an increase or decrease in the cost of the Work the **City** shall make an equitable adjustment in the Contract Price and the Contract shall be modified in writing accordingly.

4.21 Removal of Existing Work:

4.21.1 The following requirements shall apply to existing conditions which are located within the Limit of Contract Lines indicated on the Drawings:

4.21.2 On and above existing grades, unless designated in the Contract Documents to be reused, remain, or be altered, all existing items shall become the property of the **Contractor** and shall be completely removed from the site by the **Contractor**, at no change in Contract Price.

4.21.3 Below existing grades, unless designated in the Contract Documents to remain, be reused, be altered, or to be paid for on a unit price basis, as stipulated in the Section entitled "Unit Prices", all subsurface materials shall be excavated to the lines specified in the Contract Documents and completely removed from the site by the **Contractor**, at no change in the Contract Price.

4.22 Marks and Lines:

4.22.1 The **Contractor** shall furnish, at his expense, the services of a Land Surveyor registered to practice in the Commonwealth of Massachusetts, who shall, for the **Contractor**, establish and maintain on-site permanent bench marks, and determine from them the various levels of work, and place the levels, and the lines of the buildings, on substantial batter boards and stakes, as required for the proper execution of the Work.

4.22.2 The **Contractor** shall employ on a full time basis a person, acceptable to the **Official**, with sufficient engineering background and experience in the type of work required hereunder who shall, for the **Contractor**, do other engineering work which shall include, without limitation, leveling, checking, and verifying wall and main partition lines.

4.22.3 The **Contractor** shall be fully responsible for the accuracy of all lines and levels established by or for him. The **Contractor** shall furnish to the **Official** a certificate signed by said Land Surveyor, registered in the Commonwealth of Massachusetts, certifying that the location of the building and the principal lines, levels and dimensions of the building are accurately established in accordance with the Contract Drawings.

4.23 Materials, Inspection, Disposition and Suitable Storage:

4.23.1 Unless otherwise stated in the Specifications, or noted on the Drawings, all materials and equipment shall be new and in manufacturer's original containers, clearly marked as to contents. Upon delivery of materials, copies of the delivery receipts shall be given to the **Clerk of the Works**.

4.23.2 The **Contractor** shall allow the **Clerk of the Works** and/or any other designated representative of the **Official** or the **Architect** to examine materials, and he shall furnish labor and equipment to assist in such examination with no change in Contract Price.

4.23.3 The **Contractor** shall store all delivered materials in proper locations which will not interfere with the Work. If any

stored materials are rejected, a notice of rejection will be given to the **Contractor** by the **Official** or the **Architect** in writing. Upon receipt of a rejection notice, the **Contractor** shall, within twenty-four (24) hours thereafter, proceed to remove all such rejected materials from the site, and completely remove such materials within five (5) working days.

4.23.4 Should the **Contractor** or any Subcontractor install, or permit the installation of, any materials which have not been inspected prior to installation, the **Contractor** shall be held fully responsible therefor, and if such installed materials are rejected after inspection by the **Architect** or **Official**, the **Contractor** shall, take down all portions of the Work containing rejected materials, remove all such materials from the site, and replace the rejected materials accordingly at no increase in Contract Price.

4.23.5 The **Contractor** shall provide for the protection and orderly keeping of materials, and shall provide sufficient heat and cooling to prevent damage to said materials.

4.23.6 No determination by the **Official** or the **Architect** regarding materials and/or equipment which are not incorporated in the Work, but are suitably stored on the site, or at some other location approved in writing by the **Official**, for the purposes defined under Article 8, whether or not payment by the **City** to the **Contractor** on behalf of all or any part of said materials and/or equipment has been made, shall relieve the Contractor of his obligation to bring the work to Final Completion, at no change in the Contract Price.

4.23.7 In no event shall materials and/or equipment be considered delivered and suitably stored at the site, or some other location approved in writing by the **Official**, for the purposes defined under Article 8 unless in the judgment of the **Official**, the materials and/or equipment are actually scheduled for prompt use, meet the requirements of the Contract Documents, and that the **Contractor** can and will, at his expense, adequately protect and insure the materials and/or equipment until they are incorporated in the Work. No payment will be made by the **City** for related storage charges, insurance and/or costs and expenses.

4.24 Cutting and Patching:

4.24.1 See Division 1, Section 017329 of Technical Specifications.

4.25 Existing Utilities:

4.25.1 If existing utility lines, which are indicated in the Contract Documents are damaged by the **Contractor** or any Subcontractor, including without limitation, cables, ducts, conduits and piping, they shall be immediately repaired, protected, and maintained in use until relocation of same has been completed, or shall be cut or capped or prepared for service connections, as the Contract Documents require, unless they are to be abandoned in accordance with the Contract Documents.

4.25.2 The **Contractor** shall be responsible for locating all Underground Utilities in advance of excavating whether shown in the Contract Documents or indicated by exposed components; scheduling excavation and uncovering in advance, unless it prejudices Work already uncovered; shoring, blocking, and protecting all Underground Utilities; whether shown or indicated or newly-discovered; repairing any damage done to Underground Utilities to the satisfaction of the **Official** or their owner(s); promptly notifying the **Official** and the **Architect** of any newly discovered Underground Utility; and the safety and protection of, and repairing of any damage done to, any affected Work. The **Contractor** shall not, except in an emergency, make an excavation unless written notice of the proposed excavation is given to the owner of any affected Underground Utilities at least two (2) business days before such excavation is to be made.

4.25.3 All costs involved and time required to perform the responsibilities in paragraph 4.25.2 shall be deemed as within the Contract Price and the **Contractor's** schedule for performing the Work within the Contract Time.

4.25.4 The **Contractor** shall notify the **Official** in writing, not less than three (3) business days in advance of the proposed time for shutting down or interrupting of any utilities, services, or facilities which may affect the operation of other buildings, services or facilities of the **City** or the **City's** other contractors. In no case shall any shutdown or interruption of any utilities, services, or facilities be made without the prior written approval by the **Official**. Unless otherwise authorized in writing by the **Official**, the Contractor shall so schedule and coordinate his work that such interruption will occur on weekends, holidays, or before or after the normal working day of the **City's** Facilities. All costs and expenses, including outage costs and back charge costs, shall be borne by the **Contractor.**

4.26 Maintenance of Site:

4.26.1 At all times prior to Final Completion, the **Contractor** shall keep the site free from accumulation of waste materials or rubbish.

4.26.2 The **Contractor** shall be responsible for the protection of all completed Work, and for repairing, replacing or cleaning

any such Work which has been damaged by other trades or by any other cause, so that all Work is in perfect condition in accordance with the Contract Documents at the time of Substantial Completion.

4.26.3 At the end of each work week, the **Contractor** shall thoroughly clean the site of all rubbish and debris of any nature, and remove such from the site. The **Contractor** shall thoroughly clean the entire Project and site. Specific cleaning requirements, prior to final inspection, shall be as set forth in Division 1 of the Technical Specifications.

4.26.4 Immediately prior to final inspection by the **Architect** and the **Official**, the **Contractor** shall thoroughly clean the entire Project and site. Specific cleaning requirements, prior to final inspection, shall be as set forth in Division 1 of the Technical Specifications.

4.26.5 The **Contractor** shall confine construction equipment, the storage of materials and equipment, and the operations of workers to those lands, rights-of-way and easements identified in and permitted by the Contract Documents, and shall not unreasonably encumber the premises with construction equipment, materials or equipment. The **Contractor** shall assume full responsibility for any damage to those lands including properties and fixtures, rights-of-way and easements or to the owners or occupants of any adjacent lands or access, resulting from execution of the Work. The **Contractor** shall defend, indemnify and hold harmless the **Owner** and **Architect** from and against all claims arising out of or resulting from any damage to any such land, or to any adjacent lands, including loss of use.

4.26.6 The **Contractor** shall keep the premises free accumulations of waste materials, rubbish and other debris. Upon the completion of the Work, the **Contractor** shall remove waste and surplus materials, rubbish, debris, tools and construction equipment, and shall leave the site clean and ready for occupancy by the **City**. The **Contractor** shall restore to original condition all property not designated for alteration by the Contract Documents including, but not limited to walks, roadways, paved or landscaped areas used during prosecution of the Work. If the **Contractor** fails to comply with this requirement, the **City** may do so, in which case the **Contractor** shall reimburse the **City** for all costs incurred by the **City**.

4.26.7 The **Contractor** shall not load or permit any part or any structure to be loaded in any manner that will endanger the structure. The **Contractor** shall not subject any part of the Work or adjacent property to stresses or pressures that will damage and endanger the Work or adjacent property, or both.

4.27 Inspection and Testing of the Work:

4.27.1 All materials, equipment and workmanship shall be subject to inspection and testing by the **Official**, the **Architect** and their authorized representatives, for conformance with the requirements of the Contract Documents.

4.27.2 If the Contract Documents, laws, codes, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any Work to be inspected, tested or approved, the **Contractor** shall give the **Architect, Clerk of the Works,** and the **Official** written notice not less than 72 hours in advance of the time that the Work will be ready for inspection, testing, or approval so the **Architect, Clerk of the Works,** and the **Official** may observe such inspection, testing or approval. The **Contractor** shall bear all costs of such inspections, tests and approvals unless otherwise provided in the Contract Documents.

4.27.3 Inspection and testing by the **City**, the **Architect**, or their representative, or by any other person, shall in no event reduce or remove the **Contractor's** responsibility for compliance with the full intent and requirements of the Contract Documents.

4.27.4 The **Contractor** must anticipate any and all time required for the testing, inspection and approval of material before incorporation into the Work. No increases in Contract Price or Time will be permitted for losses or delays attributable thereto.

4.27.5 After testing or inspection should any materials or portion of the Work be found *defective* and not conforming to the Contract Documents, such materials or portion of the Work shall be promptly removed, replaced and made to conform to the requirements of the Contract Documents by the **Contractor** at no increase in Contract Price or Contract Time. The Contractor shall pay all costs for retesting, and or re-inspection of the corrected Work.

4.27.6 Reasonable cost for travel, room and board, incurred by the **Official** or his authorized representative, for the inspection of materials required in the performance of the Work, which are fabricated outside the limits of the City of Newton will be deducted from amounts otherwise due or to become due to the **Contractor**.

4.27.7 If after Commencement of the Work, the **Official** or the **Architect** determines, in their sole discretion, that any of the Work requires special inspection, testing or approval, not otherwise provided for in the Contract Documents, the **Architect** may with the approval of and upon the written order of the **Official**, instruct the **Contractor** in writing to order such special inspection, testing or approval. The **Contractor** shall give the **Official** and the **Architect** seventy-two (72) hours advance written notice of the time and place of such inspection, testing or approval. In the event that such special inspection or testing shows that the Work or part of the Work does not conform to the requirements of the regulations or orders of any public authority having jurisdiction, the **Contractor** shall pay all costs of such inspection, testing or approval, otherwise the **City** shall bear such

costs.

4.27.8 Examinations of questioned Work may be ordered at any time and from time to time by the **Official** and/or the **Architect**, and if so ordered, the **Contractor** shall uncover the Work. If such Work is found to be in accordance with the Contract Documents, the **City** will pay the reasonable costs of examination and replacement. If such Work is found to be not in accordance with the Contract Documents, the **Contractor** shall pay all costs of examination, replacement, and all related testing.

4.28 Claims by the Contractor for Loss or Injury:

4.28.1 If the **Contractor** claims any loss or injury resulting to him from any act, omission, or neglect of the **City**, its agents or employees, the **Contractor** shall in strict compliance with all of the requirements of Article 15, and in any event no later than thirty (30) days after the loss or injury that gives rise to the claim, deliver to the **Official** a written statement of the loss or injury in the form of a clearly marked Notice of Claim. Under no circumstances will any reimbursement be made to the **Contractor** unless the **Contractor** shall have delivered the timely written Notice of Claim in accordance with the requirements of this paragraph and Article 15.

4.28.2 The **Contractor** shall have no right to recover damages for any claims or any loss or injury resulting from Work not being performed in conformance with the Contract Documents.

4.28.3 The **Contractor** shall bear all losses resulting from any cause both before Final Completion, and after Final Completion if the Work or any part of the Work fails to conform to the Contract Documents.

4.29 Responsibility for Labor, Material and Equipment Costs:

4.29.1 The **Contractor** shall pay and be exclusively responsible for all debts for labor and material contracted for by the **Contractor**, for the rental of any appliance or equipment hired by the **Contractor** and/or for any expense incurred on account of the Work.

4.30 Conflict of Interest:

4.30.1 The **Contractor's** attention is called to M.G.L. Chapter 268A the Conflict of Interest Law. The **Contractor** shall not act in collusion with any **City** officer, agent, employee or any other party, nor shall the **Contractor** make gifts regarding this Contract or any other matter in which the **City** has a direct and substantial interest.

4.31 Emergencies:

4.31.1 In emergencies affecting the safety or protection of persons or the Work or property at or adjacent to the site, the **Contractor**, without special instructions or authorization from the **Architect** or the **Official**, is obligated to act to prevent threatened damage, death, injury, or loss. The **Contractor** shall give the **Official** written notice within forty-eight (48) hours of any changes in the Work resulting from the action taken. If the **Official** concurs, the **Official** shall authorize the required changes in accordance with Articles 11 and 12, and, unless the emergency was due in whole or in part to the fault or negligence of the **Contractor**, correspondingly adjust the Contract Price or the Contract Time.

4.32 Miscellaneous Provisions:

4.32.1 The **Contractor** shall inspect Work already in-place to verify that it is in proper condition to receive dependent Work. The **Contractor** shall be responsible for all cutting and patching which may be necessary to complete the Work and to make its several parts fit together properly, whether or not that Work is expressly specified in the Contract Documents.

4.32.2 The **Contractor** shall initiate, maintain and supervise all weather precaution programs applicable to the Work. In the event of severe weather, the **Contractor** shall immediately inspect the Work and the site, and take all necessary actions to insure that public access and safety are maintained.

4.32.3 The **Contractor** shall perform Work and operate vehicles and equipment so as to cause the least practicable interference with traffic and without becoming a hazard to the public or interfering with any overhead utilities. When transporting materials, vehicles shall not be loaded beyond the capacity recommended by the manufacturer of the vehicle or set by Law. When crossing curbs or sidewalks, the **Contractor** shall protect them from damage. Safe and adequate pedestrian and vehicular access shall be provided and maintained to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, hospitals, fire and police stations, and like establishments.

4.32.4 The **Contractor** shall give seventy-two (72) hours advance notice of Work on or across private driveways to the owners of the private driveways and the **Architect, the Clerk of the Works, and Official**. The interference from such Work shall be

minimized by restoring service as soon as possible. Except as otherwise provided in the technical Specifications, open excavations shall be bridged with steel plates.

4.32.5 Whenever the prosecution of the Work requires that certain operations be carried out beyond the limits of the site designated in the Contract Documents or the indications of temporary fences or barricades, the **Contractor** shall schedule trenching, utility Work, site development, and landscaping so as to occasion a minimum of disturbance to or interfere with the normal operation of the **City** or others.

4.32.6 Pumping, draining and control of surface and groundwater shall be done so as to not to endanger the Work or any adjacent facility or property, nor interrupt, restrict or interfere with the use of any such adjacent facility or property.

4.32.7 If a specific means and method is indicated in or required by the Contract Documents, the **Contractor** may furnish or utilize a substitute means and method, if the **Contractor** submits to the **Architect** sufficient information, in accordance with the applicable requirements for substitutions, to allow the **Architect** to determine whether the substitute is equivalent to that indicated or required by the Contract Documents.

4.32.8 Any damaged Work corrected by the **Contractor** shall be corrected so as to be equal in all respects including quality, appearance, function, finish, etc. to non-damaged like Work.

4.32.9 The **Contractor** shall, prior to final inspection, mark in a permanent and readily identifiable manner, all reference points provided by the **City** through the **Architect**.

4.32.10 The **Contractor** shall take whatever steps, procedures or means are required to prevent any dust nuisance due to his operations, and he shall maintain dust control measures at all times in accordance with the requirements of the **City** and any public governmental body with jurisdiction. Dumping of spoil or waste material on land or property obtained by the **Contractor** shall be in strict conformance with all applicable Laws.

4.32.11 The **Contractor** shall not obstruct access to municipal structures, hydrants, valves, manholes, fire alarms, etc., nor shall he make any connections to, operate valves or otherwise interfere with the operation of the water system without first securing the necessary approvals and permits.

4.32.12 The **Contractor** shall prosecute Work in the manner which will cause the least practicable interference with and avoid prolonged interruption of or damage to existing facilities, including underground utilities and overhead utilities. The **Contractor** shall obtain written approval from the **Official** prior to performing any Work involving connection to or interruption of existing facilities, and shall perform that Work during those periods of time which cause the least interference or annoyance.

4.33 Quality Control:

4.33.1 The **Contractor** shall establish a quality control system and submit the procedure to the Official to insure sufficient supervision, inspection and testing of all items of Work, including those of Subcontractors and Suppliers, and to control conformance to the applicable Specifications and Drawings with respect to product, workmanship, construction, maintenance while idle, finish, functional performance and identification. The **Contractor's** quality control system shall include checking, approval and coordination of Submittals and the surveillance of all specified tests. Nothing contained in these quality control requirements shall be construed as limiting the obligations of the **Contractor** under the Contract Documents.

4.33.2 The **Contractor's** quality control system shall specifically incorporate the responsibility for checking all aspects of the Work including, but not limited to the **Contractor**-established elevations, the location of all underground pipelines and electrical conduits before covering begins, all reinforcing steel before pouring concrete, and any other items of Work which cannot be located and inspected without uncovering once the particular part of the Work is complete. Data so obtained shall be recorded on the record documents.

4.34 Incidents with Historic Property Deposits:

4.34.1 The **Contractor** shall at once cease operations in the affected areas and notify in writing the **Official** of any historic property deposits, as determined by the City of Newton Historical Commission or the Massachusetts Historical Commission, which are encountered or unearthed during the execution of the Work. The **Contractor** shall provide for the protection of the deposits in a proper and satisfactory manner, and no further disturbance of the deposits shall be permitted until the **Contractor** has been notified by the **Official** that Work can be resumed in the affected areas.

4.34.2 If any such incident with historic properties causes or will cause delay, extension or acceleration that postpones, extends or any other manner alters the schedule or completion of all or part of the Work, the **Official** shall, pursuant to the provisions

in Articles 11 and 12, make or negotiate with the **Contractor**, an adjustment in Contract Price or Contract Time for any increases in the **Contractor's** cost or the time required to perform the Work. The **Contractor** assumes responsibility for any delay, extension or acceleration, from an incident with historical properties, which is reasonable under the Contract Documents.

4.35 Related Work at Site:

4.35.1 The **City** may perform other work at the Site with the City's own forces or have other work performed by other persons. If the Contract Documents did not note that other work is to be performed, written notice will be given to the **Contractor** prior to starting that other work.

4.35.2 The **Contractor** shall afford each other person or the **City** when performing other work proper and safe access to the Site and a reasonable opportunity for the handling, unloading and storage of materials and equipment and the execution of their work, and shall properly connect and coordinate the Work with theirs. The **Contractor** shall not cut, excavate or otherwise alter any other work without the written consent of the other person and the **Architect**. The **Contractor** shall afford each other person prompt written notice whenever Work interfacing with the person's work has been performed.

4.35.3 If any part of the Work depends for proper execution or results on the work of the **City** or another person, the **Contractor** shall inspect and promptly report to the **Architect** in writing conditions in that work which render it unavailable or unsuitable for proper execution and results. The **Contractor's** failure to do so will constitute an acceptance of other work as fit and proper for integration with the Work except for latent or non-apparent defects and deficiencies in the other work.

4.35.4 Wherever Work to be performed by the **Contractor** is dependent upon the work of others; the **Contractor** shall coordinate his Work with the dependent work to the same extent that he is required to coordinate dependent work. Subcontractor work under paragraph 6.2. Installation of Work by the **Contractor** or by any Subcontractor in any given area shall constitute acceptance by the **Contractor** or that Subcontractor of all previously placed dependent work.

4.35.5 If the **City** contracts with others for other work, the person or organization that will have the authority and responsibility for coordinating the activities of the **Contractor** and those others will be identified in the Supplementary Conditions. Unless otherwise specifically stated, neither the **City** nor the **Architect** shall have any authority or responsibility for coordination of the activities of the **Contractor** and those others.

4.35.6 Unless otherwise so provided in the Supplementary Conditions, the **Contractor** shall coordinate the preparation and checking of Submittals with those other persons whose work in any way relates or depends upon the Work, or vice versa, and the **Contractor** shall so represent it in the **Contractor's** Submittal to the **Architect**. Upon receipt of approval of those Submittals from the **Architect**, or receipt of a Submittal as "Re-submittal Not Required" from the **Official**, the **Contractor** shall promptly furnish prints of those Submittals to those other parties.

4.36 Mutual Duties and Responsibilities:

4.36.1 If the **Contractor** causes damage to the work or property of others, or if a claim arising out of the **Contractor's** execution of Work is made by a person against the **Contractor**, the **City**, or the **Architect**, the **Contractor** shall promptly attempt to settle with that person by agreement or otherwise resolve the claim. The **Contractor** shall defend, indemnify and hold harmless the **City** and the **Architect** from and against all claims, causes of action, lawsuits, damages, losses and expenses, whether direct, indirect or consequential, including but not limited to charges of engineers, attorneys and other professionals and costs of both defense and appeal, if any, arising out of or resulting from damage by the **Contractor** to the work or property of others or from the **Contractor's** execution of the Work.

4.36.2 If another person causes damage to the Work or property of the **Contractor**, or if the performance of other work results in any other claim by the **Contractor**, the **Contractor** shall promptly attempt to settle with that person by agreement or otherwise resolve the claim. The **Contractor** shall not institute any action against the **City** or **Architect**, their consultants, agents or any of their directors, officers, shareholders, agents or employees, or permit any action against them to be maintained in the **Contractor's** name or for his benefit in any court or before any tribunal, which action seeks to impose liability or recover damages from the **City** or **Architect** for such claim.

4.36.3 If another person performing other work causes delay, extension or acceleration that postpones, extends or in any other manner alters the schedule or completion of all or part of the Work, the **Official** shall, pursuant to Articles 11 and 12, make or negotiate with the **Contractor**, an adjustment in Contract Price or Contract Time for any increases in the **Contractor's** cost or the time required to perform the Work. The **Contractor** assumes responsibility for any delay, extension or acceleration caused by other work which is reasonable under the Contract Documents.

4.36.4 If another person performing other work is granted an extension in Contract Time on account of causes warranting said

extension but without compensation, and said Contract Time is coterminous with a Contract Time under this Contract, and if the **City** concludes that said extension requires a change in the coterminous Contract Time, the **Official** shall authorize the necessary change in Contract Time only.

4.37 The Contractor's Responsibility for City Costs:

4.37.1 If the **Contractor** becomes involved in settling or otherwise resolving claims with other persons performing other work arising out of events covered under paragraphs 4.36.1 or 4.36.2, or because of any other related controversy, including damage to the Work or other work or a dispute about responsibility for clean-up or any other issue, neither the **City**, the **Architect**, nor any of their consultants, agents nor any of their directors, officers, stockholders nor employees will be involved in any way in such actions unless ordered to do so by a court of competent jurisdiction. If the **City** incurs costs contrary to the provisions of this Article, the **Contractor** shall reimburse those cost to the **City**.

ARTICLE 5 - SUBCONTRACTORS AND SUPPLIERS

5.1 Use of Subcontractors:

5.1.1 The **Contractor**, in performance of the Work, shall use the Subcontractors named in the **Contractor's** Bid and shall not use any other Subcontractor in the performance of the Work against whom the **Official** has reasonable objections; nor shall the **Contractor** be required to employ any Subcontractor against whom he has a reasonable objection.

5.1.2 The **Contractor** shall not assign, delegate, subcontract or in any way transfer any interest in this Contract without prior written consent of the **Official**

5.1.3 If the **City's** consent to a Subcontractor named by the **Contractor** prior to the giving of the notice of award is withdrawn on the basis of subsequent reasonable objections, or the **City** has reasonable objection, or the **City** for the **City's** sole convenience objects, to a Subcontractor nominated after the giving of the notice of award, the **Contractor** shall promptly proceed to nominate a substitute Subcontractor for evaluation by the **City**.

5.1.4 If any such withdrawal of the **City's** consent or any such objection for the convenience of the **City** causes an increase or decrease in the **Contractor's** cost for the part of the Work in question, the **Official** shall, except as provided below, make an adjustment in the Contract Price equal to the difference in cost between the nominated and substitute sub-agreements for that part of the Work. If any such withdrawal or objection causes or will cause delays which extend, postpone or in any other manner alters the schedule or completion of all or part of the Work, the **Contractor** shall assume all of the **Contractor's** related delay, extension or acceleration costs, however, caused; except that the **Official** shall authorize the necessary change in Contract Time **only**. The **Contractor** assumes responsibility for any and all cost and delay resulting from the **City's** reasonable objection to a Subcontractor nominated after the notice of award.

5.1.5 The **City's** consent to a nominated Subcontractor shall not constitute a waiver of any right of the **City** to reject *defective* Work nor shall the authority given to the **City** under this paragraph give rise to any duty on the part of the **City** to exercise such authority for the benefit of the **Contractor** or any other person.

5.2 Relation Between Subcontractors and Contractor:

5.2.1 In the event that a suspension, delay, interruption or failure to act of the **City** increases the cost of performance to any Subcontractor, that Subcontractor shall have the same rights against the **Contractor** for payment of an increase in the cost of his performance as provided for the **Contractor** under M.G.L. Chapter 30, Section 39O, paragraphs (a) and (b). Nothing in these paragraphs (a) and (b) shall in a way change, modify, or alter any other rights the **Contractor** or the Subcontractor may have against each other.

5.3 The Contractor's Continuing Responsibilities:

5.3.1 The **Contractor** shall be fully responsible to the **City** and the **Architect** for all acts and omissions of all the Subcontractors and Suppliers, at any tier, to the same extent as the **Contractor** is responsible for the **Contractor's** own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between the **City** or the **Architect** and any Subcontractor or Supplier, nor create any express or implied duty or obligation on the part of the **City** or the **Architect** to any Subcontractor or Supplier or the **Contractor's** sureties, to pay or to see to the payment of any monies owed to any of them.

5.4 Sub agreements:

5.4.1 Work performed by a Subcontractor or Supplier shall be through an appropriate sub-agreement which expressly binds the

Subcontractor or Supplier to the requirements of the Contract Documents for the express benefit of the **City** and the **Architect**, requires each of them to assume toward the **Contractor** all the obligations which the **Contractor** assumes toward the **City** and the **Architect**, and contains waiver provisions as required by paragraph 10.9. The **Contractor** shall pay each Subcontractor and Supplier as their interests may appear, a proportionate share of any funds received on account of losses under policies issued under Article 10.

5.4.2 Within seven (7) days after receipt of a written request from the **Official**, the **Contractor** shall submit an exact copy of each sub-agreement identified in the request. Such request shall not constitute approval of any Subcontractor by the **Official**. Time periods in Articles 11, 12 and 15 allowed to the **City** for making determinations on proposals, payments or claims shall be automatically extended if those sub-agreement(s) are not submitted within seven (7) days after receipt of a written request from the **Official**.

5.4.3 Subject to prior rights, if any, of the **Contractor's** surety, the **Contractor** assigns to the **City** each sub-agreement, which the **City** assumes by notifying the Subcontractor or Supplier in writing, upon a termination action under Article 14.

ARTICLE 6 - PROJECT COORDINATION

6.1 General Coordination:

6.1.1 The **Contractor** shall be responsible for the entire Project operations and shall properly coordinate the work of all trades and give all customary and proper assistance to all Subcontractors.

6.2 Subcontractor Coordination and Communications:

6.2.1 All communications and information to and from Subcontractors shall be through the **Contractor**. The **Official** reserves the right to communicate directly with all subcontractors, suppliers, and vendors.

6.2.2 If Work to be performed by the **Contractor** directly or through a Subcontractor, is dependent upon previously placed Work, the **Contractor** shall supply and/or install items to be built into the dependent Work, examine dependent Drawings or Specifications, and examine, check and verify dependent dimensions of previously placed Work. The **Contractor** shall notify the **Architect** of previously placed dependent Work which is unsatisfactory or will prevent a satisfactory installation of other Work. Installation of Work by the **Contractor** directly or through a Subcontractor, in any given area, shall constitute acceptance by the **Contractor** of all previously placed dependent Work.

6.3 Coordination of Electric Service:

6.3.1 The **Contractor** shall coordinate the installation of the permanent primary and/or temporary electrical service with the appropriate power company, to assure availability of sufficient power for all Project requirements so as not to cause any delay in the Work.

6.4 Coordination with other Contractors:

6.4.1 The **Contractor** shall coordinate his operations with those of the **City's** other contractors if they are on, about, or adjacent to, the Project site. Cooperation will be required with respect to access to the Project site in the arrangement for the storage of materials, and in the detailed execution of the Work.

ARTICLE 7 - PROSECUTION AND COMPLETION

7.1 Progress and Completion:

7.1.1 The Date for Commencement of the Contract Time shall be the date of execution of the Contract by the **Official**, unless otherwise directed in writing by the **Official**.

7.1.2 The **Contractor** shall commence the Work no earlier than the date of execution of the Contract by the **Official**, and shall prosecute and complete the Work regularly, diligently, and uninterruptedly at such rate or progress as will ensure Substantial Completion and Final Completion within the Contract Time(s).

7.1.3 Neither the **Contractor** nor the **City** shall be liable for any damages sustained by either party due to a failure to perform

the Work under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurrence

of which was a basic assumption under which this Contract was made, including but not necessarily limited to a natural disaster (flood, hurricane, or earthquake); a state of war, an imminent security threat, acts of enemies, embargoes, labor strikes, provided that the **Contractor** has notified the **Official** in writing of such cause within fourteen (14) days after its occurrence.

7.1.4 Before any Work is started, the **Contractor** shall deliver to the **Official** all of the licenses, permits, certificates of insurance, and bonds required by the Contract Documents. All certificates of insurance shall clearly state **ON THE FACE OF THE CERTIFICATE** that: the **City** and any other entity required by the Contract are Additional Insureds on all required policies except Workers' Compensation for the covered project; that Waiver of Subrogation is included with respect to all policies and coverages listed above; that the above insurance is primary and non-contributory over any other insurance available to the **City**; that such insurance extends to contractual liability; and that should any of the above policies be cancelled before the expiration thereof the issuing insurer will mail written notice to the **City** as certificate holder thirty (30) days in advance. The following statement affirming that coverage completely complies with the contract requirements shall be included in the Special Items section of the certificate of insurance or in an attached Special Items Addendum Page: **"The aforementioned insurance coverages completely comply with General Conditions Article 10 insurance requirements, Paragraphs 10.5 through 10.13.** Refer to Article 10, Paragraphs 10.5 through 10.11 for additional insurance requirements.

7.1.5 The **Contractor** shall start performance and furnishing of the Work on the Date of Commencement of the Contract Time. No Work shall be done at the site prior to the date on which the corresponding Contract Time starts to run.

7.1.6 Within ten (10) days after the **City** executes the Agreement, a pre-construction meeting will be held to record twenty-four hour emergency telephone numbers for key personnel; to review the qualifications of key **Contractor** personnel, the **Contractor's** plans for lay-down, staging, construction traffic, access to the site, parking and other similar matters; to review procedures for Change Orders, Change Authorizations and Submittals; and to establish and understanding among the parties as to the Work.

7.2 Compliance with Contract Time Requirements:

7.2.1 The **Contractor** shall prosecute the Work with the diligence necessary to ensure its completion within the Contract Time. The **Contractor** shall provide sufficient labor, materials and equipment, and shall promptly undertake appropriate action to recover schedule, as may be necessary to comply with the Contract Time requirements. Except as otherwise may be permitted by the Contract Documents, all Work at the site shall be performed during normal working hours, unless the **Contractor** has obtained the **City's** prior written consent.

7.2.2 Normal working hours shall be as per the **City's** Noise Ordinance, secs. 20-13--20-19 of the Revised Ordinances of the City of Newton, or based on a schedule beginning no earlier than 7:00 A.M. and ending no later than 7:00 P.M. on weekdays (excluding legal holidays), but not exceeding forty-eight (48) hours per week. If Work during other than normal working hours is scheduled by the **Contractor**, he shall reimburse the **City** for all of the **City's** associated extra costs; such costs to include, but not necessarily limited to, the **Architect's** related charges to the **City** and other costs assessed against or incurred by the **City** as designated in the Contract Documents, and if not designated, which the **Contractor** could reasonably have been expected to be aware of.

7.2.3 Given the Contract Time requirements of the Contract Documents, Early Dates in the Progress Schedule shall be based on proceeding with all or part of the Work exactly on the date when the Contract Time for the Work, or designated part of the Work, commences to run. Late Dates shall be based on completing the Work, or specified part of the Work, exactly on the corresponding Contract Time.

7.2.4 No Work shall be performed in other than daylight conditions unless adequate lighting has been provided by the **Contractor** after securing all required written approvals.

7.2.5 The **Contractor** shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with the **City**. No Work shall be delayed or postponed pending resolution of any disputes or disagreements. The **Contractor** shall exercise reasonable precautions, efforts and measures to avoid or mitigate situations that would cause delays.

7.3 Substantial Completion; Partial Completion:

7.3.1 When the **Contractor** considers that (a) the entire Work, or (b) a portion of the Work, for which a Contract Time for Substantial Completion has been specified in the Contract Documents, has progressed to the point where it is sufficiently complete, in accordance with the Contract Documents, the **Contractor** shall notify the **City** and **Architect** in writing that the **Contractor** considers the Work substantially complete, or that portion of the Work substantially complete as the case may be. Within a reasonable time after receipt of any such notice from the **Contractor** and **Architect** shall inspect the Work or

designated portion of the Work to determine the status of completion. If the **Architect** does not consider (a) the Work substantially

complete, or (b) the portion of the Work inspected substantially complete, the **Official** will, within thirty (30) days after the inspection, present in writing to the **Contractor** an itemized list of incomplete and unsatisfactory Work sufficient to demonstrate the basis for that determination.

7.3.2 If the **City**, with the advice of the **Architect**, considers the Work substantially complete, the **City** will, within twenty-one (21) days of receipt of the **Contractor's** certification, present to the **Contractor** a written declaration that the Work has been substantially completed. Such declaration shall fix a date of Substantial Completion and may attach a preliminary list of minor incomplete or unsatisfactory items not impairing the usefulness of the Work as the **City**, with the advice of the **Architect**, believes justifiable which shall be completed or corrected by the **Contractor** before the **City** considers the Work acceptable and ready for final payment.

7.3.3 In the event that the **City** fails to respond, by presentation of a written declaration or itemized list, to the **Contractor's** certification within the twenty-one (21) day period, the **Contractor's** certification shall take effect as the **City's** declaration that the Work has been substantially completed. The term "substantially complete" as applied to any Work refers to Substantial Completion.

7.3.4 At the time of delivery of the **City's** written declaration of Substantial Completion of the Work or part of the Work under Partial Utilization, the **City** will attach the **Architect's** written recommendation as to division of responsibilities between the **City** and the **Contractor** for security, operation, safety, maintenance, heat, utilities, insurance, and warranties and guarantees, pending final payment or Substantial Completion of the entire Work. If approved by the **City**, such written recommendation shall become binding upon the **City** and the **Contractor**, unless they have otherwise agreed in writing and so informed the **Architect**, prior to the **Official** issuing the Certificate of Substantial Completion.

7.3.5 If the **Architect** and **City** consider, or if after consideration of the **City's** objections, the **Architect** considers the entire Work substantially complete, or the portion of the Work inspected substantially complete, the **Architect** will deliver to the **City** and **Contractor** a Certificate of Substantial Completion with a Punch List fixing a date of Substantial Completion, a date for completion of the Punch List to the satisfaction of the **Architect** and, in the case of Substantial Completion of the Work or Partial Utilization under paragraph 7.4, a recommendation as to the division of responsibilities between the **City** and **Contractor**. If after considering the **City's** objections, the **Architect** determines that the entire Work is not substantially complete, or the portion of the Work inspected is not substantially complete, the **Architect** will notify the **Contractor** in writing stating the reasons.

7.4 Partial Utilization:

7.4.1 Utilization by the **City**, of any part of the Work, prior to Substantial Completion of the Work shall not affect the times of Substantial or Final Completion.

7.4.2 The **Contractor** agrees to permit the Partial Utilization of any part of the Work, by the **City** prior to Substantial Completion, in accordance with the following terms:

7.4.3 The **City** will, prior to any such Partial Utilization, give written notice to the **Contractor** indicating the areas intended to be used and occupied and commencement date(s) of such use.

7.4.4 Upon receipt of such notice of intent from the **City**, the **Contractor** shall promptly secure and submit to the **Official** endorsement from the **Contractor's** insurance carrier(s) and written consent from the **Contractor's** surety, permitting occupancy and use of the part of the Work, by the **City**. In addition, all **Contractor** or **subcontractor** workers who may be present in any part of the Work when students are present must be CORI checked and evidence of such provided to the **City**.

7.4.5 The **Contractor** shall maintain all insurance required under the Contract Documents for all portions of the Work used or occupied by the **City**. Such occupancy shall not affect the various guarantee periods called for by the Contract Documents.

7.4.6 The utilization of any part of the Work, by the **City** shall not be construed as final acceptance of Work, nor relieve the **Contractor** of the **Contractor's** obligation to perform any Work required by the Contract Documents, but not completed prior to Substantial Completion in, and with respect to, the areas to be occupied prior to the stipulated date Substantial Completion of the Work.

7.4.7 The **Contractor** shall not be required to maintain or clean the portion(s) of the Work so occupied, nor shall the **Contractor** be responsible for wear and tear or damage resulting solely from such occupancy.

7.4.8 It is understood and agreed that when any portion of the Work is in a reasonable condition, in the opinion of the **Official**, to receive any fittings or furniture or other property of the **City** not included in the Contract Documents, the **Contractor** shall

provide all necessary facilities and protection.

7.5 City-Caused Delay:

7.5.1 In the event a suspension, delay, interruption or failure to act of the **City** increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the **Contractor** for payment for an increase in the cost of his performance as the provisions 7.5.2 and 7.5.3 give the **Contractor** against the **City**, but nothing in provisions 7.5.2 and 7.5.3 shall in any way change, modify or alter any other rights which the Contractor or the subcontractor may have against each other.

7.5.2 The **City** may order the **Contractor** in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the **City**; provided however, that if there is a suspension, delay or interruption for fifteen (15) days or more or due to a failure of the **City** to act within the time specified in this Contract, the **City** shall make an adjustment in the Contract Price for any increase in the cost of performance of this Contract but shall not include any profit to the **Contractor** on such increase; and provided further, that the **City** shall not make any adjustment in the Contract Price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which the Contract provides for an equitable adjustment of the Contract Price under any other Contract provisions.

7.5.3 The **Contractor** must submit the amount of a claim under provision 7.5.2 to the **City** in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this Contract and, except for costs due to a suspension order, the **City** shall not approve any costs in the claim incurred more than twenty (20) days before the **Contractor** notified the **City** in writing of the act or failure to act involved in the claim. The **City** and the **Contractor** agree that it is both reasonable and practicable for any Notice of Claim under the provisions of paragraph 7.5.2 to be filed in writing with the **Official** no later than thirty (30) days after the end of the suspension, delay, interruption or failure to act that gives rise to the claim

7.5.4 No **City**-caused delay is unreasonable unless it exceeds the time specified or contemplated for the act (or failure to act) in the Progress Schedule for Work involved or affected by the **City**-caused delay.

7.5.5 Except as provided in this paragraph, no order or act, or failure to act, of the **City** or **Architect** shall constitute an unreasonable **City**-caused delay, or a **City**-caused delay which justifies an increase in Contract Price or Contract Time. No claim for an increase in Contract Price or other damages or any other claim other than for an extension in Contract Time shall be made or asserted against the **City** by reason of any delays unless specifically allowed by the Contract Documents or required by law. The **Contractor** shall not be entitled to an increase in the Contract Price or to compensation of any kind from the **City**, including extended site and home office overhead, for direct, indirect, consequential impact or other costs, expenses or damages, including but not limited to costs of acceleration or inefficiency arising because of delay, disruption or interference from any cause whatsoever. This provision shall not preclude recovery of damages by the **Contractor** for hindrances or delay due solely to fraud or bad faith on the part of the **City** or its agents. Otherwise, the **Contractor** shall be entitled only to a non-compensable extension to the Contract Time as the sole and exclusive remedy for such resulting delay, in accordance with and to the extent provided above.

7.6 Division of Responsibilities:

7.6.1 At the time of delivery of the certificate of Substantial Completion of the Work, or a certificate of Substantial Completion of a portion of the Work under Partial Utilization, the **Architect** will attach a written recommendation as to division of responsibilities between the **City** and **Contractor** for security, operation, safety, maintenance, utilities, insurance, and warranties and guarantees, pending final payment (or Substantial Completion of the Work), which shall be binding upon the **City** and **Contractor**, unless the **City** and **Contractor** have otherwise agreed in writing and so informed the **Architect**.

7.6.2 Any **Architect's** recommendation as to division of responsibilities under Partial Utilization shall bind the **City** and **Contractor** at the time when the **City** starts that Partial Utilization following receipts of evidence of compliance with the requirements of paragraph 10.8 regarding property insurance.

7.7 Unreasonable Delay, Extension or Acceleration:

7.7.1 For the purposes of justifying increases in Contract Price, no delay or extension (or acceleration in lieu of any such delay or extension) for which the **City** is responsible under the Contract Documents shall be unreasonable under the circumstances, however caused, unless it extends completion of all or a specified part of the Work beyond the time specified or contemplated for all or a part of the Work in the Progress Schedule.

7.8 Use of Float:

7.8.1 Total Float and Contract Float, whether expressly disclosed in the Progress Schedule or implied by the use of float suppression techniques, are not for the exclusive benefit of the **Contractor** or **City**, and shall be available to the **City**, **Architect** and **Contractor** to offset delays which postpone, extend or in any other manner alter the schedule or completion of all or part of the Work.

7.8.2 Adjustment or removal by the **Contractor** of any float suppression techniques used, e.g. preferential sequencing, crew movements, equipment use, form reuse, etc., extended duration, imposed dates, scheduling Work not required for a Contract Time as required Work anyhow, and others will be a prerequisite to an increase in Contract Price or Contract Time.

ARTICLE 8 - PROGRESS PAYMENTS, FINAL PAYMENT & ACCEPTANCE

8.1 Schedule of Values; Application for Payment

8.1.1 The Schedule of Values shall subdivide the Work into component parts in sufficient detail to facilitate and serve as the basis for progress payments, as specified in these General Conditions, and if not specified, by further detailing of the **Contractor's** bid breakdown. For each item, the Schedule of Values shall include quantities; direct craft labor man hours, labor cost and material/equipment cost. Labor costs shall include an appropriate amount of construction equipment costs, supplemental costs, administrative expenses, contingencies and profit.

8.1.2 Pursuant to M.G.L. Chapter 30 §39 K, within fifteen (15) days after receipt from the **Contractor**, of an Application for Payment, the **City** will make a periodic payment to the **Contractor** for the work performed during the preceding month, and upon certification by the **Contractor** that he is the lawful owner and that the materials are free from all encumbrances as noted on the Transfer of Title Form, for the materials not incorporated in the Work but delivered and suitably stored at the site, or at some other location approved in writing by the **Official** to which the **Contractor** has title or to which a Subcontractor has title and has authorized the **Contractor** to transfer title to the **City**, less (1) a retention based on its estimate of the fair value of its claims against the **Contractor**, and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of M.G.L. Chapter 30, Section 39F, and less (3) a retention not exceeding five percent (5%) of the approved amount of the periodic payment. Payment for materials and equipment stored on or off the Site shall be conditioned on compliance by the **Contractor** with procedures satisfactory to the **City** to establish the **City's** title to such materials or equipment or otherwise protect the **City's** interest, at a minimum to include a fully executed Transfer of Title Form.

8.1.3 The **Contractor's** Application for Payment shall be delivered on the day of each month established by the **Official**, by hand or by registered or certified mail, with return receipt requested, to the office of the **Architect**. The **Architect** shall mark the Application with the date of receipt. The date of receipt of an Application for Payment received on a Saturday shall be the first working day thereafter.

8.1.4 Such Application for Payment shall be in accordance with the Schedule of Values and made on a two-part form approved by the **Official** and shall be arithmetically correct and shall show (a) the value of labor and materials used in the work, and (b) the value, quantity of each item of materials not incorporated in the work but delivered and suitably stored at the site or elsewhere in accordance with this Article, and shall be accompanied by receipted bills for or other acceptable evidence of the ownership of, and satisfactory authority to transfer title to the **City** of, the materials not incorporated in the Work, and in addition, on a form satisfactory to the **Official**, an instrument transferring to the **City** title to the aforesaid materials. In addition, all Applications for Payment shall contain a separate item for each filed Subcontractor as of the date the Application is filed.

8.1.5 The **Architect** will submit the **Contractor's** Application for Payment, as checked and approved by the **Architect**, together with the **Architect's** certificate, to the **Official** not later than five (5) business days from the date the **Architect** receives an Application in the proper form from the **Contractor**.

8.1.6 The **Contractor** shall also submit, when requested by the **Official** or the **Architect**, vouchers and such other information showing payments already made by him for labor and materials used in the Work.

8.1.7 The **Architect** shall issue certificates for payments monthly, based on the **Contractor's** monthly Application for Payment. All orders and certificates shall be approved by the **Official** and shall not be binding on the **City** until so approved.

8.1.8 An Application for Payment covering Work of Subcontractors or Suppliers shall exclude amounts the **Contractor** or a Subcontractor does not intend to pay to Subcontractors or Suppliers for any reason. The **Contractor** will not be paid for any Work performed by a Subcontractor until all required evidence of insurance for that Subcontractor has been received and reviewed by the official, if such information has been requested by the **Official**. The **Contractor** and the Subcontractors shall

promptly pay the amounts due to each Subcontractor and Supplier, upon receipt of payment from the **City**.

8.2 Intent of Review of Application for Payment:

8.2.1 The **Architect's** recommendation of any payment requested constitutes a representation to the **City**, based on on-site observations and on the **Architect's** review of the Application for Payment and the accompanying data and schedules, that the Work has progressed to the point indicated, that, to the best of the **Architect's** knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents subject to an evaluation of the Work for conformance with the Contract Documents as a functioning whole prior to and upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work, and to any other qualifications stated in the recommendation, and that the **Contractor** is entitled to payment of the amount recommended.

8.2.2 In the case of final payment, the **Architect's** recommendation that the Work is acceptable shall be an additional representation by the **Architect** to the **Owner** that the conditions governing final payment to the **Contractor** have been met.

8.3 Review of Applications for Payment:

8.3.1 The **Official's** review of an Application for Payment will be based on on-site observations by the **Architect**, and on the **Architect's** review of the Application for Payment and of the accompanying data and schedules, and shall indicate that, to the best of the **Architect's** knowledge, information and belief, the Work has progressed to the point indicated, and that the quality of the Work is in accordance with the Contract Documents, subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests specified in the Contract Documents, a final determination of quantities and classifications for Unit Price Work, and any other qualifications so stated.

8.3.2 The **Official** may make changes in any Application for Payment submitted by the **Contractor**, and the payment due on said Application shall be computed in accordance with the changes so made, but such changes or any requirement for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment shall be computed in accordance with the changes made as provided herein; provided that the **Official** may, within seven (7) days after receipt, return to the **Contractor** for correction any Application which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt of such Application shall be the date of receipt of the corrected Application in the proper form and with arithmetically correct computations.

8.3.3 No certificate given or payment made shall be evidence of the performance of this Contract, either wholly or in part and no payment, whether made upon the final certificate or otherwise, shall be construed as an acceptance of *defective* work or materials.

8.3.4 No payment will be made for General Conditions by the **City** to the **Contractor** until the 1) Schedule of Values; 2) Progress Schedule; 3) Schedule of Shop Drawings Submittals and Shop Drawing Log; 4) all other technical submittals, including but not limited to a Schedule for Samples, Test Procedures, Test Results and other Printed Data have all been submitted, reviewed and determined to be in accordance with the requirements of the Contract Documents. In addition, no payment will be made for General Conditions by the **City** to the **Contractor** unless Record Drawings in the required format are provided, maintained and regularly updated by the **Contractor** in accordance with the requirements of the Contract Documents. The City may withhold such amounts from progress payments or from the final payment due or to become due to the **Contractor** as are necessary to satisfy any obligations of the **Contractor** under the Contract, or to satisfy other obligations of the Contractor not related to the Contract which the **City** is ordered to satisfy by a court of competent jurisdiction or is required to satisfy by law. Obligations of the **Contractor** under the Contract that may result in withholding all or part of a payment if, in the discretion of the **City**, are not satisfactorily provided include but are not limited to: obtain all required permits and licenses; provide the required temporary facilities; security of the Site; maintenance and weekly cleaning of the Site; fire protection; wind protection; noise/pollution control; establishment of a quality control system; coordination of sub-trades and suppliers; provide a full-time licensed superintendent and competent foreman; payment of police detail and fire watch accounts; payment of **City** costs for evaluation of substitution requests; payment for site utilities; payment for all labor and materials; correction of defective work; provide project photographs; establish and maintain on-site permanent benchmarks; provide operating, service and maintenance instructions; delivery of warranties and guarantees and follow all required close-out and commissioning procedures.

8.4 Refusal to Recommend or to Make Payment:

8.4.1 The **City** may withhold from any payment an amount based on the **Official's** estimate of the fair value of its claims against the **Contractor**, including but not limited to, any liquidated damages that would become or have been determined to be due; claims made against the **City** on account of the **Contractor's** performance or furnishing of the Work; direct payments due to Subcontractors in accordance with the provisions of M.G.L. Chapter 30, §39F; subsequently discovered evidence or other items entitling the **City** to a withholding or set-off against the amount recommended; or because of the **Architect's** refusal to

recommend payment. The **Official** will give the **Contractor** immediate written notice stating the reasons for such action.

8.4.2 The **Architect** may refuse to recommend the whole or any part of any payment, or because of subsequently discovered evidence or inspection or test results, nullify any such payment previously recommended, as may be necessary in the **Architect's** opinion, to protect the **City** from loss because: the Work is *defective*, or completed Work has been damaged requiring correction or replacement; the Contract Price has been reduced by Change Order; the **City** has been required to correct *defective* Work or to complete Work; reasonable evidence exists that the Work, or specified part, cannot be completed for the Contract Price or will not be completed within the Contract Time; third party claims filed or reasonable evidence indicating the probable filing of such claims; failure of the Contractor to make payments properly to Subcontractors for labor, materials or equipment; persistent failure to carry out the Work in accordance with the Contract Documents.

8.5 Payment Upon Substantial Completion:

8.5.1 Within sixty-five (65) days after the date of Substantial Completion, the **Official** shall send to the **Contractor** for acceptance a Substantial Completion estimate for the quantity and price of the Work done and all but one percent (1%) retainage on that Work, including the quantity, price and all but one percent (1%) retainage for the undisputed part of each work item and extra work item in dispute but excluding the disputed part thereof, less the estimated cost of completing all incomplete and unsatisfactory items and less the total progress payments made to date for the Work. The **Official** also shall deduct from the Substantial Completion estimate an amount equal to the sum of all demands for direct payment filed by Subcontractors and not yet paid to Subcontractors or deposited in joint accounts pursuant to M.G.L. Chapter 30, Section 39F, but the **Official** shall not deduct any amount by virtue of claims asserted against the **Contractor** by Subcontractors or Suppliers.

8.5.2 Within fifteen (15) days after the effective date of declaration of Substantial Completion, the **Official** shall send to the **Contractor** by certified mail, return receipt requested, a complete list of all incomplete or unsatisfactory Work items, and, unless delayed by causes beyond his control, the **Contractor** shall complete all such items within forty-five (45) days after the receipt of such list or before the date for final payment and acceptance, whichever is later. If the **Contractor** fails to complete the Work items within such time, the **Official** may, subsequent to seven (7) days written notice to the **Contractor** by certified mail, return receipt requested, terminate the Contract and complete the incomplete or unsatisfactory items and charge the cost of same to the **Contractor**.

8.5.3 If the **Official** fails to prepare and send to the **Contractor** any Substantial Completion estimate required by this paragraph on or before the date specified, the **City** shall pay to the **Contractor** interest on the amount which would have been due pursuant to such Substantial Completion estimate at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston from such date to the date on which the **Official** sends that Substantial Completion estimate to the **Contractor** for acceptance or to the date of payment, whichever occurs first. The **Official** shall include the amount of such interest in the Substantial Completion estimate.

8.5.4 Not later than the sixty-fifth (65th) day after each Subcontractor substantially completes his Work in accordance with the Contract Documents, the entire balance due under the Subcontract, less amounts retained by the **Official** as the estimated cost of completing the incomplete and unsatisfactory items of Work, shall be due the Subcontractor; and the **City** shall pay that amount to the **Contractor**. The **Contractor** shall pay to the Subcontractor the full amount received from the **City** less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the **Contractor**.

8.5.5 If, within seventy (70) days after the Subcontractor has substantially completed his Work, the Subcontractor has not received from the **Contractor** the balance due under the Subcontract including any amount due for extra labor and materials furnished to the **Contractor**, less any amount retained by the **City** as the estimated cost of completing the incomplete and unsatisfactory items of Work, the Subcontractor may demand direct payment of that balance from the **City**. The demand shall be by a sworn statement delivered to or sent by registered mail to the **Official**, and a copy shall be delivered to or sent by registered mail to the **Contractor** at the same time. The demand shall contain a detailed breakdown of the balance due under the Subcontract and a statement of the status of completion of the Subcontract Work. Any demand made after Substantial Completion of the Subcontract Work shall be valid even if delivered or mailed prior to the seventieth (70th) day after the Subcontractor has substantially completed the Work. Within ten (10) days after the Subcontractor has delivered or so mailed the demand to the **Official** and delivered or so mailed a copy to the **Contractor**, the **Contractor** may reply to the demand. The reply shall be by a sworn statement delivered to or sent by registered mail to the **Official** and a copy shall be delivered to or sent by registered mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the **Contractor** and the amount due for each claim made by the **Contractor** against the Subcontractor.

8.5.6 Within fifteen (15) days after receipt of the demand by the **Official**, but in no event prior to the seventieth day after Substantial Completion of the Subcontract Work, the **Official** shall make direct payment to the Subcontractor of the balance

due under the Subcontract including any amount due for extra labor and materials furnished to the **Contractor** less any amount (i) retained by the **City** as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any

court proceedings barring such payment, or (iii) disputed by the **Contractor** in the sworn reply; provided, that the **Official** shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to , or for which the sworn reply does not contain the detailed breakdown required by paragraph 8.5.5 above. The **City** shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this paragraph.

8.5.7 The **City** shall deposit the amount deducted from a direct payment as provided in part (iii) of paragraph 8.5.6 in an interest-bearing joint account in the names of the **Contractor** and Subcontractor in a bank in Massachusetts selected by the **Official** or agreed upon by the **Contractor** and the Subcontractor and shall notify the **Contractor** and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the **Contractor** and the Subcontractor or as determined by decree of a court of competent jurisdiction and appropriate venue.

8.5.8 All direct payments and deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant in a paragraph 8.5.7, shall be made out of amounts payable to the **Contractor** at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts which later become payable to the **Contractor** and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the **City** to the **Contractor** to the extent of such payment.

8.5.9 The **Official** shall deduct from payments to the **Contractor** amounts which, together with the deposits in interest-bearing accounts pursuant to paragraph 8.5.7, are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be designated for such direct payments, and the Subcontractors all have a right in such deductions prior to any claims against such amounts by creditors of the **Contractor**.

8.6 Payment to Subcontractors (Chapter 30 §39F):

8.6.1 After the **Contractor** receives payment on account of an Application for Payment, the **Contractor** shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the **Contractor**.

8.6.2 Each payment made by the **City** to the **Contractor** for the labor performed and the materials furnished by a Subcontractor shall be made to the **Contractor** for the account of that Subcontractor; and the **Official** shall take reasonable steps to compel the **Contractor** to so pay such Subcontractor, however the **City** shall have no obligation to pay or to see to the payment of money to any Subcontractor or Supplier, except as may otherwise be required by law or by a court of competent jurisdiction. If the **Official** has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the **Contractor** or which is to be included in a payment to the **Contractor** for payment to the Subcontractor, the **Official** shall act upon the demand as provided in this Article.

8.6.3 Any assignment by a Subcontractor of the rights under this paragraph 8.6 to a surety company furnishing a bond under the provisions of M.G.L. Chapter 149, §29 shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the **City** or which are on deposit pursuant to paragraph 8.5.7 shall be subordinate to the rights of all Subcontractors who are entitled to be paid under this Section and who have not been paid in full.

8.6.4 A **Contractor** or Subcontractor shall enforce a claim to any portions of the amount of a demand for direct payment deposited as provided in this Article, by a petition in equity in the Superior Court against the other and the bank shall not be a necessary party. A Subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in this Article by a petition in equity in the Superior Court against the **City** and the **Contractor** shall not be a necessary party.

8.6.5 "Subcontractor" as used in this paragraph 8.6 shall mean a person who files a Sub-Bid and receives a subcontract as a result of that filed Sub-bid or who is approved by the **Official** in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the **Contractor**.

8.7 Final Application for Payment:

8.7.1 Upon written notice from the **Contractor** that the entire Work or a specified part is complete and ready for final payment, the **Architect** will make final inspection with the **Official** and the **Architect** will notify the **Contractor** in writing of all instances of incomplete or *defective* Work revealed by the final inspection. The **Contractor** shall immediately undertake any necessary

measures to correct the deficiencies.

8.7.2 After the **Contractor** has completed all such corrections to the satisfaction of the **Architect** and delivered all required close out documents including but not limited to, maintenance and operating instructions, guarantees, bonds, certificates of inspection, marked-up record documents and as-built drawings (revised to reflect any changes or corrections made after Substantial Completion) and all other required documents, and after the **Architect** has consented to review the Work to determine whether it is acceptable, the **Contractor** may make application for final payment. The application for final payment shall enclose: affidavits certifying that the bonds and insurance are in effect and that insurance coverage will not be canceled, adversely changed or renewal refused except as provided under paragraph 10.5.5; AIA document G707 certifying that the surety agrees that final payment shall not relieve the surety of any of its obligations under the Bond; affidavits of compliance; complete and legally effective waivers acceptable to the **Official** from all persons holding payment claims against the Work, or if any Subcontractor or Supplier refuses or fails to furnish such waiver, a bond or other security acceptable to the **Official** to indemnify the **City** against any such payment claim; and a list of all property damage and injury insurance claims arising due to Work performed handled by the **Contractor** and the **Contractor's** insurer identifying the claimant, the nature and the action taken.

8.8 Final Payment and Acceptance:

8.8.1 If, on the basis of the **Architect's** observation of the Work and final inspection, and his review of the final Application for Payment, the **Architect** is satisfied that the Work, or specified part of the Work, has been completed and the **Contractor's** other obligations under the Contract Documents have been fulfilled, the **Architect** will, within thirty (30) days after receipt of the final Application for Payment, furnish to the **Official** and the **Contractor** the **Architect's** recommendation of acceptance. If not satisfied, the **Architect** will return the Application to the **Contractor** indicating in writing the reasons for not recommending final payment and acceptance, in which case the **Contractor** shall make the necessary corrections and resubmit the Application.

8.8.2 After the receipt of an Application for final payment, and within sixty-five (65) days after (a) the **Contractor** fully completes the Work or substantially completes the Work so that the value of the Work remaining to be done is, in the estimate of the **Official**, less than one percent (1%) of the original Contract Price, or (b) the **Contractor** substantially completes the Work and the **City** takes possession for occupancy, whichever occurs first, the **City** shall pay the **Contractor** the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claims against the **Contractor** and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of M.G.L. Chapter 30, §39F, or based on the record of payments by the **Contractor** to the Subcontractors under this Contract if such record of payment indicates that the **Contractor** has not paid Subcontractors as provided in §39F.

8.8.3 If the **City** fails to make payment as provided for in Paragraph 8.8.2, there shall be added to each such payment daily interest at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Newton commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the **Contractor**; provided, that no interest shall be due, in any event, on the amount due on an Application for final payment until fifteen (15) days after receipt of such an Application from the **Contractor**. The **Contractor** agrees to pay to each Subcontractor a portion of any such interest paid in accordance with the amount due each Subcontractor.

8.8.4 If the **City** fails to prepare and send to the **Contractor** the final estimate within thirty (30) days after receipt of notice of completion, the **City** shall include in the final estimate interest on the amount which would have been due to the **Contractor** at the rate specified in paragraph 8.5.3 from the thirtieth (30th) day after such completion until the date on which the **Official** sends the final estimate to the **Contractor** for acceptance or the date of payment, whichever occurs first, provided that the **Official's** inspection shows that no Work items required by the Contract Documents remain incomplete or unsatisfactory. Interest shall not be paid under this provision on amounts for which interest is to be paid under paragraph 8.4.

8.8.5 In consideration of execution of this Contract by the **City**, the **Contractor** agrees that simultaneously with the acceptance of what the **City** tenders as the final payment by it under this Contract, he will execute and deliver to the **City** an instrument under seal releasing and forever discharging the **City** of and from any and all claims, demands, and liabilities whatsoever of every name and nature both at law and in equity arising from growing out of, or in any way connected with this Contract, save only such claims, demands, and liabilities as are expressly excepted in said instrument. It is agreed that the person who in fact executes and delivers said instrument shall be deemed to be authorized and empowered to execute and deliver the same on behalf of the **Contractor**.

8.8.6 If the **City** does not concur with the **Architect's** determination, the **City** will return the application to the **Contractor** indicating in writing the reasons for refusing final acceptance, in which case the **Contractor** shall make the necessary corrections and resubmit the application. The **City's** written determination will be binding upon the **Contractor**, unless he delivers to the **City** a written Notice of Claim within thirty (30) days after receipt of the determination in compliance with Article 15.

8.8.7 If through no fault of the **Contractor** final completion of the Work is significantly delayed and if recommended by the **Architect**, the **City** may, upon receipt of the **Contractor's** Final Application for Payment, and without terminating the Contract,

make payment of the balance due for that portion of the Work fully completed and accepted. If the balance to be held by the **City** for Work not fully completed or corrected is less than the retainage on that Work, the affidavits specified in paragraph 8.7.2 and the releases or waiver, or bonds, shall be furnished as required and submitted by the **Contractor**. Payment of the balance due shall be made under the provisions for final payment, but it shall not constitute a waiver of claims.

8.9 Payment for Labor and Materials by Contractors and Subcontractors:

8.9.1 The **Contractor** agrees that he and all Subcontractors performing the Work shall pay for all Labor performed or furnished and materials used or employed in the performance of the Work including lumber so employed which is not incorporated in the Work and is not wholly or necessarily consumed or made so worthless as to lose its identity, but only to the extent of its purchase price less its full salvage value, and including also any material specially fabricated at the order of the **Contractor** or Subcontractor for use as a component part of the Work so as to be unsuitable for use elsewhere, even though such material has not been delivered and incorporated into the Work, but only to the extent that such specially fabricated materials is in conformity with the Contract Documents, or any charges for materials used or employed therein which are consigned to the **Contractor** or to a Subcontractor who has a direct contractual relationship with the **Contractor**, and shall pay all sums due for the rental or hire of vehicles, steam shovels, roller propelled by steam or other power, concrete mixers, tools, and other appliances and equipment employed in the Work; and shall pay the transportation charges directly related to such rental or hire; and shall pay all sums due trustees or other persons authorized to collect such payments from the **Contractor** or Subcontractors based upon the labor performed or furnished as aforesaid for a maximum of one-hundred twenty (120) consecutive calendar days, for health and welfare plans and other fringe benefits which are payable in cash, and provided for in collective bargaining agreements between organized labor and the **Contractor** or Subcontractors.

8.9.2 In the event that the Contract Documents provide for reimbursement by the **City** to the **Contractor** for travel or other expenses, the **Contractor** shall submit such proposed expenses to the **Official** for approval prior to the incurrence of such expenses.

8.10 Penalties for False Claims:

8.10.1 The attention of the **Contractor** and all Subcontractors is directed to each of the following sections of the M.G.L. regarding penalties for presentation to the **City** of what the **Contractor** or Subcontractor knows to be a false claim or claims.

8.10.1.1 M.G.L. Chapter 266, §67B provides for criminal penalties of a fine of not more than Ten Thousand Dollars ($10,000.00) or for imprisonment for not more than five years in State Prison or for not more than two and one half years in the House of Correction, or both; M.G.L. Chapter 12, §5B provides for civil penalties of not less than Five Thousand Dollars ($5,000.00) and not more than Ten Thousand Dollars ($10,000.00) per violation, plus three times the amount of damages sustained by the City as well as the cost to recover said damages; and M.G.L. Chapter 29, §29F provides for debarment from bidding on all public work for a specified period of time that may be imposed for willfully supplying materially false information incident to performing any public contract or subcontract.

8.11 Contractor's Continuing Obligation:

8.11.1 The **Contractor's** obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following constitutes acceptance of Work not in accordance with the Contract Documents or a release of the **Contractor's** obligation to perform the Work in accordance with the Contract Documents: (a) a recommendation of any progress or final payment by the **Architect**, (b) the issuance of a certificate of Substantial Completion, (c) any payment by the **City** to the **Contractor**, (d) any Partial Utilization by the **City**, (e) any act of acceptance by the **City** nor any failure to do so, (f) any review and approval of a Shop Drawing, sample, test procedure, or other Submittal, (g) any review of a Progress Schedule, (h) any inspections, tests or approvals, (i) the issuance of a notice of acceptability by the **Architect**, (j) any correction of *defective* Work by the **Official**.

8.12 Waiver of Claims:

8.12.1 The making and acceptance of final payment will not constitute a waiver by the **City** of any rights in respect of the **Contractor's** continuing obligations under the Contract Documents, nor will it constitute a waiver of (a) any claims by the **City** against the **Contractor** still unsettled, (b) any claims arising from unsettled payment claims, *defective* Work appearing after final inspection or failure by the **Contractor** to comply with the Contract Documents or the terms of any special warranties or guarantees provided by the Contract Documents or by Law.

8.12.2 The making and acceptance of final payment will constitute a waiver of all claims by the **Contractor** against the **City**

other than those previously made on a timely basis in writing and still unsettled.

ARTICLE 9 - PROTECTION OF PERSONS AND PROPERTY

9.1 General:

9.1.1 The **Contractor** shall be responsible for all Site security and he shall protect everything on, in, or at the site from injury by water, frost, wind, fire, accident, theft, vandalism or other cause, and any interference; take charge of, protect, and be liable for any loss of or damage to the materials for use under this Contract delivered at or in the vicinity of the Site, and whether or not suitably stored at the Site, or at some other location agreed upon in writing by the **Official**, pursuant to this Section by whomever furnished; take all proper precautions to protect the **City's** property or adjoining property from damage or unnecessary interference; provide proper means of access to the property and replace or put in a good condition every public or private way, conduit, catch basin, fence, trees, or other things damaged by the **Contractor** in performing the Work, unless permanently done away with on approval of the **Official**, for the proper performance of the Work; take all proper precautions to protect persons from injury, unnecessary interference or inconvenience, and be responsible for the results of any failure in doing so; leave an obstructed way along public and private places for pedestrians and vehicular traffic and leave direct access to hydrants; provide proper walks over and around any obstruction made in public places in the performance of the Work; maintain from the beginning of twilight through the whole of every night, on or near the obstruction, sufficient lights and guards to protect travelers from injury thereby; when the Work is suspended keep all roadways and sidewalks in proper condition, and put and leave the same in safe condition at the completion of the Work, all to the satisfaction of the **Official**.

9.1.2 Any additional requirements for protection of persons and property shall be as set forth in these General Conditions and in the Supplementary Conditions.

9.2 Safety and Protection:

9.2.1 The **Contractor** shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs. The **Contractor** shall take all necessary precautions for the safety of, and shall erect and maintain all necessary safeguards and provide the necessary protection to prevent damage, injury or loss to: (a) all employees on the Work, (b) other persons who may be affected, (c) all the Work and materials and equipment to be incorporated into the Work whether in storage on or off the Site and (d) other property at or adjacent to the Site including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Utilities not designated for removal, relocation or replacement. Unless otherwise stated in writing by the **Contractor** to the **Official**, the **Contractor's** safety representative at the site shall be the superintendent.

9.2.2 The **Contractor** shall, and shall require all Subcontractors to comply with all Laws including **City** ordinances and regulations governing the safety and protection of persons or property, including but not limited to (a) the Occupational Safety and Health Act and the Hazard Communication Act, as promulgated by the Federal Government and as adopted by the Commonwealth of Massachusetts, and (b) all applicable State health and safety requirements. The **Contractor** shall be responsible for all fines and penalties imposed for any related violation(s) of Federal, State and **City** health and safety requirements.

9.2.3 The **Contractor** shall notify owners of adjacent property, including Underground Utility owners, in writing seventy-two hours in advance when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. The **Contractor** shall simultaneously notify the **Clerk of the Works and Official** of any notice given to owners of adjacent property. All damage, injury or loss to that property caused, directly or indirectly, in whole or in part, by the **Contractor**, any Subcontractor or Supplier shall be remedied by the **Contractor**, except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of the **City** or the **Architect**, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the **Contractor**. The **Contractor** shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to the Site. These **Contractor's** duties and responsibilities shall continue until the **Architect** has issued written notice to the **City** and the **Contractor** that the Work is acceptable.

9.2.4 Blasting operations, if any are specifically approved by the **Official**, shall be conducted by competent and suitably trained and qualified persons and in strict accordance with the rules and regulations of the Massachusetts Department of Public Safety governing the keeping, storage, use, manufacturer, sale, handling, transportation or other disposition of explosives, and such other rules and regulations as may be promulgated from time to time by authorities having jurisdiction. The **Contractor** shall obtain all required permits prior to the use of explosives, and shall furnish a copy of those permits to the **Official** prior to their use. When using other hazardous materials or equipment, the **Contractor** shall exercise the utmost care and shall carry on such

activities under the supervision of competent and properly qualified persons.

9.2.5 The **Contractor** is fully responsible for initiating, maintaining and supervising all safety precautions and programs related to safety on the site. The **Contractor** shall submit to the **Official** no later than fifteen (15) days after the Date for the Commencement of Work, his written plan for site Safety and Accident prevention. This plan must be submitted to the **Official** prior to the **Contractor's** submittal of the first Application for Payment.

9.2.6 Except as otherwise may be provided in the technical specifications, if the **Contractor** encounters material at the site reasonably believed to be asbestos or polychlorinated biphenyl (PCB) which has not been rendered harmless, the **Contractor** shall immediately stop all affected Work, report the condition to the **Official** in writing and take appropriate health and safety precautions. Upon receipt of any such notice, the **Official** will investigate the conditions. If in fact the material is asbestos or PCBs which have not been rendered harmless, the **Official** shall suspend all affected Work and proceed to have the asbestos or PCB material removed or rendered harmless by either negotiating a Change Order or Change Authorization with the **Contractor**, by means of separate contract or as the **Official** may otherwise deem expedient, or in the alternative, terminate the affected Work or the entire Agreement for convenience, as provided in Article 14.

9.2.7 Once the material has been removed or rendered harmless, the affected Work shall be resumed as directed by the **Official**. If any such incident causes or will cause delay, extension or acceleration that postpones, extends or in any other manner alters the schedule or completion of all or part of the Work, the **Owner** shall, pursuant to the provisions in Articles 8 and 11, make or negotiate with the **Contractor**, an adjustment in Contract Price or Contract Time for any increases in the **Contractor's** actual documented cost or the time required to perform the Work. The **Contractor** assumes responsibility for any related delay, extension or acceleration that is reasonable under the Contract Documents.

9.3 Accident Prevention:

9.3.1 The **Contractor** shall comply with all recommendations and requirements for accident prevention of the Associated General Contractors of America and the provisions for accident prevention included in the Commonwealth of Massachusetts, 454, CMR 10.0 "Construction Industry Rules and Regulations." The **Contractor** should note that these aforementioned recommendations and requirements are the minimum standards that are to be adhered to.

9.3.2 Neither the **City** nor the **Architect** nor any officer, agent or employee of either of them shall be responsible for providing safe working places, safety measures, means or techniques for the **Contractor**, Subcontractors or their employees or any individual.

9.4 Fire Protection and Prevention:

9.4.1 The **Contractor** will ensure that the requirements in the Contract Documents and any and all permits issued regarding Fire Protection and Prevention, including fire watch, are strictly adhered to during the entire Contract Time, until Final Completion of the Work.

9.5 Wind Protection:

9.5.1 The **Contractor** shall take every precaution to minimize danger to persons, damage to the Work, and damage to adjacent properties resulting from winds. These precautions shall include, but not limited to, removing all loose materials, tools and/or equipment from exposed locations, and removing or securing scaffolding or other temporary work.

9.6 Insurance Inspection:

9.6.1 The **Contractor** shall provide for periodic inspections by his insurance underwriters and shall submit written evidence of the same to the **Official**. The **Contractor** shall, at his expense, promptly carry out their recommendations.

9.7 Security:

9.7.1 The **Contractor** shall provide, at no increase in Contract Price, sufficient security at the Site at all times when the **Contractor's** personnel are not present for the protection of all Work, materials, equipment, and property at the Site, from the Commencement of the Work until Substantial Completion of the Project.

9.7.2 If the **Contractor** fails to provide sufficient security as called for in paragraph 9.7.1, the **Official** may elect to provide such sufficient security as required, and charge the associated costs to the **Contractor**.

9.8 Welding and Cutting:

9.8.1 All welding and cutting shall be in accordance with Newton Fire Department regulations. Torch cutting and/or welding operations by Subcontractors shall have the approval of the **Contractor** prior to start of such operations. In addition to the requirements of this Article, wherever electric or gas welding or cutting work is done in the vicinity of combustible material, or over areas where persons may be found, interposed shields of fireproof material shall be used to protect against fire damage or injury. Personnel with suitable fire extinguishing equipment shall be stationed near welding and cutting operations to prevent the sparks from lodging in floor cracks or passing through floor or wall openings and from lodging in combustible materials. Chemical extinguishers shall be available and ready for use in all locations where torch cutting and/or welding operations are in progress.

9.9 Overloading:

9.9.1 The **Contractor** shall neither cause nor allow the design live load of any or all parts of the structure to be exceeded at any time during the performance of the Work.

9.10 Noise and Pollution Control:

9.10.1 All Work performed under the Contract Documents shall conform to the requirements of: M.G.L. Chapter 111, §§ 31C and 142D; Rules and Regulations adopted by the Commonwealth of Massachusetts Department of Public Health, Division of Environmental Health; the City of Newton Noise Ordinance, secs. 20-13 – 20-19 of the Revised Ordinances of the City of Newton; the Inspectional Services Department; the Newton Health and Human Services Department; and all other regulatory agencies having jurisdiction.

9.11 Weather Protection:

9.11.1 In accordance with the requirements of M.G.L. Chapter 149, §44G(d) the **Contractor** shall be responsible for initiating, maintaining and supervising all weather protection precautions and programs in connection with the Work. As part of this responsibility, the **Contractor** shall provide temporary enclosures and heat to permit construction work to be carried on during the months of November through March, and shall furnish, if required by the **Official**, one (1) accurate Fahrenheit thermometer with daily high and low readings for every 2,000 square feet of floor space where the work areas exceed 2,000 square feet.

9.11.2 "Weather Protection" shall mean the temporary protection of that Work adversely affected by moisture, wind and cold, by covering, enclosing and/or heating. This protection shall provide adequate working areas during the months of November through March as determined by the **Official** and consistent with the approved Progress Schedule to permit the continuous progress of all Work necessary to maintain an orderly and efficient sequence of construction operations. The **Contractor** shall furnish and install all "weather protection" material and be responsible for all costs, including heating required to maintain a minimum temperature of 40 degrees Fahrenheit at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials or the applicable general conditions set forth in the Contract Documents with added regard to performance obligations of the Contract, the **Contractor** shall submit to the **Official** the required number of copies of his proposed methods for "Weather Protection."

9.11.3 Weather protection and heating devices shall comply with safety regulations, including provisions for adequate ventilation and fire protection devices. Heating devices that may cause damage to finish surfaces shall not be used.

ARTICLE 10 - LEGAL REQUIREMENTS AND INSURANCE

10.1 Laws; Permits and Licenses:

10.1.1 The **Contractor** shall become familiar with and comply with all applicable Laws, and shall give all notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to the performance of the Work. Unless otherwise expressly stated, references in the Contract Documents to Laws shall mean the current version or edition of the Law. Unless expressly required by Law, neither the **City** nor **Architect** shall be responsible for monitoring the **Contractor's** compliance with any Laws. If the **Contractor** believes the Contract Documents deviate from the requirements of any permits, codes or Laws, the **Contractor** shall give the **Architect** and the **City** prompt written notice. If the **Contractor** performs any Work knowing or having reason to know it is contrary to any permits, codes or Laws, the **Contractor** shall bear responsibility for all resulting cost and delay. Except as provided in paragraph 10.1.3, the **Contractor** shall bear responsibility for all costs and delays arising from these obligations.

10.1.2 The **Contractor** shall obtain and pay for all legally required permits and licenses, and the **Contractor** shall pay all governmental charges, impact fees, inspection fees and other fees necessary for the prosecution of the Work including Work

involved in a Change Order, Change Authorization or claim, and submit copies to the **Architect**. The **Contractor** shall meet all requirements of those permits, licenses and fees. If the **Official** has obtained any permits or licenses, the **Contractor** shall

meet all requirements of those permits and licenses. The **Contractor** shall pay all charges of utility Officials for connections to the Work. Except as provided below, the **Contractor** shall bear all costs and delays arising from these responsibilities.

10.1.3 If the requirements of any issued permit or license, or of any Laws applicable to the Work, differ from those specified in the Contract Documents, or if not specified, enacted before the date of Bid opening, the **Contractor** shall, promptly after becoming aware, notify the **Architect** in writing. If the **Official**, with the advice of the **Architect**, concludes that the Contract Documents require changing because of that variance, the **Official** shall authorize the required changes together with any adjustment in Contract Price necessitated solely by the variance. If the variance causes or will cause delay, extensions or acceleration that postpones, extends or in any other manner alters the schedule or completion of all or part of the Work, the **Official** shall, pursuant to the provisions in Articles 11 and 12, make or negotiate with the **Contractor**, an adjustment in Contract Price or Contract Time for any increases in the **Contractor's** cost or the time required to perform the Work. The **Contractor** assumes responsibility for any related delay, extension or acceleration under the Contract Documents.

10.1.4 If the **Contractor** observes that the Contract Documents are at variance with the requirements of any permits, licenses, or Laws, the **Contractor** shall give the **Architect** prompt written notice. If the **Contractor** performs any Work knowing or having reason to know that it is contrary to permits or licenses, or Laws, the **Contractor** shall assume all resultant costs and delays.

10.1.5 If the **Contractor** delays the progress of any related work at the Site let by the **City** under a separate contract apart from this Contract so as to cause loss for which the **City** becomes liable, then he shall reimburse the **City** for such loss based on actual costs incurred by the **City**.

10.2 Patent Fees and Royalties:

10.2.1 The **Contractor** shall pay all license fees and royalties and bear all costs incident to the use, in the performance of the Work or the incorporation into the Work, of any invention, design, process, product or device covered by patent rights or copyrights. If a particular item is specified in the Contract Documents or is selected by the **Contractor** for use in the performance of the Work, and its use is subject to patent rights or copyrights calling for the payment of any license fees or royalties, it shall remain the responsibility of the **Contractor** to assume all costs incident to its use. Whenever the **Contractor** is required or elects to use any such item, the right for its use shall be provided for by suitable agreement(s) with the patentee or owner, and copies of the agreement(s) shall be filed with the **Architect**. However, whether or not agreement(s) is/are made or filed as noted, the **Contractor** and his surety shall in all cases defend, indemnify and hold harmless the **Owner** and **Architect** from and against all claims, causes of action, lawsuits, damages, losses and expenses, whether direct, indirect or consequential, including but not limited to charges of engineers, attorneys and other professionals and costs of both defense and appeal, if any, in the remainder of this Article 10 referred to collectively as "claims", arising from patent rights or copyrights infringements.

10.3 Taxes:

10.3.1 Except as otherwise provided in the Instructions to Bidders, the **Contractor** shall pay all sales, consumer, use and other taxes assessed against the **City** or the **Contractor** in accordance with Laws covering the Work. The **Official** shall make an adjustment in Contract Price for any increased taxes covering the Work paid by the **Contractor**, provided that those increases in taxes were enacted after the date of Bid opening. The **City of Newton** is exempt from Massachusetts Sales Tax. The Certificate of Exemption Number is E-046-001-404.

10.3.2 M.G.L. Chapter 64, §6(f) exempts, from Massachusetts sales tax, materials and supplies consumed, employed or expended in the Work, materials and supplies physically incorporated in the Work, and rental charges for construction vehicles and equipment rented specifically for use on the Work or while being used exclusively for the transportation of materials for the Work.

10.4 Performance, Payment and Other Bonds:

10.4.1 The **Contractor** shall furnish Performance and Payment Bonds with good and sufficient surety, each in an amount equal to the Contract Price, as the security required by M.G.L. Chapter 149. All bonds shall be in the forms specified in the Contract Documents, and shall only be issued by a surety currently licensed to do business by the Commonwealth of Massachusetts Division of Insurance and appearing on the current U.S. Treasury Circular 570 List of Approved Sureties and remain in effect until the end of the Correction Period. Attorneys-in-Fact who sign Bonds shall attach a certified copy of their Power of Attorney to conduct business in the Commonwealth of Massachusetts.

10.5 The Contractor's Insurance-General:

10.5.1 The insurance the **Contractor** shall purchase and maintain at his expense shall include the coverage required by the laws of the Commonwealth of Massachusetts as well as that specified in this Article, and be written for not less than the limits of coverage required in this Article or as required by the laws of the Commonwealth of Massachusetts. Deductible amounts shall be reduced or eliminated upon the **Official's** written request. The insurer's costs of providing the insured(s) a defense and appeal, including attorney's fees, may not be included in, and shall be in addition to, the limits of the policy coverages. Certificates of Insurance must be delivered to the **Official** before any work is started, and shall be in the form required by Paragraph 7.1.4 and in the coverages and minimum policy limits required in this Article.

10.5.2 The **Contractor** shall not start or continue to perform any Work unless he has in full force and effect all required insurance; nor shall he allow any Subcontractor or Supplier to perform any Work until that Subcontractor or Supplier has in full force and effect all required insurance or the **Contractor's** insurance has been endorsed to add that Subcontractor or Supplier as an additional insured.

10.5.3 Insurance shall only be provided by insurers licensed to transact business in the Commonwealth of Massachusetts.

10.5.4 Deductible amounts shall be reduced or eliminated upon the **Official's** written request. The insurer's costs of providing the insureds a defense and appeal, including attorney's fees, may not be included, and shall be in addition to, the limits of the coverage provided.

10.5.5 All the policies of insurance shall be endorsed to provide that the coverage afforded will not be canceled, adversely changed or renewal refused until the expiration of at least thirty (30) days prior written notice to the **Official** by registered mail. Should any coverage approach expiration during the period in which it is to remain in full force and effect, it shall be renewed prior to its expiration, and a renewal certificate filed with the **Official** at least fifteen (15) days prior to expiration.

10.5.6 If any of the **Contractor's** sureties or insurers is declared bankrupt or placed into receivership, ceases to meet the requirements of the Contract Documents, or its license to do business in the Commonwealth of Massachusetts is terminated, the **Contractor** shall immediately substitute other bonds/sureties or insurers/policies, which shall conform to the requirements of the Contract Documents, and shall file the appropriate bonds or certificates of insurance with the **Official**.

10.5.7 The required insurance coverages shall be placed with insurance companies licensed by the Commonwealth of Massachusetts Division of Insurance to do business in the Commonwealth of Massachusetts and having a Best's rating of "A"; shall be taken out before the Contract Time commences and be kept in full force and effect throughout the term of the Contract; shall be primary and non-contributory to any coverages maintained by the **City**; and shall require that the **City** be given thirty (30) days advance notice in the event of any cancellation or any materially adverse change in coverage. All such insurance, with the possible exception of Pollution Liability Insurance, shall be written on an occurrence basis form as opposed to a claims-made basis form. The **City** shall be named as an additional insured under the Commercial General Liability, Umbrella, Automobile Liability, Pollution Liability and Builders Risk policies. Additional insured form ISO CG 20-10 11/85 or equivalent, and Waiver of Subrogation in Favor of Owner form ISO CG2404 is required under the General Liability and Umbrella policies. The Workers' Compensation and Employers' Liability policies shall include a waiver of subrogation in favor of the **City**. All such insurance as is required of the **Contractor** shall be provided by or on behalf of all Subcontractors to cover their operations. The **Contractor** shall be held responsible for any modifications, deviations or omissions in compliance with these requirements by the Subcontractors. At the inception of the Contract and throughout the term of the Contract the City shall be provided with certificates of insurance evidencing that such insurance policies are in place and provide the coverages required.

10.6 The Contractor's Liability Insurance:

10.6.1 The **Contractor** shall purchase and maintain commercial general liability and other insurance appropriate for the Work and which will provide protection from claims itemized below which may arise out of or result from the **Contractor's** performance and furnishing of the Work and the **Contractor's** other obligations under the Contract Documents, whether the Work and other obligations will be performed or furnished by the **Contractor**, any Subcontractor or Supplier. The amounts of the commercial general liability insurance policy shall be as follows:

1.	Bodily Injury	$1,000,000 each occurrence
2.	Property Damage	$2,000,000 general aggregate, per project
3.	Products & Completed Operations	$1,000,000 annual aggregate
4.	Personal & Advertising Injury	$1,000,000 each occurrence
5.	Medical Expenses	$10,000

The commercial general liability policy shall include coverage relating to explosion, collapse, and underground property damage.

The **Contractor** shall also provide insurance coverage for bodily injury and property damage resulting from liability arising out of pollution related exposures such as asbestos abatement, lead paint abatement, tank removal, removal of contaminated soil, etc. The **City** shall be named as an additional insured and the amount of coverage shall be $1,000,000 per occurrence and $2,000,000 aggregate.

10.6.1.1 Claims under worker's compensation, disability benefits, and other applicable similar employee benefits acts; claims for damages because of bodily injury, occupational sickness or disease, or death of the **Contractor's** employees.

10.6.1.2 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the **Contractor's** employees; claims for damages insured by personal injury liability coverage sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by the **Contractor**, or (b) by any other person for any other reason; claims for damages because of injury to or destruction of tangible property wherever located, including loss of use resulting from any such injury or destruction.

10.6.1.3 Claims arising out of operation of laws for damages because of bodily injury or death of any person or for damage to property.

10.6.1.4 Claims for damages because of bodily injury or death of any person, or property damage arising out of ownership, maintenance, operation, use or loading and unloading of any owned, hired or non-owned motor vehicle used in the Work, including employee non-ownership use. The combined single limit shall be $1,000,000 and shall include a CA9948 Pollution Endorsement and shall name the **City** as an additional insured.

10.6.2 The **Contractor's** liability insurance shall include contractual liability coverage sufficient to cover to the **Contractor's** indemnification obligations under the Contract Documents. The **Contractor** agrees to pay on behalf of the **Official**, and to provide and pay a defense for all claims covered by the **Contractor's** obligations under the indemnification provisions.

10.6.3 The **Contractor's** liability insurance shall be endorsed to include the **City** as an additional insured, and the **Architect**, the **City's** and **Architect's** consultants, any of their subsidiaries or affiliates, and each of their respective directors, officers, shareholders, agents or employees as additional insureds. The insurance afforded to the **City** and those other parties shall be primary insurance, and neither the coverage nor the amount of insurance provided under the **Contractor's** policies shall be reduced or prorated by the existence of any other insurance applicable to any loss the **City** or those other parties may have sustained.

10.6.4 The **Contractor's** liability insurance shall remain in effect until the end of the Correction Period and at all times after that when the **Contractor** may be correcting, or removing and replacing *defective* Work. The Products and Completed operations insurance shall be maintained for two (2) years after final payment. Evidence of insurance shall be furnished to the **Official** upon request and no less frequently than yearly.

10.6.5 These requirements shall not be construed to limit the liability of the **Contractor** or his insurers. The **City** does not represent that the specified coverages or limits of insurance are sufficient to protect the **Contractor's** interests or liabilities.

10.6.6 If the **City** or the **Contractor** suffers injury or damage to person or property because of error, omission or act of the other, any of the other's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observation of that injury or damage. This provision is not and shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.

10.7 The Owner's Liability Insurance:

10.7.1 The **Contractor** shall purchase and maintain owners' contractor's protective liability insurance specifically for and appropriate for the Work and which will provide protection for the **City** against those claims which may arise out of or result from operations under the Contract; or the **Contractor** shall be required to endorse the **Contractor's** commercial liability insurance to show that the limits of liability apply per project and per location. If the **Contractor** furnishes owner's and contractor's protective liability insurance, the parties designated in paragraph 10.6.3 shall be included as additional insureds by endorsement.

10.8 Property Insurance:

10.8.1 The **Contractor** shall purchase and maintain Property Insurance written on a Builders Risk “all risk” completed value

completed Work and Work in progress insurance, or equivalent policy form, and shall include, without limitation, insurance against the perils of flood and earthquake, fire, physical loss or damage including theft, vandalism, malicious mischief, collapse,

windstorm and demolition occasioned by enforcement of any applicable legal requirements covering the Work at the Site in the amount of its full replacement cost. The insurance shall include the interests of the **City**, **Contractor**, Subcontractors and Suppliers, **Architect** and the **City's** and **Architect's** consultants, all of whom shall be listed as additional insureds, and shall be endorsed to include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the all risk insurance, the **Contractor** shall purchase and maintain property insurance on any Work stored on and off the site in transit when that Work is included in an Application for Payment. The property insurance may have a deductible not exceeding $25,000.00 which shall be borne by the **Contractor**, and shall comply with the requirements in paragraph 10.9.

10.8.2 If required in the Supplementary Conditions, the **Contractor** shall purchase and maintain boiler and machinery insurance and additional property insurance which will include the interests of the **City**, the **Contractor**, Subcontractors, the **Architect** and the **City's** and the **Architect's** consultants, all of whom shall be listed as additional insureds.

10.9 Waiver of Rights:

10.9.1 The **City** and the **Contractor** waive all rights against each other for all losses and damages caused by any of the perils covered by the insurance provided in response to paragraphs 10.6, 10.7 and 10.8 and any other insurance applicable to the Work and also waive all such rights against the **City**, and all other persons named as insureds or additional insureds in such policies for losses and damages so caused. Each Sub-agreement shall contain similar waiver provisions by the Subcontractor or Supplier in favor of the **City**, the **Architect**, and all other parties named as insureds or additional insureds. None of these waivers shall extend to the rights that any of the insured may have to the proceeds of insurance held by the **City** as trustee or otherwise payable under a policy so issued.

10.9.2 The **City** and the **Contractor** intend that any policies of insurance shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered. Accordingly, all such policies shall be endorsed to provide that in the event of payment of any loss or damage the insurer will have no rights of subrogation or other recovery against any of the parties named as insured or additional insured, and if the insurers require separate waiver forms to be signed by the **Architect** or the **City's** and the **Architect's** consultants, the **City** will obtain separate waiver forms, and if such forms are required of any Subcontractor or Supplier, the **Contractor** will obtain them.

10.10 Receipt and Application of Proceeds:

10.10.1 Any insured loss under the policies of property insurance required by paragraph 10.8 will be adjusted with the **City** and made payable to the **City** as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 10.10.2. The **City** shall deposit in a separate account any money so received, and shall distribute it in accordance with any agreement that the parties in interest may reach. If no other distribution agreement is reached the damaged Work shall be repaired or replaced, the monies so received applied for that purpose, and the Work and the associated costs covered by Change Order.

10.10.2 The **City** as trustee shall have power to adjust and settle any loss with the insurers, unless one of the parties in interest objects in writing within fifteen (15) days after the occurrence of loss to the **City's** exercise of this power. If an objection is made, the **City** as trustee shall settle with the insurers pursuant to any agreement the parties in interest may reach.

10.11 Indemnification:

10.11.1 To the fullest extent permitted by law the **Contractor** shall assume the defense of and hold the **City**, **Architect**, their officers, agents and employees harmless from all suits and claims against them, or any arising from the use of any invention, patent or patent right, and by or from any act or omission or neglect for the **Contractor**, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

10.11.2 For any and all claims against the **City** or the **Architect** or any of their officers, agents, or employees by an employee of the **Contractor**, and Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation of the **Contractor** shall not be limited in any way by any limitation of the amount or type of damages, compensation or benefits payable by or for the **Contractor** or any **Contractor** under Worker's Compensation Acts, disability benefit acts or other employee benefit acts.

10.11.3 To the fullest extent permitted by law the **Contractor** shall defend, indemnify and hold harmless the **City** and **Architect**

from and against all claims for bodily injury, sickness, disease, or death, or injury to or destruction of property, including loss of use, which claims arise out of, relate to, or are in any way connected with: the Work; the failure of the **Contractor** or any

Subcontractor to provide a safe work place; or noncompliance with Law by the **Contractor**, any Subcontractor or Supplier. With respect to all claims against the **City** or **Architect** by any employee of the **Contractor**, the indemnification obligation under this paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the **Contractor**, any Subcontractor or Supplier under worker's compensation, disability benefit or other employee benefit acts.

10.11.4 The obligations of the **Contractor** under paragraph 10.11.3 shall not extend to the liability of the **Architect** arising out of or resulting from (a) the preparation or approval of maps, drawings, opinions, reports, surveys, designs or specifications, or (b) the giving or failure to give directions or instructions by the **Architect**, but only if such giving or failure to give is the sole cause of the injury or damage.

10.11.5 The **Contractor** shall defend, indemnify and hold harmless the **City** and **Architect** from and against all claims as referred to in this paragraph, claims for damages to the Work itself, and claims for any other costs which any of them may incur arising from (a) failure, neglect or refusal of the **Contractor** to faithfully perform the Work and other obligations under the Contract Documents, or (b) the failure of the **Contractor**, any Subcontractor or Supplier to obtain or renew the insurance coverages required by the Contract Documents.

10.12 Partial Utilization-Property Insurance:

10.12.1 Any Partial Utilization by the **City** shall be subject to the insurers providing the property insurance having acknowledged receipt of notice and in writing effected the necessary changes in coverage. Those insurers shall consent by endorsement, but the property insurance shall not be canceled or lapse on account of any Partial Utilization.

10.13 Non-Conforming Bonds or Insurance:

10.13.1 If any of the **Contractor's** surety(ides) or insurer(s) is declared bankrupt, placed into receivership or otherwise becomes insolvent, or ceases to meet the requirements of the Contract Documents, or its license to do business in the Commonwealth is terminated, the **Contractor** shall at once substitute another bond and surety, or insurer and policy, which shall conform to the requirements of the Contract Documents.

10.14 Medical and Sanitary Requirements:

10.14.1 The **Contractor** shall promptly and fully comply with all sanitary and medical requirements as may from time to time be promulgated so that the health of all workers, local communities and persons residing on or near the Work may be preserved and safeguarded. The **Contractor** shall dismiss, and shall not rehire, any person who violates sanitary and medical requirements.

10.14.2 The **Contractor** shall rigorously prohibit the committing of nuisances upon the lands of the **City** or upon adjacent property. Structures for the sanitary necessities of all persons employed on the Work shall be provided and maintained by the **Contractor**.

10.14.3 As to health and sanitation, the **Contractor** shall promptly and fully comply with the Laws and Regulations of the State Department of Public Health, and those of all other local Authorities. The **Contractor** shall provide all articles necessary for first aid, and he shall make proper and satisfactory provisions for the transportation of sick and injured employees to, and their care at, established hospitals in the vicinity of the Work.

10.15 Required Provisions, Chapter 30, §39R:

10.15.1 The **Contractor** shall make, and keep for at least six (6) years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the **Contractor**, and until the expiration of six (6) years after final payment, the Office of the Commonwealth's Inspector General and the Deputy Commissioner of Capital Asset Management and Maintenance shall have the right to examine any books, documents, papers or records of the **Contractor** or of any Subcontractor that directly pertain to, and involve transactions relating to, the **Contractor** or that Subcontractor. The **Contractor** shall describe any change in the method of maintaining records or recording transactions that materially affect any statements filed with the **Official**, and the date of the change and reasons for the change, and shall accompany the description with a letter from the **Contractor's** Independent Certified Public Accountant approving or otherwise commenting on the changes. The Contractor certifies that prior to executing the Contract, the **Contractor** has filed a statement of management of Internal Accounting Controls and an audited financial statement for the most recent completed fiscal year, and he will continue to file such statements annually.

10.15.2 The **Contractor** shall file with the **Official** a statement of management as to whether his and his subsidiaries system of

Internal Accounting Controls reasonably assures that: (1) transactions are executed in accordance with management's general and specific authorization; (2) transactions are recorded as necessary (i) to permit preparation of financial statements in conformity with generally accepted accounting principles, and (ii) to maintain accountability for assets; (3) access to assets is permitted only in accordance with management's general or specific authorization; and (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any difference.

10.15.3 The **Contractor** shall also file with the **Official** a statement prepared and signed by an Independent Certified Public Accountant, stating that s/he has examined the statement of management of internal accounting controls and expressing an opinion as to whether: (1) the representations of management in response to this paragraph 10.15 are consistent with the result of management's evaluation of the system of internal accounting controls; and (2) such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

10.15.4 The **Contractor** shall annually, during the term of the Contract, file with the Deputy Commissioner of Capital Asset Management and Maintenance a financial statement prepared by an Independent Certified Public Accountant based on an Audit by that Accountant. The final statement filed shall include the date of final payment. All statements shall attach an Accountant's report, and shall be made available to the **Official** upon request.

10.15.5 Failure by the **Contractor** to satisfy any of the requirement of M.G.L. Chapter 30, §39R, or to comply with any such rules, regulations and guidelines as may be promulgated from time to time, may be grounds for debarment pursuant to M.G.L. Chapter 149, §44C.

10.15.6 Records and statements required to be made, kept or filed under these provisions shall not be public records as defined in M.G.L. Chapter 4, §7, and shall not be open to public inspection; provided, however, that such records and statements shall be made available as stated in paragraph 10.14.1.

10.16 No Conflict with Laws or Regulations:

10.16.1 The duties, obligations, criteria or procedures imposed by these General Conditions and the rights and remedies made available are in addition to, and not in any way a limitation of, any rights and remedies which are otherwise made available or imposed by Laws or Regulations, except that in the event a specific part or detailed requirement of a provision, criterion or procedure in these General Conditions and a specific part or detailed requirement of a provision, criterion or procedure imposed or available by Laws or Regulations conflict, the specific part or detailed requirement of such provision, criterion or procedure imposed or available by Laws or Regulations in conflict shall govern. All other specific parts or detailed requirements in the provisions, criteria or procedures of the applicable Laws or Regulations and these General Conditions not in conflict shall remain in full force and effect and be read with the controlling specific part or detailed requirement. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

10.17 Notice and Service:

10.17.1 Unless otherwise specified in the Contract Documents, any notice or communication shall be in writing, and shall be deemed to have been given as of the time of actual receipt.

10.17.2. Any notice or other communication to the **Contractor** shall be sufficiently given if delivered to the intended individual, officer or partner of the **Contractor** in person or at the office of the **Contractor** designated in the Contract.

10.17.3 All notices or other communication to the **Official** shall, unless otherwise specified in writing to the **Contractor**, be sufficiently given if delivered to the intended individual in person or at the office designated in the Contract.

ARTICLE 11 - CHANGES IN THE WORK

11.1 Changes in the Work:

11.1.1 Without invalidating the Agreement and without notice to any surety, the **City** may, at any time, by Change Order or Change Authorization signed by the **City**, order changes in the Work (a) consisting of additions, deletions or other revisions within the scope of the Work in the requirements of the Specifications and Drawings, the means, methods, techniques or sequences applicable to the Work, the **City**-furnished lands, equipment, materials, or services, or (b) directing acceleration of the Work, and unilaterally make or provide the basis for making an adjustment in Contract Price or Contract Time. Upon receipt

of any such unilateral order, the **Contractor** shall promptly proceed or continue with the Work involved as directed. Any such unilateral adjustment in Contract Price or Contract Time made by Change Order, or authorized by Change Authorization, shall

be final and binding on the **Contractor** unless the **Contractor** delivers to the **Official** written Notice of Claim, in strict compliance with all of the requirements of Article 15, within thirty (30) days after receipt of the unilateral order.

11.1.2 The **Official** reserves the right to negotiate with the **Contractor** changes under in the Work by delivering to the **Contractor** an unsigned Change Authorization describing the change under consideration and requesting that the **Contractor** submit a proposal for an adjustment in Contract Price or Contract Time.

11.1.3 Any other written or oral order from the **Official** or the **Architect**, including statement or conduct, instruction, interpretation, determination, or approval that causes a change shall be treated as a change in the Work; but only if the **Contractor** or the **Official** gives prompt written notice to the other by means of an unsigned Change Authorization detailing the circumstances, and the scope and character of the Work involved.

11.1.4 If after evaluation of an unsigned Change Authorization received under paragraph 11.1.3, the **Official**, with the advice of the **Architect**, concludes that changes in the Work have been ordered, the **Official** shall by Change Order or Change Authorization signed by the **City** correspondingly amend the Contract Documents. If the **Official**, on the other hand, concludes that a change has not been ordered, the **Official's** determination shall be final and binding on the **Contractor** unless the **Contractor** delivers to the **Official** written Notice of Claim that complies with Article 15 within thirty (30) days from receipt of that decision.

11.1.5 Except as provided in this paragraph, no written or oral order from the **Official** or the **Architect**, shall be treated as a change in the Work or entitle the **Contractor** to an increase in Contract Price or Contract Time under this paragraph.

11.1.6 Adjustments in Contract Price or Contract Time made necessary by changes in the Work ordered or negotiated under this paragraph shall be based on changes, as specified in Articles 7 and 12, in the **Contractor's** cost or the time required to perform any part of the Work, except that no increase in Contract Price or Contract Time shall be due under this paragraph if excluded by another provision of the Contract Documents.

11.1.7 No proposal nor claim by the **Contractor** on account of changes under paragraph 11.1.3 shall be allowed for any costs or delay incurred more than twenty (20) days before the **Contractor** gives written notice as required.

11.2 Changes Due to Differing Site Conditions:

11.2.1 If the **Contractor** or the **Official** discovers that the actual subsurface or latent physical conditions encountered at the Site differ materially from those shown or indicated on the Contract Documents, or from those ordinarily encountered and recognized as inherent in the Work of the character and scope provided, or that any reference points need correction to enable the **Contractor** to proceed with the Work, either the **Contractor** or the **Official** shall notify the other party in writing. A notice from the **Contractor** shall be delivered promptly and before the conditions are disturbed. A notice from the **Official** shall be delivered as soon as possible after the conditions are discovered.

11.2.2 Upon receipt or delivery of any such notice, the **Official** shall investigate the conditions. If the **Official** concludes that conditions on which the **Contractor** is entitled to rely do materially differ, the **Official** shall order the necessary changes and correspondingly adjust Contract Time or Contract Price, as provided in Article 12, unless excluded by another provision of the Contract Documents.

11.2.3 If the **Official** decides that the Contract Documents do not need amending or decides to make or not to make a change in Contract Price or Contract Time, or that a change in reference points is not required, any such decision shall be final and binding on the **Contractor** unless he delivers written Notice of Claim that complies with Article 15 within thirty (30) days of receipt of that decision.

11.2.4 Except in the case of newly-discovered underground utilities all costs involved and time required to perform the specified **Contractor's** responsibilities for underground utilities shall be considered as having been included in the Contract Price and in the **Contractor's** schedule for performing the Work within the Contract Time.

11.2.5 If Underground Utilities cause or will cause delays which postpone, extend or in any other manner alter the schedule or the completion of all or part of the Work, the **Contractor** shall assume all of the **Contractor's** related delay, extension or acceleration costs, however caused; except that, if the **Official** believes that the delays require a change in Contract Time, the **Official** shall authorize the necessary change in Contract Time only.

11.2.6 At least twenty (20) days, plus the time required by the **Contractor** to deliver a proposal shall be allowed to the **Official** to resolve any report of differing site conditions.

11.2.7 No proposal nor claim by the **Contractor** due to differing site conditions shall be allowed unless the **Contractor** has given written notice as required by this Article or Article 15.

11.3 Changes Due to Overruns or Underruns in Quantities:

11.3.1 For all Unit Price Work the Contract Price includes an amount equal to the sum of the unit prices Bid for each item of Unit Price Work times its estimated quantity. Each unit price will be deemed to include an amount sufficient to cover all costs, including supplemental and administrative costs, and profit. Prior to final payment, a Change Order will be issued as recommended by the **Architect** to reflect actual quantities for Unit Price Work, and to correspondingly adjust the Contract Price.

11.3.2 The **Contractor** shall promptly, before proceeding with any affected Work, notify the **Official** in writing whenever the actual quantity for a significant item of Unit Price Work, differs materially from its estimated quantity, and request a re-evaluation of that item's unit price or the Contract Time, or inform the **Official** that a re-evaluation is not warranted. Promptly after receipt of the notice, the **Architect** will review conditions about that item of Work and evaluate their effect on the unit prices and the Contract Time(s). If the **Official** consents to quantities so varying from those estimated, or does not make written objection, the **Contractor** shall proceed with the affected Unit Price Work as directed by the **Architect**.

11.3.3 If the **Official** determines that the additional or reduced quantities for such an item of Unit Price Work justify an adjustment in the unit price, or in Contract Time, or both, the **Official** shall authorize a revised unit price applicable to actual quantities for that item above one hundred twenty percent (120%) or below eighty percent (80%) of the estimated quantity, or a change in Contract Time, or both; except that, no adjustment shall be provided unless the variation between actual and estimated quantities for all Unit Price Work results in an increase or decrease in the Contract Price by more than ten percent (10%). If the **Official** decides that the unit prices are valid even for the additional or reduced quantities, or that no adjustment in the Contract Time is warranted, solely due to the variation in quantities, or both, that decision shall be final and binding on the **Contractor** unless he delivers to the **Official** a written Notice of Claim within thirty (30) days from receipt of that decision pursuant to the requirements of Article 15..

11.3.4 In evaluating unit prices, or changes in Contract Time due to quantity variations, the **Contractor** and the **Official** shall take into account increases or decreases in the **Contractor's** costs to perform the Work involved solely as result of the variation in quantities, as opposed to the **Contractor's** fault or negligence, errors in the **Contractor's** Bid, or other similar factors.

11.4 Change Orders; Change Authorizations:

11.4.1 A Change Order or Change Authorization executed by the **City** and also by the **Contractor** without a **Contractor's** notice of reservation of rights to claim additional adjustments constitutes an all-inclusive settlement for all changes and for all direct, supplemental, indirect, consequential and cumulative costs and delays, including the Contractor's overhead and profit, and the **Contractor's** signature represents a waiver of any and all rights to file a claim on account of that instrument, the Work or the Work involved in that instrument and all prior Change Orders.

11.4.2 A Change Order or Change Authorization, signed by the **City**, and also by the **Contractor**, with a notice of reservation of rights to claim additional compensation, shall become final and binding on the **Contractor**, without consideration of his reservation of rights, unless the **Contractor** delivers to the **Official** a clearly marked written Notice of Claim within thirty (30) days after the date when a Notice of Claim on account of the Change Order or Change Authorization executed by the **City** becomes due in strict compliance with the requirements of Article 15, and in any event no later than thirty (30) days after the date the **Contractor** signs the Change Order containing a notice of reservation of rights to claim additional compensation.

11.4.3 The **City** and the **Contractor** shall sign Change Orders with reasonable promptness covering changes in the Work including any necessary adjustments in Contract Price or Contract Time ordered or agreed to by the parties, changes in Contract Price or Contract Time which are agreed to in total or in part or previously executed Change Authorizations. Amounts for Work involved in a Change Order may be included in Application for Payment only after it has been completely executed by the **City**.

11.4.4 When signed by the **City**, the **City** may use Change Authorizations to order changes in the Work, provide the basis for a subsequent adjustment in Contract Price or Contract Time, order changes not warranting an adjustment in Contract Price or Contract Time, or authorize minor deviations. Amounts for Work involved in a Change Authorization are not allowable for payment until that Change Authorization has been incorporated into a Change Order that has been signed by the **Official**, approved as to form by the Corporation Counsel and approved to have a sufficient appropriation by the City Auditor.

11.4.5 The **City** reserves the right to decrease the adjustments made in any Change Order if, upon an audit of the **Contractor's** records including but not limited to records pertaining to all cost and pricing data used by the **Contractor** in estimating the **Contractor's Bid** for the work and in monitoring costs incurred, that audit reveals that the **Contractor** provided false or

inaccurate cost and pricing data in negotiating that Change Order.

11.5 Deviations:

11.5.1 In accordance with M.G.L. Chapter 30, §39I, every **Contractor** having a contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public building or public works for the Commonwealth, or of any political subdivision thereof, shall perform all the work required by such contract in conformity with the Plans and Specifications contained therein. No willful and substantial deviation from said Plans and Specifications shall be made unless authorized in writing by the **Official** or by the **Architect** in charge of the work who is duly authorized by the **City** to approve such deviations. In order to avoid delays in the execution of the work, such deviation from the Plans and Specifications may be authorized by a written order of the **Official** or **Architect** so authorized to approve such deviation. Within 30 days thereafter, such written order shall be confirmed by a certificate of the **Official** stating: (1) if such deviation involves any substitution or elimination of materials, fixtures or equipment, the reasons why such materials, fixtures or equipment were included in the first instance and the reasons for substitution or elimination and, if the deviation is of any other nature, the reason for such deviation giving justification therefor; (2) that the specified deviation does not materially damage the Project as a whole; (3) that either the work substituted for the work specified is of the same cost and quality, or that an equitable adjustment has been agreed upon between the **Official** and the **Contractor**, and the amount in dollars of said adjustment; and (4) that the deviation in the best interest of the **City**. Such certificate shall be signed under the penalties of perjury and shall be a permanent part of the file record of the Work. Whoever violates any provision of this paragraph willfully and with intent to defraud shall be punished by a fine of not more than $5,000 or by imprisonment for not more than 6 months, or both.

11.6 Delay and Waiver Provisions:

11.6.1 At least twenty (20) days plus the time required by the **Contractor** to deliver a proposal shall be allowed to the **Owner** to negotiate and resolve any changes in the Work, any changes in unit prices or any report of differing site conditions.

11.6.2 If a change in the Work, a case of differing site conditions or a case of variation in quantities causes or will cause delay, extension or acceleration that postpones, extends or in any other manner alters the schedule or completion of all or part of the Work, the **Official** shall, pursuant to Articles 8 and 11, make or negotiate with the **Contractor**, an adjustment in Contract Price or Contract Time for any increase in the **Contractor's** cost or the time required to perform the Work. The **Contractor** assumes responsibility for any related delay, extension or acceleration caused by or resulting to the **Contractor**.
11.6.3 No proposal nor claim by the **Contractor** on account of changes in the Work, differing site conditions or variation in quantities shall be allowed if made after final payment.

ARTICLE 12 - CHANGES IN CONTRACT PRICE OR CONTRACT TIME

12.1 Changes in Contract Price or Contract Time:

12.1.1 The Contract Price or Contract Time shall be changed only by Change Order. The basis for a subsequent change in Contract Price or Contract Time may also be authorized by a Change Authorization signed by the **Official**.

12.1.2 Contract Time whether stated in the Agreement or changed by Change Order shall not be changed due to a delay in a **Contractor's** early completion date until all Contract Float is used and performance of the specified Work extends necessarily beyond that Contract Time.

12.1.3 Contract Price whether stated in the Agreement or changed by Change Order shall not be changed due to a delay in a **Contractor's** early completion date until half of the Contract Float available in the Progress Schedule at the time of the start of the delay is used and performance of the specified Work is necessarily extended.

12.2 Proposals or Claims Substantiating Adjustments:

12.2.1 All **Contractor** proposals must at a minimum contain the reasons for the proposed change; the effect of the proposed change on the Progress Schedule; the effect on the Contract Time and the proposed price for the change, all in sufficient detail to be evaluated by the **Architect**. All **Contractor** proposals shall be due within twenty (20) days after receipt of the **Architect's** written notice requesting a proposal or delivery to the **Architect** of the **Contractor's** written notice of the occurrence of an event which the **Contractor** believes justifies a change in Contract Price or Contract Time. Any delay in the submittal of a **Contractor's** proposal will not justify or constitute basis for an increase in Contract Price or Contract Time. Proposals shall not be subject to change for at least sixty (60) days from their receipt by the **Architect**. If no Contractor proposal has been received by the **Architect** within the twenty (20) day period allowed by this Article, or if the **Contractor's** proposal does not

contain the information required, then the **Architect**, in his sole discretion, will use any of the methods described in Article 12.3 to determine the adjustment, if any, in the Contract Price.

12.2.2 Contractor proposals shall cover all aspects of the Work involved, and shall be fully documented and itemized as to all costs, as specified in this Article, quantities, and Fee which shall segregate percentages for profit and administrative costs. Proposals shall certify in writing that the amounts would be or were necessarily incurred despite reasonable mitigation efforts. Amounts for Subcontractors or Suppliers shall be equally supported, and must be reviewed by the Contractor before being submitted to the **Architect**.

12.2.3 Where the change in Contract Price arises from changes in the time required to perform any Work, or where a change in Contract Time is sought, the **Contractor's** itemized estimates shall in addition detail all productivity and production data, and include a detailed analysis of the Progress Schedule.

12.3 Methods for Determining Adjustments in Contract Price:

12.3.1 The methods to be used to determine an adjustment in Contract Price necessitated by changes ordered or under negotiation, delay ordered, caused or under negotiation or Work covered by any proposal or claim, all pursuant to these General Conditions are referred to collectively as "the Work involved", and are limited to the following:

12.3.2 Where the Work involved is covered by lump sum prices or unit prices in the Contract Documents, on the basis of those lump sum prices or unit prices, respectively;

12.3.3 Where the Work involved is not covered by lump sum prices or unit prices, by mutual acceptance of a lump sum price negotiated on the basis of the **Contractor's** itemized good faith estimate of the anticipated cost of the Work involved as specified in this Article plus a fee for the Work involved calculated per paragraph 12.11;

12.3.4 Where the Work involved is not covered by either of the first two methods, and **Official** and the **Contractor** cannot agree, on the basis of the **Official's** estimate of the cost of the Work involved plus a fee for the Work involved of eighty-five percent (85%) of the maximum fee allowed in paragraph 12.11;

12.3.5 Where the **Official** and the **Contractor** cannot agree, and the **Official** directs the **Contractor** to proceed with the Work involved with payments to be made per actual costs, on the basis of an itemized breakdown of the actual cost of the Work involved as specified in this Article plus a fee for the Work involved of seventy percent (70%) of the maximum fee allowed in paragraph 12.11. Where the Official and the Contractor agree and the Official directs the Contractor to proceed with the Work involved with payment to be made per actual costs on a time and materials basis, on the basis of an itemized breakdown of the actual cost of the Work involved as specified in this Article, plus a fee for the Work involved of one hundred percent (100%) of the maximum fee allowed in paragraph 12.11;

12.3.6 Where the Work involved is not covered by any of the preceding methods, and if payment is to be determined by a court of competent jurisdiction and appropriate venue, it is agreed that the actual cost and fee methods in paragraph 12.3.5 shall be the only appropriate method for determining the cost and the fee of the Work involved.

12.3.7 In computing the cost of the Work involved, costs shall be in amounts no higher than those prevailing in the locality of the Project, and include only the appropriate items for labor, material or equipment, construction equipment, and supplemental costs specified in this Article.

12.4 Labor, Subcontract and Material/Equipment Costs:

12.4.1 The cost of the Work involved includes payroll costs for craft labor including foremen in the direct employ of the **Contractor** assigned to the site and engaged in furnishing and incorporating materials or equipment in the Work involved. Payroll costs shall include wages at the minimum wage rates for Contractor's personnel established for this Contract pursuant to M.G.L. Chapter 149, §§ 26-27H plus labor burdens, e.g. social security, unemployment, workers' compensation, health and retirement benefits, vacation and holiday pay, etc. When determining actual payroll costs per paragraph 12.3.5, daily time sheets certified by the **Contractor** and verified by the **Architect** will be the record upon which payroll costs shall be based. When determining actual payroll costs per paragraph 12.3.6, daily time sheets shall be valid only if they expressly correlate to the Work involved, and if developed when the Work involved was performed for the purposes of establishing payroll.

12.4.2 The cost of the Work involved includes payments by the **Contractor** to Suppliers for material and equipment used in the Work involved, including transportation, storage, and necessary Supplier's field services. All trade discounts, rebates and refunds and all returns from sale of surplus items shall accrue to the **Official**, and the **Contractor** shall make provisions so that they may be obtained. If required by the **Official**, the **Contractor** shall obtain bids for designated items of materials or

equipment and nominate at least two (2) suppliers for selection by the **Official**. When determining actual material and equipment costs, invoices segregating items associated with the Work involved shall be the record upon which to base actual costs.

12.4.3 The cost of the Work involved includes payments made by the **Contractor** to Subcontractors for the Work involved performed by the Subcontractors. When determining Subcontractors' cost of the Work involved, the methods to be used shall be those used to determine the **Contractor's** costs, except that the term "Subcontractor" shall replace the term "the **Contractor**" if the context will permit. If required by the **Official**, the **Contractor** shall obtain detailed competitive sub-bids and nominate at least two (2) Subcontractors for the performance of any Work involved, subject to selection by the **Official**.

12.5 Construction Equipment Costs:

12.5.1. The cost of the Work involved includes costs for individual construction equipment with replacement value in excess of $500.00. Transportation, loading and unloading, installation, dismantling and removal costs shall be allowed only if prior consent is obtained from the **Architect**, and if the equipment is or was transported to the site solely for the Work involved. Shipping costs will be allowed if the equipment requires the use of a carrier, and provided the travel distance does not exceed that for similar equipment available from sources in the Boston metropolitan area. When multiple attachments are used, only the highest cost attachment shall be recoverable. Equipment costs shall cease when the equipment is no longer needed for the Work involved. Payroll costs for labor operating the equipment shall be as in paragraph 12.4.1. Equipment costs shall be computed using the same accounting and estimating rules, and prices, whether related to added or deleted items of Work.

12.5.2. When determining actual equipment costs under paragraph 12.3.5, daily records listing the equipment, operators, and actual usage, and verified by the **Architect** shall be the records upon which costs will be based. When determining actual equipment costs under paragraph 12.3.6, similar daily records shall be valid only if developed when the Work involved was performed.

12.5.3. Rented or owned equipment at the site, idled solely by actions of the **Official** or the **Architect**, shall be paid at the rates for rented equipment, or on the basis of fifty (50%) percent of the rates for owned equipment, respectively, provided that the idle period exceeds that normally experienced for such equipment and occurs during normal working hours.

12.6 Rented or Leased Equipment:

12.6.1. Except as provided below, for equipment rented or leased, the **Contractor** or Subcontractors shall be entitled to amounts based on negotiated rental or lease rates, but in no event shall the amounts exceed the rates listed in the Rental Rate "Blue Book" published by Equipment Watch, Inc. for the region covering the Boston metropolitan area applicable to that equipment model number and year. The equipment rate for second or third shifts shall not exceed fifty percent (50%) of the base rate. Operating costs shall not exceed the hourly operation rate in the Blue Book. Hourly rates for equipment previously in use at the site for at least a month (or a week) shall be based on the monthly rate divided by 176 hours (or the weekly rate divided by 40 hours). Equipment not previously in use at the site shall not be billed to the **Official** at rates higher than:

Equipment Usage	Payment Category
Less than 8 hours	Hourly Rate
1 day but less than 7 days	Daily Rate
1 week but less than 30 days	Weekly Rate
30 days or more (when in use)	Monthly Rate

12.6.2 For equipment rented or leased from firms associated with or owned by the **Contractor**, costs shall be treated as though the equipment was owned equipment.

12.7 Owned Equipment:

12.7.1 For equipment owned by the **Contractor**, or by his affiliates, the **Contractor** shall be entitled to costs based on billings established by his normal accounting practices, but in no event shall those costs exceed the rates listed in the Custom Cost Evaluator published by Equipment Watch, Inc. for the region covering the Boston metropolitan area. The owned equipment hourly rate plus the estimated operation cost per hour from the Custom Cost Evaluator will be the basis for determining owned equipment costs. For shift Work, the equipment rate shall not exceed the shift Work hourly costs in the Custom Cost Evaluator.

12.8 Supplemental Costs:

12.8.1 The cost of the Work involved includes a proportion of necessary supplemental costs, to the extent those supplemental costs increase or decrease on account of (a) labor, material/equipment, Subcontract or equipment costs of the Work involved, or (b) an extension in Contract Time, including:

12.8.1.1 Payroll costs, and subsistence expenses, for the **Contractor's** full-time resident superintendent, and payroll costs for other personnel in the employ of the **Contractor** engaged in Site activities and listed in the schedule of indirect personnel classifications agreed to by the **Official**, if those costs arise solely from an extension in Contract Time.

12.8.1.2 Costs not exceeding two percent (2%) of the labor costs under paragraph 12.4.1 excluding burdens of field supplies consumed in the performance of the Work involved, and purchase costs not exceeding two percent (2%) of the labor costs under paragraph 12.4.1, less burdens; tools individually valued at less than $500.00 and not owned by the workers which are used and consumed in the performance of the Work involved, and purchase cost less market value if used but not consumed.

12.8.1.3 Costs of office and temporary facilities at the site, inclusive of materials, supplies, equipment and appliances, if those costs arise solely from an extension in Contract Time;

12.8.1.4 The costs of utilities, fuel and sanitary facilities, long distance telephone calls, telephone service at the site, if those costs arise solely from an extension in Contract Time;

12.8.1.5 Costs of consultants or Subcontractors not covered under paragraph 12.4.3; provided those costs were authorized by the **Official** prior to proceeding with the Work involved, and if not covered by paragraph 12.4 or are not excluded by paragraph 12.11.

12.8.1.6 Taxes related to the Work involved, and for which the **Contractor** is liable, and fees for permits and licenses, if they related solely to the Work involved.

12.8.1.7 Physical losses, damages and expenses to the Work involved not compensated by property insurance or otherwise, sustained by the **Contractor** in the performance and furnishing of the Work, except losses and damages within the deductible amounts of property insurance, but only if the losses, damages and expenses result from causes beyond the control and not due to the fault or negligence of the **Contractor**.

12.8.1.8 The actual documented cost of premiums for increases in bonds and insurance required solely because of the Work involved will be paid based on invoices from the surety.

12.9 Limitation on Equipment and Supplemental Costs:

12.9.1 The **Contractor** shall not be allowed to recover construction equipment or supplemental costs not attributable to the performance of the Work involved. Payroll costs for the full-time resident superintendent are an example of costs that are not recoverable.

12.10 Costs Covered by the Fee for the Work Involved:

12.10.1 The Cost of the Work involved shall not include any of the following costs that are considered administrative costs or contingencies covered by the Fee for the Work involved:

12.10.1.1 Payroll costs and other compensation of (a) the **Contractor's** executives, general and administrative managers, project managers, estimators, claim consultants, attorneys, accountants, labor relation coordinators, contract and subcontract administrators, purchasers, expeditors, and other administrative staff, whether employed at the site or in his principal or branch offices, and (b) construction managers, engineers, schedulers, detailers, architects, safety personnel, clerks and other administrative staff employed in his principal or branch offices;

12.10.1.2 The market value of small tools used but not consumed.

12.10.1.3 Any part of the **Contractor's** capital expenses, including interest on capital for the Work involved, lost interest, on unpaid retainage, and charges for delinquent payments.

12.10.1.4 Costs associated with the preparation of Change Orders or Change Authorizations whether or not ultimately authorized by the **Official**, or the preparation or filing of claims.

12.10.1.5 Costs of consultants or attorneys, in the direct employ of the **Contractor** or otherwise, utilized for services related to the Work.

12.10.1.6 Other administrative expense(s), lost profits, lost interest on unpaid retainage, and the costs of any item not specifically

and expressly included in this Article 12.

12.10.1.7 Expenses of the **Contractor's** principal and branch offices, including, but not limited to storage and yard facilities.

12.11 Fee for the Work Involved:

12.11.1 Any adjustment in Contract Price for Work involved shall also include a Fee for costs under paragraph 12.10 and negotiated profit, shall not exceed the following amounts:

12.11.1.1 **On any change order, the General Contractor will be allowed only (i) a ten percent (10%) mark up for Over-head and Profit (O&P) for its work and (ii) a five percent (5%) mark up for O&P on sub-contractors' work.**

The sub-contractors will be allowed(i) a ten percent (10%) mark up for O&P for their work and (ii) a five percent (5%) mark up for O&P on sub-sub contractors' work . and (ii) a five percent (5%) mark up for O&P on sub-sub contractors' work.

For both the General Contractor and sub-contractors, any increase in the cost of a bond will be added to the change order at direct cost.

12.11.1.2 The credit to be allowed to the **City** for any adjustment in Contract Price yielding a net decrease in cost, *i.e.* the cost of the Work involved is negative, shall be the amount of the net decrease together with a Fee credit equal to one-third of the Fee which would be allowed under paragraphs 12.11.1.1 and 12.11.1.2.

12.11.1.2 When more than one individual adjustment in Contract Price, each resulting in a net increase or decrease in the Cost of the Work involved, is covered in one specific Change Order or Change Authorization or proposal or claim, the combined Fee shall be computed as the sum of the individual Fees.

12.12 Payment for Extension in Contract Time:

12.12.1 Subject to the applicable requirements of the Contract Documents, an extension in Contract Time may be combined with an increase in Contract Price to cover costs solely associated with the time extension in the case of changes in the Work, differing site conditions, or significant variation in quantities. No such adjustment in Contract Price shall be made to the extent that performance would have been extended by any other cause, including fault or negligence of the **Contractor**, Subcontractors, or Suppliers, or for which an adjustment is excluded by any other provision of the Contract Documents.

12.12.2 The cost of the Work involved arising from an extension in Contract Time, shall exclude amounts not solely related to the extension in Contract Time, such as: operating costs of construction equipment assigned to the Work on a continuing basis but primarily used in the furnishing and incorporating of materials and equipment into the Work; owned, or rental, costs plus operating costs of construction equipment used solely in the furnishing and incorporating of materials or equipment into the Work such as crane costs for specific lifts and concrete pump truck costs; supplemental costs unaffected by the increase in Contract Time, or otherwise allocable to Work other than the Work involved e.g. small tools, site facilities fully paid for in previous payments, etc.

12.12.3 If delays entitling the **Contractor** to increase in Contract Price under the Contract Documents extend performance or completion of the entire Work beyond the Contract Time stated in Article 4 of the Owner-Contractor Agreement and if, upon a request from the **Contractor**, the **City** concludes that because of such extension a portion of the **Contractor's** costs itemized in paragraph 12.10 will be or were unabsorbed prior to the expiration of the Contract Time, the **Contractor** shall be allowed Fee to cover any such unabsorbed costs given by the portion of the Contract Price unbilled prior to the expiration of the Contract Time times the ratio of the **Contractor's** administrative costs to billings, not to exceed five percent (5%).

12.12.4 The **Contractor** shall not recover from the **City**: acceleration costs to keep progress despite **City**-caused delays or other delays which warrant extensions in Contract Time but exclude increases in Contract Price; escalation costs for any part of the Work not delayed beyond the Late Dates in the Progress Schedule; or delay costs not expressly allowed for in this Article.

12.13 Criteria for Determining Adjustments in Contract Time:

12.13.1 The criteria to be used to determine an adjustment in Contract Time necessitated by changes ordered or under negotiation as provided in these General Conditions, or Work covered by a proposal or a claim, are limited to the following:

12.13.2 An adjustment in a specified Contract Time will not be granted unless (a) the time required to perform or complete the furnishing or performance of Work controlling achievement of that particular Contract Time is extended pursuant to paragraph 12.13.3, and (b) all of the Total Float, and therefore Contract Float, in the Progress Schedule is used and consumed.

12.13.3 An extension in Contract Time will not be granted unless the **Contractor** can demonstrate through an analysis of the Progress Schedule that unforeseeable causes beyond the control and without the fault or negligence of both the **Contractor** and the Subcontractors or Suppliers led to performance or completion of all or part of the Work beyond the corresponding Contract Time despite the **Contractor's** reasonable and diligent actions. Examples of such causes include: (1) acts of God or of the public enemy; (2) acts of the **City** in its sovereign or contractual capacity; (3) acts of the U.S. Government or another Public Authority or Agency; (4) acts of another party in the performance of a contract with the **City**; (5) fires, floods, epidemics, quarantine restrictions; (6) incidents with archaeological features; (7) strikes, freight embargo; (8) unusual weather and related adverse subsurface conditions, unusual meaning expectation, frequency, severity, or unseasonable; (9) a case of differing site conditions or differing reference points; (10) a case of an emergency; (11) a case of a reasonable objection to a nominated Subcontractor; (12) unusually severe shortages of construction materials from such causes as area-wide shortages, an industry-wide strike, or a natural disaster affecting all feasible sources of supply; (13) variation in quantities of Unit Price Work as provided in Article 11; (14) delays, as itemized in this paragraph, to Subcontractors or Suppliers arising from unforeseeable causes beyond the control and without fault or negligence of both the **Contractor** and those Subcontractors or Suppliers; (15) work stoppages caused by or initiated by other **City** or public agencies.

12.13.4 An extension in Contract Time, if any granted, shall be the **Contractor's** sole and exclusive remedy for any delay, disruption, interference, or hindrance and associated costs, however caused, resulting from causes contemplated in paragraph 12.13.3.

12.14 Negotiating Changes in Contract Price or Contract Time:

12.14.1 In addition to the notice requirements in Articles 7 and 11, the **Contractor** shall give written notice to the **Official** of any written or oral order of the **Official** or the **Architect** which justifies a change in Contract Price or Contract Time by delivering a proposed Change Authorization itemizing in sufficient detail the related circumstances and the justification for the adjustments proposed. If the **Official,** with the advice of the **Architect**, concludes that a change in Contract Price or Contract Time is warranted, the **City** shall make or negotiate with the **Contractor** the appropriate adjustments. If the **Official** finds otherwise, the **Official's** decision shall be final and binding on the **Contractor** unless the **Contractor** delivers to the **Official** a clearly marked written Notice of Claim within thirty (30) days from receipt of that decision in strict compliance with the requirements of Article 15.

12.14.2 The **Official** may notify the **Contractor** of proposed changes in Contract Price or Contract Time by delivering to the **Contractor** an unsigned Change Authorization requesting that the **Contractor** signoff on the proposed changes in Contract Price or Contract Time or submit an alternate proposal.

12.14.3 If the **Official** makes the decision to order any changes in Contract Price or Contract Time, whether unilaterally or in negotiations with the **Contractor**, those changes in Contract Price or Contract Time shall be binding on the **Contractor**, unless the **Contractor** delivers to the **Official** clearly marked written Notice of Claim within thirty (30) days from receipt of that decision in strict compliance with the provisions of Article 15.

12.14.4 If the **Contractor** is directed or ordered to stop the Work, or any part of the Work by any **City** or public agency, other than the **Official** the **Contractor** is required to so inform the **Official** within four (4) hours of such action.

ARTICLE 13 - GUARANTEES

13.1 General Guarantees:

13.1.1 In consideration of the execution of this Contract by the **City** and the Contract Price herein stipulated to be paid and received for the performance of the work, the **Contractor** binds and obligates himself and agrees to bring all portions of the Work under this Contract to completion in accordance with the Contract Documents and within the Contract Time, free of all defects of material and workmanship, and guarantees that the Work shall remain free of all defects of material and workmanship for a period of one year from the date of Substantial Completion. The **Contractor** guarantees, on written notice from the **Official**, to immediately repair and make good, or cause to be repaired and made good, at the **Contractor's** expense, all defects of material or workmanship in the Work and to pay for or cause to be paid for any damage to other work resulting therefrom, or from the repair thereof which may develop during the period of one year from the date of Substantial Completion.

13.1.2 Warranties for all specified or substitute items of materials and equipment shall include a certification endorsed by the **Contractor** warranting their merchantability, and that they are functionally suitable and fit for their intended purpose.

13.1.3 The warranties, guarantees and obligations for correction of Work specified in this Article are in addition to and not in limitation of any other specific remedies provided in the Contract Documents or by Laws or Regulations.

13.2 Tests and Inspections:

13.2.1 The **Official**, the **Architect**, their representatives, testing agencies and Public Authorities or Agencies with jurisdiction shall be permitted access to the Work for their observation, inspection and testing. The **Contractor** shall provide proper and safe conditions for such access. The **Contractor** shall give the **Architect** and **Clerk of the Works** timely notice of readiness of, and access to, the Work for all required inspections, tests, or approvals. Test, inspections or approvals shall not in any way relieve the **Contractor** from his obligations to perform the Work in accordance with the Contract Documents, or to warrant and guarantee the Work as provided in the Contract Documents.

13.2.2 Deleted in its Entirety.

13.2.3 If a Public Authority or Agency enforces testing, inspection or approval differing from those specified, or if not specified, from those enacted on or before the date of Bid opening, necessitating an amendment to the Contract Documents, the **Official** shall authorize the required changes in the Work, together with any adjustment in Contract Price necessitated by the changes. If the Changed testing, inspection or approval causes or will cause delays which postpone, extend or in any manner alter the schedule or the completion of all or part of the Work, the **Contractor** shall absorb all of the **Contractor's** related delay, extension or acceleration costs, however caused; except that if the **Official** and the **Contractor** believe that the delays require a change in Contract Time, the **Official** shall authorize the necessary change in Contract Time **only**.

13.2.4 If any testing, inspection or approval reveals failure of any part of the Work, the **Contractor** shall not be allowed to recover any associated costs, and he shall reimburse the **Official** for all of direct, indirect and consequential costs made necessary by that failure including those of repeated procedures and compensation for the **Architect's** services.

13.2.5 Tests, inspections or approvals shall not in any way relieve the **Contractor** from the **Contractor's** obligations to perform the Work in accordance with the Contract Documents and to warrant and guarantee the Work as provided in the Contract Documents

13.3 Special Guarantees:

13.3.1 It is expressly agreed and understood that the general guarantee set forth under this Article is in addition to and not in substitution of such guarantees as may be required under any other Section of the Contract Documents.

13.3.2 All guarantees required in the Contract Documents, including those which originate with any Subcontractor, Supplier or other person, shall be in the form set forth by the **Official** and must be delivered to the **Official** before final payment to the **Contractor** will be made.

13.3.3 The **Contractor** and Subcontractors shall be jointly and severally liable to the **City** under the terms of all guarantees originating with any Subcontractor.

13.3.4 The failure to deliver a required guarantee shall be held to constitute a failure of the **Contractor** or Subcontractor to fully complete his work in accordance with the Contract Documents.

13.3.5 The period of all special guarantees, unless otherwise specified, shall be one year from the date of Substantial Completion.

13.4 Correction or Removal, or Acceptance of Defective Work:

13.4.1 If required by the **Official** or **Architect**, the **Contractor** shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by the **Architect** or if any testing, inspection or approval of all or part the Work reveals failure of that part of the Work to comply with the requirements of the Contract Documents, remove it from the site and replace it at the **Contractor's** expense. If, instead of requiring correction or removal and replacement of *defective* Work, the **Official** prefers to accept it, the **Official** may do so, in which case the **Contractor** shall not be entitled to any increase in Contract Time or Contract Price, and he shall reimburse the **City** for all direct, indirect and consequential costs of the **City** incurred because of the correction or removal of or due to the **City's** evaluation and determination to accept *defective* Work.

13.4.2 If the **Official's** acceptance of *defective* Work occurs prior to the **Architect's** recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents; and the **City** shall be entitled to an appropriate decrease in the Contract Price. If the acceptance occurs after that recommendation, an appropriate amount shall be deducted from the final payment, or if the final payment has been made, an appropriate amount shall be paid by the **Contractor** to the **City**.

13.5 The City May Correct Defective Work:

13.5.1 If the **Contractor** fails within a reasonable time after written notice of the **Architect** to proceed to correct *defective* Work or to remove and replace rejected Work as required by the **Architect**, or if the **Contractor** fails to perform the Work in accordance with the Contract Documents, or if the **Contractor** fails to comply with any other provision of the Contract Documents, the **Official** may, after seven (7) days' written notice to the **Contractor**, correct and remedy any such deficiency. To the extent necessary to complete corrective action, the **Official** shall have full power and authority to exclude the **Contractor** from all or part of the site, and to exercise all of the rights and remedies in paragraph 14.1 The **Contractor** shall allow the **Official**, the **Official's** representatives, agents and employees whatever access to the site that may be necessary to enable the **Official** to exercise the rights and remedies under this paragraph. The **Contractor** shall not be allowed an extension in Contract Time or increase in Contract Price because of any delay in performance of the Work attributable to the exercise by the **City** of these rights and remedies, and he shall reimburse the **City** for all direct, indirect and consequential costs of the **City** in exercising such rights and remedies, such costs to include, but not be limited to, all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of defective Work, and a Change Order will be issued incorporating the necessary changes.

13.6 Uncovering Work:

13.6.1 If Work that is to be observed by the **Architect** or inspected, tested or approved is covered without written concurrence or contrary to the written request of the **Official** or the **Architect**, it shall when requested by the **Official**, be uncovered, exposed or otherwise made available for observation, testing, inspection or approval, as the **Official** may require and if necessary, replaced at the **Contractor's** expense.

13.6.2 The **Contractor**, at the **Architect's** request, shall uncover, expose or otherwise make available for observation, inspection or testing as the **Architect** may require, any covered Work if the **Architect** considers it advisable that such covered Work be observed by the **Architect** or inspected or tested by others.

13.6.3 The **Contractor** shall not be entitled to an increase in Contract Price or Contract Time, and he shall reimburse the **City** for all direct, indirect and consequential costs incurred by the **City** due to any uncovering or exposure, including but not limited to, the costs of that uncovering or exposure, observation, inspection, testing and satisfactory reconstruction, whenever Work covered without the written concurrence or contrary to the written request of the **Architect** or **Official** under paragraph 13.6.1 is uncovered, or whenever covered Work uncovered at the **Architect's** request under paragraph 13.6.2 is found to be *defective.* If Work is uncovered or exposed under paragraph 13.6.2 and not found to be *defective,* the **Contractor** shall be entitled to an increase in Contract Price or Contract Time, either or both, directly attributable to such uncovering.

13.7 Correction Period:

13.7.1 The Correction Period shall commence on the date of Substantial Completion of the Work, or a later date if so specified in the Contract, and last for one (1) year or such a longer period of time as may be specified in the Contract Documents.

13.7.2 If within the designated Correction Period, the Work, or any part of the Work is discovered to be *defective*, the **Contractor** shall promptly, without an adjustment in Contract Price and in accordance with the **Official's** written instructions, either correct that *defective* Work, or if it has been rejected by the **Official**, remove it from the site and replace it with *non-defective* Work. If circumstances warrant it, including, but not limited to, in an emergency, the **Official** may have the *defective* Work corrected or the rejected Work removed and replaced. In that event, the **Contractor** shall not be allowed to recover any associated costs, and he shall reimburse the **City** for all of the **City's** reasonable direct, indirect and consequential costs so incurred. If that event takes place after final payment and the **Contractor** fails to pay such costs to the **City** within thirty (30) days after presentation for payment, the **City** will give written notice to the **Contractor** of a claim, in which case the provisions of Article 15 shall apply.
13.7.3 The specified warranties and guarantees and the **Contractor's** obligations for correction of Work specified in this Article are in addition to and not in limitation of any other specific remedies provided in the Contract Documents or by Law. Nothing contained in this paragraph or this Article shall be construed as establishing a period of limitation for or limiting the obligations of the **Contractor** under the Contract Documents.

13.8 Extended Warranties and Guarantees:

13.8.1 Following written notice to the Contractor, the **City** may in its sole discretion advance or defer the date for commencement of the Correction Period, in which case the **Contractor** shall maintain the warranties and guarantees until the revised date for commencement of the Correction Period. If such advancement or deferral in the date for commencement of the Correction Period causes an increase or decrease in the cost of the warranties and guarantees provided by the **Contractor**, the **Official** shall

make an adjustment in Contract Price or Contract Time, as provided in Articles 8 and 11.

13.8.2 Whenever the **City** undertakes Partial Utilization of a portion of the Work which was specifically identified in the Contract Documents, or the **Contractor** fails to complete the Work or a separable portion of the Work within the corresponding Contract Time and the **City** undertakes Partial Utilization under paragraph 7.4, the **Contractor** shall maintain the warranties and guarantees in full force and effect during the period between the applicable commencement of Partial Utilization date, and the date of commencement of the Correction Period, and for such maintenance of the warranties and guarantees the **Contractor** shall receive no adjustment in Contract Price.

13.8.3 Any *defective* Work that is either corrected or rejected and replaced will be warranted and guaranteed in accordance with the provisions of this Article 13 for a period of one (1) year from the date of such correction or removal and replacement. If within such extended Correction Period, that Work is once again found to be *defective*, the **City** may exercise any of the **City's** rights and remedies under this Article.

13.9 Special Maintenance Requirements:

13.9.1 In special circumstances where the Work, or a designated part, progresses to Substantial Completion or Partial Completion but is not placed in continuous service until the commencement of the Correction Period, the **Contractor** shall maintain the Work, or designated part, in good order an in proper working condition and take all other actions as are necessary for its protection during the period between the applicable Substantial or Partial Completion date and the date of commencement of the Correction Period, and for such maintenance the **Contractor** shall receive no adjustment in Contract Price.

13.9.2. If the Work suffers loss or damage, however caused, the **Contractor** shall rebuild, repair, restore and make good without an increase in Contract Price all losses or damages to any portion of any Work. The occurrence of **City**-caused delay or the granting of an extension in Contract Time for any cause shall not relieve the **Contractor** of his responsibility for the Work, or designated part, as specified in this paragraph.

ARTICLE 14 - TERMINATION

14.1 Notice of Intention to Terminate for Cause:

14.1.1. If at any time reasonable doubt of the **Contractor's** due performance arises, the **Official** may demand adequate, written assurance of due performance. In addition, the **Official**, acting on knowledge or belief, may include with the demand for assurance a written notice to the **Contractor** and surety of the **City's** intent to terminate the **Contractor's** right to complete the Work within seven (7) days, or sooner if safety to persons or property is in question, because of occurrence of any of the following events, which constitute lack of due performance and are reasonable grounds for terminating the **Contractor**.

14.1.1.1 The **Contractor** fails to complete the Work, or separable part, within the corresponding Contract Time; fails or refuses to prosecute the Work, or separable part of the Work, with the diligence required for completion within the corresponding Contract Time; or fails or refuses to supply sufficient skilled workers, materials or equipment in adherence to the Progress Schedule, as revised from time to time;

14.1.1.2 The **Contractor** admits in writing, or the **City** otherwise establishes, the **Contractor's** inability to pay his debts generally as they become due; or in response to the **City's** demand, fails to promptly provide adequate, written assurance, the adequacy of which the **City** shall be the sole judge, of due performance in accordance with the Contract Documents;

14.1.1.3 A trustee, receiver, custodian or agent of the **Contractor** is appointed under applicable Law or under contract, whose appointment or authority to take charge of property of the **Contractor** is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of the **Contractor's** creditors; or

14.1.1.4 The **Contractor** disregards the authority of the **Architect**, otherwise violates in any substantial way any provision of the Contract Documents, fails to perform the Work in accordance with the Contract Documents, with the Contract Documents, or disregards the Laws, ordinances, codes, rules or regulations of any public governmental entity with jurisdiction.

14.1.1.5 The **Contractor** fails to make payment to filed Item 2 Subcontractors for materials or labor in accordance with the written agreements between the **Contractor** and Subcontractors.

14.1.1.6 The **Contractor** is guilty of a substantial breach of a provision of the Contract Documents.

14.1.2. Promptly after the **Contractor** receives either a demand for assurance or a notice of termination, the **Contractor** and

surety shall meet with the **City** and present the plan they intend to follow to give adequate assurance of due performance to the **City** and to avoid or cure any default. If at or after the meeting, the **City** decides to allow the **Contractor** to continue prosecution of the Work to completion, that decision shall not waive the **City's** right to declare the **Contractor** in default subsequently nor affect any rights or remedies of the **City** against the **Contractor** or surety, or both, then existing or which may accrue in the future.

14.2 Termination for Cause:

14.2.1. If the **Contractor** at any time refuses or neglects to supply a sufficient number of properly skilled workers or of materials of the proper quality, or fails in any respect to perform the Work, or separable part of the Work, with promptness and diligence, or fails in the performance of any of the agreements herein contained, and such refusal, neglect or failure has been certified to by the **Official**, the **City** shall have full power and authority to give written notice to the **Contractor** and the surety of the **City's** intention to terminate the services of the **Contractor** seven (7) days after giving notice, or sooner if safety to persons or property is in question.

14.2.2 If the **Contractor** seeks relief in bankruptcy, or if he makes a general assignment for the benefit of his creditors, or if a receiver of his property is appointed, or if the Work to be done under this Contract is abandoned, or if this Contract or any part thereof is sublet or assigned without the previous written consent of the **Official**, or if the **Contractor** becomes insolvent, or if at any time the **Official** shall certify in writing that the **Contractor** has refused or neglected to supply a sufficient number of properly skilled workers or of materials of the proper quality, or has failed in any respect to perform the Work with promptness and diligence, or has failed in the performance of any agreements herein contained, the **City** acting by the **Official** and at his discretion, may without prejudice to any right or remedy, and after giving the **Contractor** and his surety seven (7) days prior written notice, notify the **Contractor** to terminate the Work and the **City**, acting by the **Official** and at his discretion, and without prejudice to any other remedies that the **City** may have, may thereupon by contract or otherwise, complete the Work and charge the entire expense of so completing the Work to the **Contractor**; and the **Contractor** shall not be entitled to receive any further payment under this Contract until Final Completion of the Work, at which time, if the unpaid balance of the amount to be paid under this Contract shall exceed the expense incurred by the **City**, such excess shall be paid by the **City** to the **Contractor.** If the expense of completing the Work exceeds such unpaid balance, an appropriate credit Change Order shall be issued deducting from the Contract an amount then or thereafter due to the Contractor equal to the actual cost of correcting such deficiencies, including the City's expenses and compensation for the additional services of the Architect made necessary by such failure, refusal or default. For the purpose of completing the Work, the **City**, acting by the **Official**, may take possession of and use, or cause to be used, any materials, implements, machinery and tools of every description as may be found upon the site of the work.

14.3 Termination for Convenience:

14.3.1 Upon not less than seven (7) days written notice to the **Contractor** and the surety, or sooner if reasonable under the circumstances; the **Official** may, without cause and without prejudice to any other right or remedy, elect to terminate any part of the Work, or the Contract in whole or in part as the **City** may deem appropriate for its convenience. Upon receipt of any such termination notice, the **Contractor** shall immediately proceed in accordance with any specific provisions or instructions, protect and maintain the Work, and make reasonable and diligent efforts to mitigate costs associated with the termination.

14.3.2 In any such termination for the convenience of the **City**, the **Contractor** shall be paid for Work completed in accordance with the Contract Documents prior to receipt of the notice of termination, and for reasonable termination settlement costs relating to commitments which had become firm prior to the termination, based solely on supporting documentation that is provided to the **City** by the **Contractor**, the adequacy of which will be determined by the **City** in its sole discretion; provided, however, that the payment to the **Contractor** will exclude any and all anticipated supplemental costs, administrative expenses and profit on uncompleted work; and provided, further, that if no agreement can be reached as to reasonable termination costs, the parties will follow the provisions in the Federal Acquisition Regulations, clause 52.249-2 found in 48 CFR PART 52.

14.3.3 If, after notice of termination of the services of the **Contractor** for any of the causes listed in paragraph 14.1, it is determined that the **Contractor** was not in default, the termination shall be deemed to have been for the convenience for the **City**. In such event the **Contractor** may recover from the **City** payment in accordance with this paragraph 14.3.

14.3.4 Upon any such termination for convenience, the **City** shall have full power and authority to take possession of the Work, assume any Sub-agreements with Subcontractors and Suppliers which the **City** so selects, and prosecute the Work to completion by contract or as the **City** may deem expedient.

14.4 Surety Default:

14.4.1 If upon receipt of a notice of termination for cause, the surety fails to perform its obligations under the Performance Bond with reasonable promptness, the **City** shall declare the surety in default under the Performance Bond in accordance with the provisions of this paragraph.

14.4.1.1 No default of the surety under the Performance Bond shall be declared however, until the expiration of seven (7) days after receipt by the surety of a written notice from the **Official** demanding that the surety perform its obligations under the Performance Bond.

14.4.1.2 If the **City** declares the surety in default, the **City** shall have full power and authority to exclude the surety and **Contractor** from the site, assume any Sub-agreements which the **City** so selects and take possession of the Work and of all the surety's and **Contractor's** tools, appliances, plant and office, and construction equipment at the site and (a) use the same to the full extent they could be used by the surety and **Contractor** (without liability to the surety or **Contractor** for trespass, rent or conversion), (b) incorporate into the Work all materials and equipment stored at the site or for which the **City** has paid the **Contractor** but which are stored elsewhere, and (c) prosecute the Work to completion by contract or as the **City** otherwise may deem expedient.

14.4.2 If the **City** has terminated the **Contractor** or defaulted the surety, any such termination or default will not affect any rights or remedies of the **City** against the **Contractor** or surety, or both, then existing or which may accrue after termination. Any retention or payment of monies due the **Contractor** or surety by the **City** will not release the **Contractor** or surety from any liability. All provisions of the Contract Documents that by their nature survive final acceptance of the Work shall remain in full force and effect after a termination for cause of the **Contractor** or default of the surety, or both, as applicable.

14.4.3 The **City** may, in its sole discretion, permit the **Contractor** or surety to continue to perform Work when the **Contractor** or surety has been terminated or declared in default for any reason. Such decision by the **City** shall in no way operate as a waiver of any of the **City's** rights under the Contract Documents or the Performance Bond, nor in the event of a subsequent default, entitle the **Contractor** or surety to continue to perform or prosecute the Work to completion.

14.5 The Contractor May Stop Work or Terminate:

14.5.1 To the extent permitted by Law, if through no act or fault of the **Contractor**, the **Architect** fails to act on any Application for Payment within thirty (30) days after it is submitted, or the **City** fails for ninety (90) days to pay the **Contractor** any Application for Payment sum finally determined by the **Architect** and **City** to be due, then the **Contractor** may, upon thirty (30) additional days written notice to the **City** of a suspension of work, suspend the Work.

14.5.2 If the **City** fails to correct the conditions, if any, which under this paragraph justify the **Contractor's** suspension of the Work within ninety (90) days from the commencement of the suspension, the **Contractor** may upon thirty (30) days additional written notice to the **City** and the **Architect** terminate the Contract and recover from the **City** payment in accordance with paragraph 14.4.2 Except as specifically provided in this paragraph, these provisions shall not relieve the **Contractor** of the obligations under Article 8 to carry on the Work in accordance with the Progress Schedule and without delay during disputes and disagreements with the **City**.

ARTICLE 15 - DISPUTES

15.1 Claims Under This Article:

15.1.1 All Notices of Claims, Claims and any other matters in dispute between the **City** and the **Contractor** arising from or related to the Contract Documents or a claimed breach thereof, specifically including those matters arising from Paragraphs 4.28.1; 7.5.3 and 11.4.2, shall be subject to, processed and resolved as provided in this Article 15.

15.1.2 A "Claim" under this Article 15 shall mean a written demand or assertion by the **City** or **Contractor**, which is properly certified according to the requirements of Paragraph 15.2.1, seeking an adjustment in Contract Price and payment of monies due, an extension or shortening in Contract Time, the adjustment or interpretation of Contract terms, or any other relief arising under or relating to the Contract, after a determination by the **Architect** or **City** under the appropriate provision of the Contract Documents.

15.1.3 A Claim arising under the Contract is a Claim that can be resolved under a provision within the Contract Documents that provides for or excludes the relief sought by the claimant. Such Claims shall be resolved in accordance with the applicable provisions.

15.1.4 No Claim shall be valid unless it is based upon the prior submission of a clearly marked written "Notice of Claim" that states the general nature of the Claim delivered by the party making the Claim to other party promptly, but in no event later than thirty (30) days after the **Architect's** or **Official's** determination giving rise to the Claim. The receipt by the **City** of a timely Notice of Claim shall be a condition precedent to the **City** receiving a valid a Claim submitted from the **Contractor** for evaluation. The clearly marked written "Claim" itself together with all supporting data shall be delivered within sixty (60) days after the determination. The responsibility to substantiate Claims shall rest with the party making the Claim. Notwithstanding anything to the contrary in this Article, the **Official** shall not be required to deliver notice of any Claim for liquidated damages or involving retention until sixty (60) days after the final acceptance.

15.1.5 A Claim by the **Contractor** shall be submitted to the **Official** with a copy to the **Architect** for a written decision from the **City**. The City will provide the **Contractor** with a written acknowledgement of receipt of the Claim within seventy-two (72) hours, and will notify the **Contractor** as to the status of the Claim within thirty (30) days of receipt. A Claim by the **City** shall be submitted to the **Contractor** and the **Architect** for a written determination from the **Architect**.

15.1.6 Once given, the **City's** final decision on a Claim submitted by the **Contractor** shall be final and binding on the **Contractor** unless the **Contractor** files suit within thirty (30) days after receipt of the **City's** decision.

15.2 Requirements for Contractor Claims:

15.2.1 For all **Contractor** Claims seeking an increase in Contract Price or Contract Time, the **Contractor** shall submit a statement signed under the penalties of perjury and executed by an officer or partner in charge, or by a responsible senior officer or general managing partner of the **Contractor** certifying that the Claim is made in good faith; the amount claimed accurately reflects the adjustments in Contract Price or Contract Time for which the **Contractor** believes the **City** is liable, and covers all costs and delays to which the **Contractor** is entitled from the occurrence of the claimed event; and supporting costs and pricing data are current, accurate, complete and represent the best of the **Contractor's** knowledge and belief.

15.3 Determination on a Claim:

15.3.1 Pending final resolution of any Claim, including litigation, the **Contractor** shall proceed diligently with the Work, and comply with any decision of the **Official** or the **Architect**.

15.3.2 After settlement or final adjudication of any Claim under this Article if, upon demand, payment by the **Contractor** is not made to the **City**, the **City** may offset the appropriate amounts against (a) payments due to the **Contractor** under any other contract between the **City** and the **Contractor**, or (b) any amounts for which the **City** may be obligated to the **Contractor** in any capacity.

15.4 Venue:

15.4.1 The **Contractor**, the **Contractor's** sureties, and the Subcontractors and Suppliers agree, consent and submit to the service of process at the address and in the manner specified in Article 10.17.

15.4.2 The **Contractor**, the **Contractor's** sureties, and the Subcontractors and Suppliers waive jurisdiction and venue and shall submit to the jurisdiction of the County of Middlesex only, regardless of residence or domicile, with respect to any actions or suits at law or in equity arising under or related to the bidding, award, performance, or completion of the Work, payment for work performed, or any Claim.

15.4.3 The **Contractor** shall insert a provision containing the venue and service of process requirements of paragraph 15.4.1 and 15.4.2 in all sub-agreements and agreements between the **Contractor** and his sureties and insurers, altering the provisions only as necessary to properly identify the contracting parties.

ARTICLE 16 – LIQUIDATED DAMAGES

16.1.1 If the Contractor fails to complete the Work within the time specified in the contract, or any extension thereof, the Contractor shall pay to the City as liquidated damages, the sum of $3,000.00 for each day of delay. Completion dates are specified in the Contract for separate phases of the work, and the amount of liquidated damages shall be assessed on each and every phase which is delayed. In the context of this paragraph, "delay" means failure to complete the Project. To the extent that the Contractor's delay or nonperformance is excused under another section in this Contract, liquidated damages shall not be due the City. The Contractor remains liable for damages caused other than by delay.

16.1.2 If the City terminates the Contractor's right to proceed pursuant to section 2.12.1, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the Work together with any increased costs to the City in completing the Work.

16.1.3 If the City does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the Work is completed or accepted.

END OF GENERAL CONDITIONS

CITY OF NEWTON

WAGE RATE REQUIREMENTS

1. GENERAL

A. This section summarizes the requirements for the payment of wages to laborers and mechanics employed under the Contract.

B. Other duties and requirements of law which may not be specified in this section apply and are inherently a part of the Contract.

2. WAGE RATES

A. The rate per hour to be paid to mechanics, apprentices, teamsters, chauffeurs, and laborers employed on the Work shall not be less than the rate of wages in the attached "Minimum Wage Rates" as determined by the Commissioner of Labor and Industries. This schedule shall continue to be the minimum rate of wages for said employees during the life of this Contract.

B. Keep posted on the site a legible copy of said schedule. Keep on file the wage rates and classifications of labor employed on this Work in order that they may be available for inspection by the Owner, Administrator, or the Architect.

C. Apprentices employed pursuant to this determination of wage rates must be registered and approved by the State Apprenticeship Council wherever rates for journeymen or apprentices are not listed.

D. Pay reserve police officers employed on the Work the prevailing rate of wages paid to regular police officers as required by M.G.L. c149, Sec. 34B, as amended. Such police officers shall be covered by Workmen's Compensation Insurance and Employers Liability Insurance by the Contractor.

E. The Contractor and all subcontractors shall, on a weekly basis throughout the term of the contract, provide to the City of Newton certified payroll affidavits verifying compliance with M.G.L. c.149, Sec. 27, 27A and 27B. The Contractor is obiligated to provide such records to the City directly on a weekly basis. The City may assess a penalty of $100 for each day beyond the required submission date that such records are received, which amount shall be deducted from any amounts to the Contractor from the City. In the event of chronic late submissions, the City shall report the same to the Office of the Attorney General.

F. The Contractor and all subcontractors shall provide a Statement of Compliance within 15 days of the completion of its portion of the work. This statement shall be submitted to the Owner on the form found elsewhere in this section.

G. The Contractor shall maintain accurate and complete records, including payroll records, during the Contract term and for three years thereafter.

END OF SECTION

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS
Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

ROSALIN ACOSTA
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: City of Newton

Contract Number: IFB #22-01 **City/Town:** NEWTON

Description of Work: NECP Building Renovation Project; school building modifications/renovations and associated site work

Job Location: 687 Washington St

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall he incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.05	$12.91	$14.82	$0.00	$64.78
	08/01/2021	$37.05	$13.41	$14.82	$0.00	$65.28
	12/01/2021	$37.05	$13.41	$16.01	$0.00	$66.47
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.12	$12.91	$14.82	$0.00	$64.85
	08/01/2021	$37.12	$13.41	$14.82	$0.00	$65.35
	12/01/2021	$37.12	$13.41	$16.01	$0.00	$66.54
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.24	$12.91	$14.82	$0.00	$64.97
	08/01/2021	$37.24	$13.41	$14.82	$0.00	$65.47
	12/01/2021	$37.24	$13.41	$16.01	$0.00	$66.66
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR *LABORERS - ZONE 1*	06/01/2021	$41.42	$8.60	$17.57	$0.00	$67.59
	12/01/2021	$42.43	$8.60	$17.57	$0.00	$68.60
	06/01/2022	$43.43	$8.60	$17.57	$0.00	$69.60
	12/01/2022	$44.43	$8.60	$17.57	$0.00	$70.60
	06/01/2023	$45.43	$8.60	$17.57	$0.00	$71.60
	12/01/2023	$46.68	$8.60	$17.57	$0.00	$72.85
For apprentice rates see "Apprentice- LABORER"						
AIR TRACK OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$41.42	$8.60	$17.57	$0.00	$67.59
	12/01/2021	$42.43	$8.60	$17.57	$0.00	$68.60
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	12/01/2020	$38.10	$12.80	$9.45	$0.00	$60.35
ASPHALT RAKER *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT RAKER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 1*	06/01/2021	$41.42	$8.60	$17.57	$0.00	$67.59
	12/01/2021	$42.43	$8.60	$17.57	$0.00	$68.60
	06/01/2022	$43.43	$8.60	$17.57	$0.00	$69.60
	12/01/2022	$44.43	$8.60	$17.57	$0.00	$70.60
	06/01/2023	$45.43	$8.60	$17.57	$0.00	$71.60
	12/01/2023	$46.68	$8.60	$17.57	$0.00	$72.85
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)* For apprentice rates see "Apprentice- LABORER (Heavy and Highway)	06/01/2021	$41.42	$8.60	$17.57	$0.00	$67.59
	12/01/2021	$42.43	$8.60	$17.57	$0.00	$68.60
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2020	$46.10	$7.07	$17.98	$0.00	$71.15

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$29.97	$7.07	$11.69	$0.00	$48.73
2	65	$29.97	$7.07	$11.69	$0.00	$48.73
3	70	$32.27	$7.07	$12.59	$0.00	$51.93
4	75	$34.58	$7.07	$13.49	$0.00	$55.14
5	80	$36.88	$7.07	$14.38	$0.00	$58.33
6	85	$39.19	$7.07	$15.29	$0.00	$61.55
7	90	$41.49	$7.07	$16.18	$0.00	$64.74
8	95	$43.80	$7.07	$17.09	$0.00	$67.96

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (NEWTON)*	02/01/2021	$55.75	$11.39	$22.09	$0.00	$89.23
	08/01/2021	$57.15	$11.39	$22.25	$0.00	$90.79
	02/01/2022	$57.74	$11.39	$22.25	$0.00	$91.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Newton*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.88	$11.39	$22.09	$0.00	$61.36
2	60	$33.45	$11.39	$22.09	$0.00	$66.93
3	70	$39.03	$11.39	$22.09	$0.00	$72.51
4	80	$44.60	$11.39	$22.09	$0.00	$78.08
5	90	$50.18	$11.39	$22.09	$0.00	$83.66

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.58	$11.39	$22.25	$0.00	$62.22
2	60	$34.29	$11.39	$22.25	$0.00	$67.93
3	70	$40.01	$11.39	$22.25	$0.00	$73.65
4	80	$45.72	$11.39	$22.25	$0.00	$79.36
5	90	$51.44	$11.39	$22.25	$0.00	$85.08

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2021	$41.82	$8.60	$17.72	$0.00	$68.14
	12/01/2021	$42.83	$8.60	$17.72	$0.00	$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2021	$40.67	$8.60	$17.72	$0.00	$66.99
	12/01/2021	$41.68	$8.60	$17.72	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2021	$40.67	$8.60	$17.72	$0.00	$66.99
	12/01/2021	$41.68	$8.60	$17.72	$0.00	$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 2 (Eastern Massachusetts)*	03/01/2021	$43.54	$9.40	$18.95	$0.00	$71.89
	09/01/2021	$44.19	$9.40	$18.95	$0.00	$72.54
	03/01/2022	$44.79	$9.40	$18.95	$0.00	$73.14
	09/01/2022	$45.44	$9.40	$18.95	$0.00	$73.79
	03/01/2023	$46.04	$9.40	$18.95	$0.00	$74.39

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER - Zone 2 Eastern MA*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.77	$9.40	$1.73	$0.00	$32.90
2	60	$26.12	$9.40	$1.73	$0.00	$37.25
3	70	$30.48	$9.40	$13.76	$0.00	$53.64
4	75	$32.66	$9.40	$13.76	$0.00	$55.82
5	80	$34.83	$9.40	$15.49	$0.00	$59.72
6	80	$34.83	$9.40	$15.49	$0.00	$59.72
7	90	$39.19	$9.40	$17.22	$0.00	$65.81
8	90	$39.19	$9.40	$17.22	$0.00	$65.81

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.10	$9.40	$1.73	$0.00	$33.23
2	60	$26.51	$9.40	$1.73	$0.00	$37.64
3	70	$30.93	$9.40	$13.76	$0.00	$54.09
4	75	$33.14	$9.40	$13.76	$0.00	$56.30
5	80	$35.35	$9.40	$15.49	$0.00	$60.24
6	80	$35.35	$9.40	$15.49	$0.00	$60.24
7	90	$39.77	$9.40	$17.22	$0.00	$66.39
8	90	$39.77	$9.40	$17.22	$0.00	$66.39

Notes:
% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $30.72/ 3&4 $36.75/ 5&6 $55.37/ 7&8 $61.45

Apprentice to Journeyworker Ratio:1:5

CARPENTER WOOD FRAME *CARPENTERS -ZONE 2 (Wood Frame)*	04/01/2021	$27.87	$7.21	$5.80	$0.00	$40.88
	04/01/2022	$28.62	$7.21	$5.80	$0.00	$41.63
	04/01/2023	$28.97	$7.21	$5.80	$0.00	$41.98

All Aspects of New Wood Frame Work

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER (Wood Frame) - Zone 2*

Effective Date - 04/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$16.72	$7.21	$0.00	$0.00	$23.93
2	60	$16.72	$7.21	$0.00	$0.00	$23.93
3	65	$18.12	$7.21	$2.00	$0.00	$27.33
4	70	$19.51	$7.21	$2.00	$0.00	$28.72
5	75	$20.90	$7.21	$5.80	$0.00	$33.91
6	80	$22.30	$7.21	$5.80	$0.00	$35.31
7	85	$23.69	$7.21	$5.80	$0.00	$36.70
8	90	$25.08	$7.21	$5.80	$0.00	$38.09

Effective Date - 04/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$17.17	$7.21	$0.00	$0.00	$24.38
2	60	$17.17	$7.21	$0.00	$0.00	$24.38
3	65	$18.60	$7.21	$2.00	$0.00	$27.81
4	70	$20.03	$7.21	$2.00	$0.00	$29.24
5	75	$21.47	$7.21	$5.80	$0.00	$34.48
6	80	$22.90	$7.21	$5.80	$0.00	$35.91
7	85	$24.33	$7.21	$5.80	$0.00	$37.34
8	90	$25.76	$7.21	$5.80	$0.00	$38.77

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80

Step 1&2 $19.75/ 3&4 $24.54/ 5&6 $32.52/ 7&8 $35.31

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (NEWTON)*	01/01/2020	$49.07	$12.75	$22.41	$0.62	$84.85

Apprentice - *CEMENT MASONRY/PLASTERING - Eastern Mass (Newton)*

Effective Date - 01/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.54	$12.75	$15.41	$0.00	$52.70
2	60	$29.44	$12.75	$17.41	$0.62	$60.22
3	65	$31.90	$12.75	$18.41	$0.62	$63.68
4	70	$34.35	$12.75	$19.41	$0.62	$67.13
5	75	$36.80	$12.75	$20.41	$0.62	$70.58
6	80	$39.26	$12.75	$21.41	$0.62	$74.04
7	90	$44.16	$12.75	$22.41	$0.62	$79.94

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CHAIN SAW OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$51.73	$13.75	$15.80	$0.00	$81.28
	12/01/2021	$52.88	$13.75	$15.80	$0.00	$82.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$33.40	$13.75	$15.80	$0.00	$62.95
	12/01/2021	$34.19	$13.75	$15.80	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$52.06	$8.25	$22.75	$0.00	$83.06

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.03	$8.25	$0.00	$0.00	$34.28
2	55	$28.63	$8.25	$6.16	$0.00	$43.04
3	60	$31.24	$8.25	$6.72	$0.00	$46.21
4	65	$33.84	$8.25	$7.28	$0.00	$49.37
5	70	$36.44	$8.25	$19.39	$0.00	$64.08
6	75	$39.05	$8.25	$19.95	$0.00	$67.25
7	80	$41.65	$8.25	$20.51	$0.00	$70.41
8	90	$46.85	$8.25	$21.63	$0.00	$76.73

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 1*	06/01/2021	$40.82	$8.60	$17.57	$0.00	$66.99
	12/01/2021	$41.83	$8.60	$17.57	$0.00	$68.00
	06/01/2022	$42.83	$8.60	$17.57	$0.00	$69.00
	12/01/2022	$43.83	$8.60	$17.57	$0.00	$70.00
	06/01/2023	$44.83	$8.60	$17.57	$0.00	$71.00
	12/01/2023	$46.08	$8.60	$17.57	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 1*	06/01/2021	$41.82	$8.60	$17.57	$0.00	$67.99
	12/01/2021	$42.83	$8.60	$17.57	$0.00	$69.00
	06/01/2022	$43.83	$8.60	$17.57	$0.00	$70.00
	12/01/2022	$44.83	$8.60	$17.57	$0.00	$71.00
	06/01/2023	$45.83	$8.60	$17.57	$0.00	$72.00
	12/01/2023	$47.08	$8.60	$17.57	$0.00	$73.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BURNERS *LABORERS - ZONE 1*	06/01/2021	$41.57	$8.60	$17.57	$0.00	$67.74
	12/01/2021	$42.58	$8.60	$17.57	$0.00	$68.75
	06/01/2022	$43.58	$8.60	$17.57	$0.00	$69.75
	12/01/2022	$44.58	$8.60	$17.57	$0.00	$70.75
	06/01/2023	$45.58	$8.60	$17.57	$0.00	$71.75
	12/01/2023	$46.83	$8.60	$17.57	$0.00	$73.00
For apprentiee rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 1*	06/01/2021	$41.82	$8.60	$17.57	$0.00	$67.99
	12/01/2021	$42.83	$8.60	$17.57	$0.00	$69.00
	06/01/2022	$43.83	$8.60	$17.57	$0.00	$70.00
	12/01/2022	$44.83	$8.60	$17.57	$0.00	$71.00
	06/01/2023	$45.83	$8.60	$17.57	$0.00	$72.00
	12/01/2023	$47.08	$8.60	$17.57	$0.00	$73.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 1*	06/01/2021	$41.57	$8.60	$17.57	$0.00	$67.74
	12/01/2021	$42.58	$8.60	$17.57	$0.00	$68.75
	06/01/2022	$43.58	$8.60	$17.57	$0.00	$69.75
	12/01/2022	$44.58	$8.60	$17.57	$0.00	$70.75
	06/01/2023	$45.58	$8.60	$17.57	$0.00	$71.75
	12/01/2023	$46.83	$8.60	$17.57	$0.00	$73.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 1*	06/01/2021	$40.82	$8.60	$17.57	$0.00	$66.99
	12/01/2021	$41.83	$8.60	$17.57	$0.00	$68.00
	06/01/2022	$42.83	$8.60	$17.57	$0.00	$69.00
	12/01/2022	$43.83	$8.60	$17.57	$0.00	$70.00
	06/01/2023	$44.83	$8.60	$17.57	$0.00	$71.00
	12/01/2023	$46.08	$8.60	$17.57	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$68.70	$9.40	$23.12	$0.00	$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$73.60	$9.40	$23.12	$0.00	$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$103.05	$9.40	$23.12	$0.00	$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) *DRAWBRIDGE - SEIU LOCAL 888*	07/01/2020	$26.77	$6.67	$3.93	$0.16	$37.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ELECTRICIAN *ELECTRICIANS LOCAL 103*	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$22.16	$13.00	$0.66	$0.00	$35.82
2	40	$22.16	$13.00	$0.66	$0.00	$35.82
3	45	$24.93	$13.00	$15.13	$0.00	$53.06
4	45	$24.93	$13.00	$15.13	$0.00	$53.06
5	50	$27.71	$13.00	$15.57	$0.00	$56.28
6	55	$30.48	$13.00	$16.01	$0.00	$59.49
7	60	$33.25	$13.00	$16.46	$0.00	$62.71
8	65	$36.02	$13.00	$16.90	$0.00	$65.92
9	70	$38.79	$13.00	$17.34	$0.00	$69.13
10	75	$41.56	$13.00	$17.80	$0.00	$72.36

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$22.74	$13.00	$0.68	$0.00	$36.42
2	40	$22.74	$13.00	$0.68	$0.00	$36.42
3	45	$25.58	$13.00	$15.15	$0.00	$53.73
4	45	$25.58	$13.00	$15.15	$0.00	$53.73
5	50	$28.42	$13.00	$15.59	$0.00	$57.01
6	55	$31.26	$13.00	$16.04	$0.00	$60.30
7	60	$34.10	$13.00	$16.48	$0.00	$63.58
8	65	$36.95	$13.00	$16.93	$0.00	$66.88
9	70	$39.79	$13.00	$17.37	$0.00	$70.16
10	75	$42.63	$13.00	$17.83	$0.00	$73.46

Notes: :
App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2021	$63.47	$15.88	$19.31	$0.00	$98.66
	01/01/2022	$65.62	$16.03	$20.21	$0.00	$101.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$31.74	$15.88	$0.00	$0.00	$47.62
2	55	$34.91	$15.88	$19.31	$0.00	$70.10
3	65	$41.26	$15.88	$19.31	$0.00	$76.45
4	70	$44.43	$15.88	$19.31	$0.00	$79.62
5	80	$50.78	$15.88	$19.31	$0.00	$85.97

Effective Date - 01/01/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$32.81	$16.03	$0.00	$0.00	$48.84
2	55	$36.09	$16.03	$20.21	$0.00	$72.33
3	65	$42.65	$16.03	$20.21	$0.00	$78.89
4	70	$45.93	$16.03	$20.21	$0.00	$82.17
5	80	$52.50	$16.03	$20.21	$0.00	$88.74

Notes:
Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2021	$44.43	$15.88	$19.31	$0.00	$79.62
	01/01/2022	$45.93	$16.03	$20.21	$0.00	$82.17
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2021	$45.88	$13.50	$15.70	$0.00	$75.08
	11/01/2021	$46.88	$13.50	$15.70	$0.00	$76.08
	05/01/2022	$48.03	$13.50	$15.70	$0.00	$77.23
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2021	$47.40	$13.50	$15.70	$0.00	$76.60
	11/01/2021	$48.41	$13.50	$15.70	$0.00	$77.61
	05/01/2022	$49.57	$13.50	$15.70	$0.00	$78.77
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2021	$22.91	$13.50	$15.70	$0.00	$52.11
	11/01/2021	$23.51	$13.50	$15.70	$0.00	$52.71
	05/01/2022	$24.18	$13.50	$15.70	$0.00	$53.38
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING *ELECTRICIANS LOCAL 103*	03/01/2021	$42.11	$13.00	$17.88	$0.00	$72.99
	09/01/2021	$43.77	$13.00	$18.00	$0.00	$74.77
	03/01/2022	$45.27	$13.00	$18.12	$0.00	$76.39
	09/01/2022	$46.99	$13.00	$18.24	$0.00	$78.23
	03/01/2023	$48.54	$13.00	$18.37	$0.00	$79.91
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$41.31	$13.75	$15.80	$0.00	$70.86
	12/01/2021	$42.26	$13.75	$15.80	$0.00	$71.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$24.50	$8.60	$17.57	$0.00	$50.67
	12/01/2021	$24.50	$8.60	$17.57	$0.00	$50.67
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE 1*	03/01/2021	$48.59	$9.40	$19.25	$0.00	$77.24
	09/01/2021	$49.39	$9.40	$19.25	$0.00	$78.04
	03/01/2022	$50.19	$9.40	$19.25	$0.00	$78.84

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.30	$9.40	$1.79	$0.00	$35.49
2	55	$26.72	$9.40	$1.79	$0.00	$37.91
3	60	$29.15	$9.40	$13.88	$0.00	$52.43
4	65	$31.58	$9.40	$13.88	$0.00	$54.86
5	70	$34.01	$9.40	$15.67	$0.00	$59.08
6	75	$36.44	$9.40	$15.67	$0.00	$61.51
7	80	$38.87	$9.40	$17.46	$0.00	$65.73
8	85	$41.30	$9.40	$17.46	$0.00	$68.16

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.70	$9.40	$1.79	$0.00	$35.89
2	55	$27.16	$9.40	$1.79	$0.00	$38.35
3	60	$29.63	$9.40	$13.88	$0.00	$52.91
4	65	$32.10	$9.40	$13.88	$0.00	$55.38
5	70	$34.57	$9.40	$15.67	$0.00	$59.64
6	75	$37.04	$9.40	$15.67	$0.00	$62.11
7	80	$39.51	$9.40	$17.46	$0.00	$66.37
8	85	$41.98	$9.40	$17.46	$0.00	$68.84

Notes: Steps are 750 hrs.
% After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 $33.03/ 3&4 $39.64/ 5&6 $59.08/ 7&8 $65.73

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$33.40	$13.75	$15.80	$0.00	$62.95
	12/01/2021	$34.19	$13.75	$15.80	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 2)*	01/01/2021	$41.56	$8.25	$22.75	$0.00	$72.56

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 2*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.78	$8.25	$0.00	$0.00	$29.03
2	55	$22.86	$8.25	$6.16	$0.00	$37.27
3	60	$24.94	$8.25	$6.72	$0.00	$39.91
4	65	$27.01	$8.25	$7.28	$0.00	$42.54
5	70	$29.09	$8.25	$19.39	$0.00	$56.73
6	75	$31.17	$8.25	$19.95	$0.00	$59.37
7	80	$33.25	$8.25	$20.51	$0.00	$62.01
8	90	$37.40	$8.25	$21.63	$0.00	$67.28

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio: 1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$27.90	$13.75	$0.00	$0.00	$41.65
2	60	$30.44	$13.75	$15.80	$0.00	$59.99
3	65	$32.97	$13.75	$15.80	$0.00	$62.52
4	70	$35.51	$13.75	$15.80	$0.00	$65.06
5	75	$38.05	$13.75	$15.80	$0.00	$67.60
6	80	$40.58	$13.75	$15.80	$0.00	$70.13
7	85	$43.12	$13.75	$15.80	$0.00	$72.67
8	90	$45.66	$13.75	$15.80	$0.00	$75.21

Effective Date - 12/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$28.53	$13.75	$0.00	$0.00	$42.28
2	60	$31.13	$13.75	$15.80	$0.00	$60.68
3	65	$33.72	$13.75	$15.80	$0.00	$63.27
4	70	$36.32	$13.75	$15.80	$0.00	$65.87
5	75	$38.91	$13.75	$15.80	$0.00	$68.46
6	80	$41.50	$13.75	$15.80	$0.00	$71.05
7	85	$44.10	$13.75	$15.80	$0.00	$73.65
8	90	$46.69	$13.75	$15.80	$0.00	$76.24

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	03/01/2021	$55.41	$13.00	$20.01	$0.00	$88.42
	09/01/2021	$56.84	$13.00	$20.06	$0.00	$89.90
	03/01/2022	$58.04	$13.00	$20.09	$0.00	$91.13
	09/01/2022	$59.48	$13.00	$20.13	$0.00	$92.61
	03/01/2023	$60.67	$13.00	$20.17	$0.00	$93.84
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 1*	06/01/2021	$41.42	$8.60	$17.57	$0.00	$67.59
	12/01/2021	$42.43	$8.60	$17.57	$0.00	$68.60
	06/01/2022	$43.43	$8.60	$17.57	$0.00	$69.60
	12/01/2022	$44.43	$8.60	$17.57	$0.00	$70.60
	06/01/2023	$45.43	$8.60	$17.57	$0.00	$71.60
	12/01/2023	$46.68	$8.60	$17.57	$0.00	$72.85
For apprentice rates see "Apprentice- LABORER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$41.42	$8.60	$17.57	$0.00	$67.59
	12/01/2021	$42.43	$8.60	$17.57	$0.00	$68.60
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2020	$49.00	$13.80	$17.14	$0.00	$79.94
	09/01/2021	$51.40	$13.80	$17.14	$0.00	$82.34
	09/01/2022	$53.85	$13.80	$17.14	$0.00	$84.79

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.50	$13.80	$12.42	$0.00	$50.72
2	60	$29.40	$13.80	$13.36	$0.00	$56.56
3	70	$34.30	$13.80	$14.31	$0.00	$62.41
4	80	$39.20	$13.80	$15.25	$0.00	$68.25

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$25.70	$13.80	$12.42	$0.00	$51.92
2	60	$30.84	$13.80	$13.36	$0.00	$58.00
3	70	$35.98	$13.80	$14.31	$0.00	$64.09
4	80	$41.12	$13.80	$15.25	$0.00	$70.17

Notes:
Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (BOSTON AREA)*	09/16/2020	$48.66	$8.10	$25.10	$0.00	$81.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Boston*

Effective Date - 09/16/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$29.20	$8.10	$25.10	$0.00	$62.40
2	70	$34.06	$8.10	$25.10	$0.00	$67.26
3	75	$36.50	$8.10	$25.10	$0.00	$69.70
4	80	$38.93	$8.10	$25.10	$0.00	$72.13
5	85	$41.36	$8.10	$25.10	$0.00	$74.56
6	90	$43.79	$8.10	$25.10	$0.00	$76.99

Notes:

** Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:**

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
LABORER *LABORERS - ZONE 1*	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85
	06/01/2022	$42.68	$8.60	$17.57	$0.00	$68.85
	12/01/2022	$43.68	$8.60	$17.57	$0.00	$69.85
	06/01/2023	$44.68	$8.60	$17.57	$0.00	$70.85
	12/01/2023	$45.93	$8.60	$17.57	$0.00	$72.10

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 1*

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$24.40	$8.60	$17.57	$0.00	$50.57
2	70	$28.47	$8.60	$17.57	$0.00	$54.64
3	80	$32.54	$8.60	$17.57	$0.00	$58.71
4	90	$36.60	$8.60	$17.57	$0.00	$62.77

Effective Date - 12/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.01	$8.60	$17.57	$0.00	$51.18
2	70	$29.18	$8.60	$17.57	$0.00	$55.35
3	80	$33.34	$8.60	$17.57	$0.00	$59.51
4	90	$37.51	$8.60	$17.57	$0.00	$63.68

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85

Apprentice - *LABORER (Heavy & Highway) - Zone 1*

Effective Date - 06/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$24.40	$8.60	$17.57	$0.00	$50.57
2	70	$28.47	$8.60	$17.57	$0.00	$54.64
3	80	$32.54	$8.60	$17.57	$0.00	$58.71
4	90	$36.60	$8.60	$17.57	$0.00	$62.77

Effective Date - 12/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.01	$8.60	$17.57	$0.00	$51.18
2	70	$29.18	$8.60	$17.57	$0.00	$55.35
3	80	$33.34	$8.60	$17.57	$0.00	$59.51
4	90	$37.51	$8.60	$17.57	$0.00	$63.68

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CARPENTER TENDER *LABORERS - ZONE 1*	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85
	06/01/2022	$42.68	$8.60	$17.57	$0.00	$68.85
	12/01/2022	$43.68	$8.60	$17.57	$0.00	$69.85
	06/01/2023	$44.68	$8.60	$17.57	$0.00	$70.85
	12/01/2023	$45.93	$8.60	$17.57	$0.00	$72.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 1*	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85
	06/01/2022	$42.68	$8.60	$17.57	$0.00	$68.85
	12/01/2022	$43.68	$8.60	$17.57	$0.00	$69.85
	06/01/2023	$44.68	$8.60	$17.57	$0.00	$70.85
	12/01/2023	$45.93	$8.60	$17.57	$0.00	$72.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 1*	06/01/2021	$40.82	$8.60	$17.57	$0.00	$66.99
	12/01/2021	$41.83	$8.60	$17.57	$0.00	$68.00
	06/01/2022	$42.83	$8.60	$17.57	$0.00	$69.00
	12/01/2022	$43.83	$8.60	$17.57	$0.00	$70.00
	06/01/2023	$44.83	$8.60	$17.57	$0.00	$71.00
	12/01/2023	$46.08	$8.60	$17.57	$0.00	$72.25
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	06/01/2024	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 1*	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85
	06/01/2022	$42.68	$8.60	$17.57	$0.00	$68.85
	12/01/2022	$43.68	$8.60	$17.57	$0.00	$69.85
	06/01/2023	$44.68	$8.60	$17.57	$0.00	$70.85
	12/01/2023	$45.93	$8.60	$17.57	$0.00	$72.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 1*	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85
	06/01/2022	$42.68	$8.60	$17.57	$0.00	$68.85
	12/01/2022	$43.68	$8.60	$17.57	$0.00	$69.85
	06/01/2023	$44.68	$8.60	$17.57	$0.00	$70.85
	12/01/2023	$45.93	$8.60	$17.57	$0.00	$72.10
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LASER BEAM OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$42.57	$11.39	$20.14	$0.00	$74.10
	08/01/2021	$43.69	$11.39	$20.30	$0.00	$75.38
	02/01/2022	$44.16	$11.39	$20.30	$0.00	$75.85

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.29	$11.39	$20.14	$0.00	$52.82
2	60	$25.54	$11.39	$20.14	$0.00	$57.07
3	70	$29.80	$11.39	$20.14	$0.00	$61.33
4	80	$34.06	$11.39	$20.14	$0.00	$65.59
5	90	$38.31	$11.39	$20.14	$0.00	$69.84

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.85	$11.39	$20.30	$0.00	$53.54
2	60	$26.21	$11.39	$20.30	$0.00	$57.90
3	70	$30.58	$11.39	$20.30	$0.00	$62.27
4	80	$34.95	$11.39	$20.30	$0.00	$66.64
5	90	$39.32	$11.39	$20.30	$0.00	$71.01

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$55.77	$11.39	$22.08	$0.00	$89.24
	08/01/2021	$57.17	$11.39	$22.24	$0.00	$90.80
	02/01/2022	$57.74	$11.39	$22.24	$0.00	$91.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.89	$11.39	$22.08	$0.00	$61.36
2	60	$33.46	$11.39	$22.08	$0.00	$66.93
3	70	$39.04	$11.39	$22.08	$0.00	$72.51
4	80	$44.62	$11.39	$22.08	$0.00	$78.09
5	90	$50.19	$11.39	$22.08	$0.00	$83.66

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.59	$11.39	$22.24	$0.00	$62.22
2	60	$34.30	$11.39	$22.24	$0.00	$67.93
3	70	$40.02	$11.39	$22.24	$0.00	$73.65
4	80	$45.74	$11.39	$22.24	$0.00	$79.37
5	90	$51.45	$11.39	$22.24	$0.00	$85.08

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
MILLWRIGHT (Zone 1) *MILLWRIGHTS LOCAL 1121 - Zone 1*	03/01/2021	$43.77	$8.58	$21.57	$0.00	$73.92
	01/03/2022	$45.52	$8.58	$21.57	$0.00	$75.67
	01/02/2023	$47.27	$8.58	$21.57	$0.00	$77.42

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 1*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$24.07	$8.58	$5.72	$0.00	$38.37
2	65	$28.45	$8.58	$17.93	$0.00	$54.96
3	75	$32.83	$8.58	$18.98	$0.00	$60.39
4	85	$37.20	$8.58	$20.01	$0.00	$65.79

Effective Date - 01/03/2022

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$25.04	$8.58	$5.72	$0.00	$39.34
2	65	$29.59	$8.58	$17.93	$0.00	$56.10
3	75	$34.14	$8.58	$18.98	$0.00	$61.70
4	85	$38.69	$8.58	$20.01	$0.00	$67.28

Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 $5.72, Step 2 $6.66)
Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$23.40	$13.75	$15.80	$0.00	$52.95
	12/01/2021	$23.98	$13.75	$15.80	$0.00	$53.53
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$28.26	$13.75	$15.80	$0.00	$57.81
	12/01/2021	$28.94	$13.75	$15.80	$0.00	$58.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$52.06	$8.25	$22.75	$0.00	$83.06

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.03	$8.25	$0.00	$0.00	$34.28
2	55	$28.63	$8.25	$6.16	$0.00	$43.04
3	60	$31.24	$8.25	$6.72	$0.00	$46.21
4	65	$33.84	$8.25	$7.28	$0.00	$49.37
5	70	$36.44	$8.25	$19.39	$0.00	$64.08
6	75	$39.05	$8.25	$19.95	$0.00	$67.25
7	80	$41.65	$8.25	$20.51	$0.00	$70.41
8	90	$46.85	$8.25	$21.63	$0.00	$76.73

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2021	$42.96	$8.25	$22.75	$0.00	$73.96

* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

Apprentice - *PAINTER Local 35 Zone 2 - Spray/Sandblast - New*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.48	$8.25	$0.00	$0.00	$29.73
2	55	$23.63	$8.25	$6.16	$0.00	$38.04
3	60	$25.78	$8.25	$6.72	$0.00	$40.75
4	65	$27.92	$8.25	$7.28	$0.00	$43.45
5	70	$30.07	$8.25	$19.39	$0.00	$57.71
6	75	$32.22	$8.25	$19.95	$0.00	$60.42
7	80	$34.37	$8.25	$20.51	$0.00	$63.13
8	90	$38.66	$8.25	$21.63	$0.00	$68.54

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2021	$41.02	$8.25	$22.75	$0.00	$72.02

PAINTERS LOCAL 35 - ZONE 2

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.51	$8.25	$0.00	$0.00	$28.76
2	55	$22.56	$8.25	$6.16	$0.00	$36.97
3	60	$24.61	$8.25	$6.72	$0.00	$39.58
4	65	$26.66	$8.25	$7.28	$0.00	$42.19
5	70	$28.71	$8.25	$19.39	$0.00	$56.35
6	75	$30.77	$8.25	$19.95	$0.00	$58.97
7	80	$32.82	$8.25	$20.51	$0.00	$61.58
8	90	$36.92	$8.25	$21.63	$0.00	$66.80

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	01/01/2021	$41.56	$8.25	$22.75	$0.00	$72.56

* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

Apprentice - *PAINTER - Local 35 Zone 2 - BRUSH NEW*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.78	$8.25	$0.00	$0.00	$29.03
2	55	$22.86	$8.25	$6.16	$0.00	$37.27
3	60	$24.94	$8.25	$6.72	$0.00	$39.91
4	65	$27.01	$8.25	$7.28	$0.00	$42.54
5	70	$29.09	$8.25	$19.39	$0.00	$56.73
6	75	$31.17	$8.25	$19.95	$0.00	$59.37
7	80	$33.25	$8.25	$20.51	$0.00	$62.01
8	90	$37.40	$8.25	$21.63	$0.00	$67.28

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2021	$39.62	$8.25	$22.75	$0.00	$70.62

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 2 - BRUSH REPAINT*

Effective Date - 01/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.81	$8.25	$0.00	$0.00	$28.06
2	55	$21.79	$8.25	$6.16	$0.00	$36.20
3	60	$23.77	$8.25	$6.72	$0.00	$38.74
4	65	$25.75	$8.25	$7.28	$0.00	$41.28
5	70	$27.73	$8.25	$19.39	$0.00	$55.37
6	75	$29.72	$8.25	$19.95	$0.00	$57.92
7	80	$31.70	$8.25	$20.51	$0.00	$60.46
8	90	$35.66	$8.25	$21.63	$0.00	$65.54

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)* For apprentice rates see "Apprentice- LABORER (Heavy and Highway)	06/01/2021	$40.67	$8.60	$17.57	$0.00	$66.84
	12/01/2021	$41.68	$8.60	$17.57	$0.00	$67.85
PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$36.88	$12.91	$14.82	$0.00	$64.61
	08/01/2021	$36.88	$13.41	$14.82	$0.00	$65.11
	12/01/2021	$36.88	$13.41	$16.01	$0.00	$66.30
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)* For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2020	$49.07	$9.40	$23.12	$0.00	$81.59

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.54	$9.40	$23.12	$0.00	$57.06
2	60	$29.44	$9.40	$23.12	$0.00	$61.96
3	70	$34.35	$9.40	$23.12	$0.00	$66.87
4	75	$36.80	$9.40	$23.12	$0.00	$69.32
5	80	$39.26	$9.40	$23.12	$0.00	$71.78
6	80	$39.26	$9.40	$23.12	$0.00	$71.78
7	90	$44.16	$9.40	$23.12	$0.00	$76.68
8	90	$44.16	$9.40	$23.12	$0.00	$76.68

Notes:
% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 $34.01/ 3&4 $41.46/ 5&6 $62.80/ 7&8 $69.25

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$23.18	$11.70	$8.25	$0.00	$43.13
2	45	$26.07	$11.70	$20.24	$0.00	$58.01
3	60	$34.76	$11.70	$20.24	$0.00	$66.70
4	70	$40.56	$11.70	$20.24	$0.00	$72.50
5	80	$46.35	$11.70	$20.24	$0.00	$78.29

Notes:
** 1:3; 3:15; 1.10 thereafter / Steps are 1 yr.
Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

PIPELAYER *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
PIPELAYER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2021	$60.19	$13.57	$17.26	$0.00	$91.02

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$21.07	$13.57	$6.24	$0.00	$40.88
2	40	$24.08	$13.57	$7.08	$0.00	$44.73
3	55	$33.10	$13.57	$9.63	$0.00	$56.30
4	65	$39.12	$13.57	$11.33	$0.00	$64.02
5	75	$45.14	$13.57	$13.03	$0.00	$71.74

Notes:
** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$67.89, Step5 with lic$75.59

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	03/01/2021	$57.94	$11.70	$20.24	$0.00	$89.88
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)* For apprentice rates see "Apprentice- LABORER (Heavy and Highway)	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
POWDERMAN & BLASTER *LABORERS - ZONE 1*	06/01/2021	$41.67	$8.60	$17.57	$0.00	$67.84
	12/01/2021	$42.68	$8.60	$17.57	$0.00	$68.85
	06/01/2022	$43.68	$8.60	$17.57	$0.00	$69.85
	12/01/2022	$44.68	$8.60	$17.57	$0.00	$70.85
	06/01/2023	$45.68	$8.60	$17.57	$0.00	$71.85
	12/01/2023	$46.93	$8.60	$17.57	$0.00	$73.10
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$41.67	$8.60	$17.57	$0.00	$67.84
	12/01/2021	$42.68	$8.60	$17.57	$0.00	$68.85
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$33.40	$13.75	$15.80	$0.00	$62.95
	12/01/2021	$34.19	$13.75	$15.80	$0.00	$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS 170 - Rosenfeld (Walpole)*	01/01/2021	$23.50	$11.51	$8.00	$0.00	$43.01
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	02/01/2021	$46.60	$12.28	$17.15	$0.00	$76.03
	08/01/2021	$48.03	$12.28	$17.15	$0.00	$77.46
	02/01/2022	$49.46	$12.28	$17.15	$0.00	$78.89

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ROOFER - Local 33*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.30	$12.28	$4.31	$0.00	$39.89
2	60	$27.96	$12.28	$17.15	$0.00	$57.39
3	65	$30.29	$12.28	$17.15	$0.00	$59.72
4	75	$34.95	$12.28	$17.15	$0.00	$64.38
5	85	$39.61	$12.28	$17.15	$0.00	$69.04

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.02	$12.28	$4.31	$0.00	$40.61
2	60	$28.82	$12.28	$17.15	$0.00	$58.25
3	65	$31.22	$12.28	$17.15	$0.00	$60.65
4	75	$36.02	$12.28	$17.15	$0.00	$65.45
5	85	$40.83	$12.28	$17.15	$0.00	$70.26

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.
(Hot Pitch Mechanics' receive $1.00 hr. above ROOFER)

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	02/01/2021	$46.85	$12.28	$17.15	$0.00	$76.28
	08/01/2021	$48.28	$12.28	$17.15	$0.00	$77.71
	02/01/2022	$49.71	$12.28	$17.15	$0.00	$79.14
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2021	$51.67	$13.65	$24.57	$2.70	$92.59
	08/01/2021	$53.42	$13.65	$24.57	$2.75	$94.39
	02/01/2022	$55.17	$13.65	$24.57	$2.80	$96.19

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$21.70	$13.65	$5.89	$0.00	$41.24
2	42	$21.70	$13.65	$5.89	$0.00	$41.24
3	47	$24.28	$13.65	$11.13	$1.48	$50.54
4	47	$24.28	$13.65	$11.13	$1.48	$50.54
5	52	$26.87	$13.65	$12.08	$1.58	$54.18
6	52	$26.87	$13.65	$12.33	$1.59	$54.44
7	60	$31.00	$13.65	$13.70	$1.76	$60.11
8	65	$33.59	$13.65	$14.65	$1.88	$63.77
9	75	$38.75	$13.65	$16.56	$2.08	$71.04
10	85	$43.92	$13.65	$17.96	$2.28	$77.81

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	$22.44	$13.65	$5.89	$0.00	$41.98
2	42	$22.44	$13.65	$5.89	$0.00	$41.98
3	47	$25.11	$13.65	$11.13	$1.48	$51.37
4	47	$25.11	$13.65	$11.13	$1.48	$51.37
5	52	$27.78	$13.65	$12.08	$1.58	$55.09
6	52	$27.78	$13.65	$12.33	$1.59	$55.35
7	60	$32.05	$13.65	$13.70	$1.76	$61.16
8	65	$34.72	$13.65	$14.65	$1.88	$64.90
9	75	$40.07	$13.65	$16.56	$2.08	$72.36
10	85	$45.41	$13.65	$17.96	$2.28	$79.30

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.34	$12.91	$14.82	$0.00	$65.07
	08/01/2021	$37.34	$13.41	$14.82	$0.00	$65.57
	12/01/2021	$37.34	$13.41	$16.01	$0.00	$66.76
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.63	$12.91	$14.82	$0.00	$65.36
	08/01/2021	$37.63	$13.41	$14.82	$0.00	$65.86
	12/01/2021	$37.63	$13.41	$16.01	$0.00	$67.05
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1*	03/01/2021	$62.45	$10.00	$21.25	$0.00	$93.70

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550 (Section A) Zone 1*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$21.86	$10.00	$11.99	$0.00	$43.85
2	40	$24.98	$10.00	$12.70	$0.00	$47.68
3	45	$28.10	$10.00	$13.41	$0.00	$51.51
4	50	$31.23	$10.00	$14.13	$0.00	$55.36
5	55	$34.35	$10.00	$14.84	$0.00	$59.19
6	60	$37.47	$10.00	$15.55	$0.00	$63.02
7	65	$40.59	$10.00	$16.26	$0.00	$66.85
8	70	$43.72	$10.00	$16.98	$0.00	$70.70
9	75	$46.84	$10.00	$17.69	$0.00	$74.53
10	80	$49.96	$10.00	$18.40	$0.00	$78.36

Notes: Apprentice entered prior 9/30/10:
40/45/50/55/60/65/70/75/80/85
Steps are 850 hours

Apprentice to Journeyworker Ratio:1:3

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	03/01/2021	$42.11	$13.00	$17.88	$0.00	$72.99
	09/01/2021	$43.77	$13.00	$18.00	$0.00	$74.77
	03/01/2022	$45.27	$13.00	$18.12	$0.00	$76.39
	09/01/2022	$46.99	$13.00	$18.24	$0.00	$78.23
	03/01/2023	$48.54	$13.00	$18.37	$0.00	$79.91

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 03/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$18.95	$13.00	$0.57	$0.00	$32.52
2	45	$18.95	$13.00	$0.57	$0.00	$32.52
3	50	$21.06	$13.00	$14.51	$0.00	$48.57
4	50	$21.06	$13.00	$14.51	$0.00	$48.57
5	55	$23.16	$13.00	$14.84	$0.00	$51.00
6	60	$25.27	$13.00	$15.18	$0.00	$53.45
7	65	$27.37	$13.00	$15.52	$0.00	$55.89
8	70	$29.48	$13.00	$15.85	$0.00	$58.33
9	75	$31.58	$13.00	$16.20	$0.00	$60.78
10	80	$33.69	$13.00	$16.53	$0.00	$63.22

Effective Date - 09/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	$19.70	$13.00	$0.59	$0.00	$33.29
2	45	$19.70	$13.00	$0.59	$0.00	$33.29
3	50	$21.89	$13.00	$14.57	$0.00	$49.46
4	50	$21.89	$13.00	$14.57	$0.00	$49.46
5	55	$24.07	$13.00	$14.91	$0.00	$51.98
6	60	$26.26	$13.00	$15.26	$0.00	$54.52
7	65	$28.45	$13.00	$15.59	$0.00	$57.04
8	70	$30.64	$13.00	$15.94	$0.00	$59.58
9	75	$32.83	$13.00	$16.28	$0.00	$62.11
10	80	$35.02	$13.00	$16.63	$0.00	$64.65

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	02/01/2021	$54.69	$11.39	$22.09	$0.00	$88.17
	08/01/2021	$56.09	$11.39	$22.25	$0.00	$89.73
	02/01/2022	$56.68	$11.39	$22.25	$0.00	$90.32

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 02/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$27.35	$11.39	$22.09	$0.00	$60.83
2	60	$32.81	$11.39	$22.09	$0.00	$66.29
3	70	$38.28	$11.39	$22.09	$0.00	$71.76
4	80	$43.75	$11.39	$22.09	$0.00	$77.23
5	90	$49.22	$11.39	$22.09	$0.00	$82.70

Effective Date - 08/01/2021

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$28.05	$11.39	$22.25	$0.00	$61.69
2	60	$33.65	$11.39	$22.25	$0.00	$67.29
3	70	$39.26	$11.39	$22.25	$0.00	$72.90
4	80	$44.87	$11.39	$22.25	$0.00	$78.51
5	90	$50.48	$11.39	$22.25	$0.00	$84.12

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE* For apprentice rates see "Apprentice- LABORER"	06/01/2021	$42.07	$8.60	$17.72	$0.00	$68.39
	12/01/2021	$43.08	$8.60	$17.72	$0.00	$69.40
TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE* For apprentice rates see "Apprentice- LABORER"	06/01/2021	$40.79	$8.60	$17.72	$0.00	$67.11
	12/01/2021	$41.80	$8.60	$17.72	$0.00	$68.12
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE* For apprentice rates see "Apprentice- LABORER"	06/01/2021	$40.67	$8.60	$17.72	$0.00	$66.99
	12/01/2021	$41.68	$8.60	$17.72	$0.00	$68.00
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4* For apprentice rates see "Apprentice- OPERATING ENGINEERS"	06/01/2021	$50.19	$13.75	$15.80	$0.00	$79.74
	12/01/2021	$51.33	$13.75	$15.80	$0.00	$80.88
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.92	$12.91	$14.82	$0.00	$65.65
	08/01/2021	$37.92	$13.41	$14.82	$0.00	$66.15
	12/01/2021	$37.92	$13.41	$16.01	$0.00	$67.34
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)* For apprentice rates see "Apprentice- LABORER"	06/01/2021	$52.90	$8.60	$18.17	$0.00	$79.67
	12/01/2021	$53.91	$8.60	$18.17	$0.00	$80.68
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)* For apprentice rates see "Apprentice- LABORER"	06/01/2021	$54.90	$8.60	$18.17	$0.00	$81.67
	12/01/2021	$55.91	$8.60	$18.17	$0.00	$82.68
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)* For apprentice rates see "Apprentice- LABORER"	06/01/2021	$44.97	$8.60	$18.17	$0.00	$71.74
	12/01/2021	$45.98	$8.60	$18.17	$0.00	$72.75

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2021	$46.97	$8.60	$18.17	$0.00	$73.74
	12/01/2021	$47.98	$8.60	$18.17	$0.00	$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE A*	06/01/2021	$37.34	$12.91	$14.82	$0.00	$65.07
	08/01/2021	$37.34	$13.41	$14.82	$0.00	$65.57
	12/01/2021	$37.34	$13.41	$16.01	$0.00	$66.76
WAGON DRILL OPERATOR *LABORERS - ZONE 1*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
	06/01/2022	$42.93	$8.60	$17.57	$0.00	$69.10
	12/01/2022	$43.93	$8.60	$17.57	$0.00	$70.10
	06/01/2023	$44.93	$8.60	$17.57	$0.00	$71.10
	12/01/2023	$46.18	$8.60	$17.57	$0.00	$72.35
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) *LABORERS - ZONE 1 (HEAVY & HIGHWAY)*	06/01/2021	$40.92	$8.60	$17.57	$0.00	$67.09
	12/01/2021	$41.93	$8.60	$17.57	$0.00	$68.10
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2021	$50.73	$13.75	$15.80	$0.00	$80.28
	12/01/2021	$51.88	$13.75	$15.80	$0.00	$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2021	$60.19	$13.57	$17.26	$0.00	$91.02
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$29.67	$9.25	$1.89	$0.00	$40.81
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$42.03	$9.25	$10.27	$0.00	$61.55
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$34.62	$9.25	$10.07	$0.00	$53.94
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$27.20	$9.25	$1.82	$0.00	$38.27
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$42.03	$9.25	$14.35	$0.00	$65.63
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$37.09	$9.25	$10.87	$0.00	$57.21
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$27.20	$9.25	$1.82	$0.00	$38.27
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$22.25	$9.25	$1.82	$0.00	$33.32
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	08/30/2020	$49.45	$9.25	$17.48	$0.00	$76.18

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LINEMAN (Outside Electrical) - East Local 104*

Effective Date - 08/30/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$29.67	$9.25	$3.39	$0.00	$42.31
2	65	$32.14	$9.25	$3.46	$0.00	$44.85
3	70	$34.62	$9.25	$3.54	$0.00	$47.41
4	75	$37.09	$9.25	$5.11	$0.00	$51.45
5	80	$39.56	$9.25	$5.19	$0.00	$54.00
6	85	$42.03	$9.25	$5.26	$0.00	$56.54
7	90	$44.51	$9.25	$7.34	$0.00	$61.10

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$30.73	$4.70	$3.17	$0.00	$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	02/04/2019	$28.93	$4.70	$3.14	$0.00	$36.77

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)
Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

The Massachusetts Prevailing Wage Law
M.G.L. c.149, §§26 – 27

NOTICE TO AWARDING AUTHORITIES

- 'The enclosed wage schedule applies only to the specific project listed at the top and will be updated for any public construction project lasting longer than one (1) year.
- 'You should request an updated wage schedule from the Division of Occupational Safety if you have not opened bids or selected a contractor within 90 days of the date of issuance of the enclosed wage schedule.
- 'The wage schedule shall be incorporated in any advertisement or call for bids for the project for which it has been issued.
- 'Once a contractor has been selected by the awarding authority, the wage schedule shall be made a part of the contract for that project.

NOTICE TO CONTRACTORS

- The enclosed wage schedule, and any updated schedule, must be posted in a conspicuous place at the work site during the life of the project.
- The wages listed on the enclosed wage schedule must be paid to employees on public works projects regardless of whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- The enclosed wage schedule applies to all phases of the project including the final clean-up. Contractors whose only role is to perform final clean-up must pay their employees according to this wage schedule.
- All apprentices must be registered with the Massachusetts Division of Apprentice Training in order to be paid at the reduced apprentice rates. If a worker is not registered with the Division of Apprentice Training, they must be paid the "total rate" listed on the wage schedule regardless of experience or skill level. For further information, please call (617) 727-3486 or write to the Division of Apprentice Training, 399 Washington Street, 4th Floor, Boston, MA 02108

WEEKLY PAYROLL RECORDS REPORT

& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c.149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. This is required to be done on a weekly basis. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor or public body shall furnish to the Department of Labor & Workforce Development/Division of Occupational Safety within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 2021

I,_____,_____
(Name of signatory party) (Title)
do hereby state:
That I pay or supervise the payment of the persons employed by
_____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions M.G.L. c.149, §§26-27.

Signature _____

Title _____

DIVISION OF OCCUPATIONAL SAFETY, 399 WASHINGTON STREET, 5th FL., BOSTON, MA. 02108

END OF SECTION

WEEKLY PAYROLL REPORT FORM

Company Name:

Project Name:

Awarding Auth.:

Work Week Ending:

Prime Contractor

Subcontractor
List Prime Contractor:

Employer Signature:

Print Name & Title:

Employee Name & Address	Work Classification	Hours Worked							(A) Tot. Hrs.	(B) Hourly Base Wage	Employer Contributions			(F) [B+C+D+E] Hourly Total Wage (prev. wage)	(G) [A*F] Weekly Total Amount
											(C) Health & Welfare	(D) Pension	(E) Supp. Unemp		
		S	M	T	W	T	F	S							

NOTE: Every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority.

Insert Technical Specifications Here

Insert Haz Mat Reports Here

Insert Con Comm Order of Conditions Here

Insert Other Pertinent Information Here (if applicable)

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TABLE OF CONTENTS

INTRODUCTORY DOCUMENTS

DIVISION 01 — GENERAL REQUIREMENTS

DIVISION 3- CONCRETE

DIVISION 4- MASONRY

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work performed by Owner.
4. Work under Owner's separate contracts.
5. Future work not part of this Project.
6. Owner-furnished/Owner-installed (OFOI) products.
7. Contractor's use of site and premises.
8. Coordination with occupants.
9. Work restrictions.
10. Specification and Drawing conventions.
11. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 PROJECT INFORMATION

A. Project Identification: Gath Memorial Pool Improvements

1. Project Location: 256 Albemarle Road, Newton, MA.

B. Owner: City of Newton, Massachusetts.

1. Owner's Representative: Rafik Ayoub, Project Manager, Public Buildings Department.

C. Architect: Bargmann Hendrie + Archetype, Inc. Boston, MA.

1. Architect's Representative: Tom Scarlata, Principal

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Aquatic: Replacement of the existing swimming pool and wading pool with a lap pool, zero depth pool, and spray deck.

2. Building: Accessibility upgrades to the building including new entry stairs and ramps, new gender neutral toilet and shower rooms, construction of an accessible path between the lobby and pool, improvements to the reception counter, and construction of new lifeguard and first aid space.

3. Removal and expansion of the pool decks, new ramps, new shade structures, fencing, retaining wall and other site work.

4. Other Work indicated in the Contract Documents.

B. Type of Contract: Single prime contract bid under M.G.L. c149.

1.5 WORK PERFORMED BY OWNER

A. Cooperate fully with Owner, so work may be carried out smoothly, without interfering with or delaying Work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before Work under this Contract begins.

1. Removal of existing fixtures; furnishings and equipment that will be reused in the renovated project.

C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory Work under this Contract.

1. The Albemarle Fields improvement project will be performed after completion of the pool. The Gath Memorial Pool will leave portions of the site loamed and seeded and terminate power to existing sports lighting fixtures removed under a future field project.

1.6 WORK UNDER OWNER'S SEPARATE CONTRACTS

A. Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.

B. Concurrent Work: Owner will award separate contract(s) or self-perform the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

1. Installation of telephone, data, and communication systems.

2. Installation of fixtures, furnishings and equipment.

1.7 OWNER-FURNISHED/OWNER-INSTALLED (OFOI) PRODUCTS

A. The Owner will furnish and install products indicated.

B. Owner-Furnished/Owner-Installed (OFOI) Products:

1. Newton Fire Department will extend fire alarm signal cable. Conduit, pathway, and fire alarm system are the work of the Gath Memorial Pool Project.

1.8 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Albemarle Fields and Albemarle Road will remain open to the public at all times.

2. Parking in front of the bathhouse building is used by Day School personnel and will remain in use throughout construction.

3. Albemarle Road the drive/walk path at the south side of the pool complex is used by students and parents as drop-off and pick-off to the Day school. Drop-off and pick-up will be required throughout construction.

4. The field house structure and basketball court to the north of the bathhouse will remain open during construction.

5. The Contractor shall coordinate temporary measures to direct parking and foot traffic during the work with the City. Activities and temporary measures must be submitted and approved with notice to the City twenty one (21) days prior to starting the temporary measures.
6. Driveways, Walkways and Entrances: Keep driveways and entrances serving the park clear and available to City Staff, the public and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
    c. Schedule deliveries and activities around the following pick-up drop off times:
    d. Drop-off 7 AM to 8:30 AM Monday through Friday

e. Pick-up 2 PM to 3 PM Monday, Tuesday, Thursday, and Friday; 1PM to 2PM on Wednesdays.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.9 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner and the Public will occupy the adjacent site and fieldhouse during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than seventy-tw0 (72) hours' notice to Owner of activities that will affect Owner's operations.

B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.

1.10 WORK RESTRICTIONS

A. Comply with restrictions on construction operations outlined in Newton Ordinances §20-13 Article NOISE. https://www.nonoise.org/regulation/ordinance/Newton,%20Massachusetts.pdf.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to between 7 a.m. to 8 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

1. Weekend Hours: Saturdays 8AM to 7PM, not work on Sundays

C. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances within the existing building, on Project site, or Albemarle Fields is not permitted.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
3. Keynoting: Materials and products are identified by reference keynotes listed on the drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 011400- WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes Work Requirements and Restrictions required by Permits and Conditions placed on the Project by Authorities having Jurisdiction. These include, but are not limited to:
   1. City of Newton Conservation Commission Order of Dated June_____, 2023

B. Related Requirements:
   1. Section 011000- "Summary" for general work restrictions related to hours of operation and site access.
   2. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
   3. Prior to Occupancy.

1.2 CONSERVATION COMMISSION ORDER OF CONDITIONS; SUBMITTALS/ACTIONS REQUIRED BY CONTRACTOR

A. The Conservation Commission Order of Conditions has been issued to the City of Newton as the "Applicant". Portions of the Order of Conditions require action and Work by the Contractor. The following is part of the Work including but not limited to the following

   1. Provide MASS DEP sign with File Number XXX-XXXX
   2. Allow access to the Conservation Agent and Commission to review the work
   3. Provide erosion control measures as shown on the drawings and in the Order of Conditions
   4. Confirm construction staging area
   5. Schedule a site visit with the Conservation Commission prior to start of the work.
   6. Maintain Conditions During Construction described on page ___ of the Conditions.
   7. Prepare an as-built plan of the work as defined in "Conditions related to Certificate of Compliance" Pages _____ of the Conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011400

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SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:
1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Section 014000 "Quality Requirements" for field testing by an independent testing agency.
3. Section 013543 - “ Environmental Procedures”
4. Section 022820 - “ Asbestos Remediation”

1.3 DEFINITIONS

A. The unit prices provided will be used for an ADD to the Work and cover the description outlined below for each scope of Work. Where base contact amounts are indicated, Work not utilized under this Section will be taken as a DEDUCT and will be taken at fifteen (15%) less than the ADD price to account for overhead and profit.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Trench rock excavation and replacement with satisfactory soil material.
   1. Description: Classified trench rock excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, in accordance with Section 312000 "Earth Moving."
   2. Unit of Measurement: One (1) cubic yard of rock excavated, based on survey of in-place surveys volume of before and after removal.

B. Unit Price No 2.
   1. Description:
   2. Unit of Measurement :

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

B. Alternates shall be further defined by M.G.L. c149 §44.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. **Alternate No. One (1)**
   1. Base Bid:
   2. Alternate Work:
      a. .

B. **Alternate No. Two (2):**
   1. Base Bid:
   2. Alternate Work:

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 M.G.L. c. 30 § 39 M- “OR EQUAL”

A. It is the intent of the Project to provide material specifications that provide for full competition for each item of material to be furnished under the Contract. For every item specified, the specifications contain multiple brands of material or provide a material description that at least three manufacturers or producers can meet.
   1. The Architect and Owner make the determination as to whether a bid item is equal to that named in a specification. M.G.L. c. 30, § 39M (b).

1.5 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

   1. Substitution Request Form: Use facsimile of form provided in Project Manual.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
    b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Samples, where applicable or requested.
    f. Certificates and qualification data, where applicable or requested.
    g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
    h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
    i. Research reports evidencing compliance with Massachusetts Building Code building code in effect for the Project including all ICC codes referenced in the MA Code.
    j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
    k. Cost information, including a proposal of change, if any, in the Contract Sum.
    l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
    m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within **seven** (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within seven (7) days of receipt of request, or five (5) days of receipt of additional information or documentation, whichever is later.

1.6 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.7 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.8 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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Advancement of Construction Technology

SUBSTITUTION REQUEST

(After the Bidding Phase)

Project: Gath Memorial Pool Improvements

256 Albemarle Road, Newton, MA

To: Bargmann Hendrie + Archetype, Inc.

9 Channel Center St. Suite 300, Boston, MA

Re: _____

Substitution Request Number: _____

From: _____

Date: _____

A/E Project Number: 3457.00

Contract For: General Construction

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

September 1996
CSI Form 13.1A

SUBSTITUTION REQUEST
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions (ASI) authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on in the form of a BH+A Bulletin.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Proposal requests will be issued in the form of a BH+A Bulletin.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within fourteen (14) days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Architect and simultaneously to the Owner's Project Manager.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on a BH+A form similar to AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on BH+A Bulletin Form similar to the AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:
   1. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
   2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
   1. Submit the schedule of values to Architect at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

   1. Identification: Include the following Project identification on the schedule of values:

      a. Project name and location.
      b. Name of Architect.
      c. Architect's Project number.
      d. Contractor's name and address.

e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703).

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. The minimum breakdown shall be:
   a. Bonds
   b. Insurance
   c. Permits
   d. General Conditions
   e. OH&P
   f. Mobilization
   g. Closeout Documents
   h. Start-up
   i. Training
   j. As-built Drawings
   k. Warranty
   l. Environmental Protection
   m. Site Protection
   n. Concrete Work Building
   o. Concrete Footings Building
   p. Concrete Foundation/Retaining Walls
   q. Miscellaneous Concrete
4. Masonry
   a. Concrete Masonry Units Material
      1) CMU
      2) Clay Brick Masonry
      3) Reinforcing
      4) Mortar & Grout
   b. Concrete Masonry Units Labor
5. Metals
   a. Miscellaneous and Ornamental Steel
      1) Submittals and Shop Drawings
      2) Guards & Rails
      3) Lintels
      4) Miscellaneous
6. Wood, Plastics & Composites
   a. Rough Carpentry
   b. Roof Framing
   c. Finish Carpentry Interior
   d. Finish Carpentry Exterior
   e. Decking
   f. Casework
7. Waterproofing, Damproofing & Caulking
   a. Below grade waterproofing
   b. Air Barrier Membrane
   c. Sealants
8. Insulation
   a. Rigid Insulation
9. Fiber Cement Siding

10. Roofing and Flashing
    a. Roof Flashing at Vents
    b. Roof repair
    c. Roof Accessories
11. Hollow Metal Doors & Frames
    a. Doors
    b. Frames
    c. Borrowed Lites
12. Door Hardware
13. Glass & Glazing
    a. Glass
14. Louvers
15. Gypsum Wall Board
    a. Metal Framing
    b. GWB Ceilings
    c. Acoustic Insulation and Sealant
16. Ceramic Tile
17. Acoustical Tile Ceiling (Breakdown further by type)
18. Painting
19. Signage
    a. Interior
20. Compartments and Cubicles
21. Toilet Accessories
22. Fire Protection Specialties
23. Fiberglass Lockers
24. Site Furnishings
25. Pool Structure (Zero Depth)
    a. Reinforcing
    b. Bonding
    c. Gunite
    d. Plaster Finish (each type)
    e. Tile Markings
26. Pool Structure (Lap Pool)
    a. Reinforcing
    b. Bonding
    c. Gunite
    d. Plaster Finish
    e. Tile Markings
27. Pool Recirculation
    a. Gutters
    b. Piping Pools to Filter Room
    c. Piping Filter Room
    d. Main Drains
    e. Returns
28. Pool Filtration
    a. Filter Tanks
    b. Pumps, Piping, Valves, etc
    c. UV Equipment.
    d. Chemicals and Controls
29. Miscellaneous Pool

30. Pool Deck Equipment (One line item for each piece of equipment.)
31. Pool Water Features (Line Item for Each Feature)
32. Water Feature Pumps and Piping
33. Spray Deck
34. Surfacing
35. Water Features
36. Piping
37. Filter
38. Chemical Control
39. UV Equipment
40. Start-up and Training
41. O& M Manuals
42. Extended Maintenance Agreement
43. Plumbing
    a. Rough-In Material
    b. Rough-In Install
    c. Fixtures Material
    d. Fixtures Install
    e. Testing
    f. Start-up and Training
44. HVAC
    a. Fans
    b. Ductwork
    c. Controls
    d. Start-up and Training
45. Electrical
    a. Distribution Rough-In Material
    b. Distribution Rough-In Install
    c. Devices Equipment
    d. Devices Install
    e. Light Fixtures Material (Provide Line item for each fixture type)
    f. Light Fixtures Install
    g. Fire Alarm Equipment
    h. Tel/Data Distribution
    i. Testing
46. Demolition of Site Elements
47. Dewatering
48. Pool Excavation
49. Building Excavation
50. Subgrade Preparation
51. Utility Excavation
52. Miscellaneous Excavation
53. Building Backfill
54. Utility Backfill
55. Pool Backfill
56. Miscellaneous Backfill
57. Site Utilities
    a. Structures Material
    b. Structures Install
    c. Piping Material

d. Piping Install

58. Concrete Paving
    a. Walks
    b. Pool Decks
59. Bituminous Paving
    a. Regular
60. Site Improvements
61. Fencing
62. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
63. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in a minimum amount totaling five (5) percent of the Contract Sum and subcontract amount.
64. Sustainable Submittals

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit a draft copy of the Application for Payment seven (7) days prior to due date for review by Architect.

2. .

3. Applications shall reflect work complete at time of draft submission; amounts requested shall not project work to the last day of the month.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703, or form in similar format, as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit (6) six signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment .

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. Owner reserves the right to designate which entities involved in the Work must submit waivers.
3. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner and recognized in the Commonwealth of Massachusetts.
5. Waiver Forms shall:
    a. Indicate period of payment
    b. Must be signed
    c. Must be notarized and dated

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Sustainable design action plans, including preliminary project materials cost data.
7. Schedule of unit prices.

8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.
15. Certificates of insurance and insurance policies.
16. Performance and payment bonds.
17. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. RFIs.
3. Digital project management procedures.
4. Web-based Project management software package.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:
1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. CITY: Owner’s Project Manager

C. RFI: Request for Information. Request from Owner, CITY, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 NAMING CONVENTIONS

A. All documents and forms shall be clearly labelled and numbered as follows:
1. Emails: Subject Lines of Emails shall start with “Gath Pool”
2. Documents: All forms shall contain “Gath Pool” or “Gath” in the file name.
3. All RFI’s shall contain a subject line to describe the RFI
4. All Submittals shall contain the Specification Number and Title of the submittal.

1.5 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory. Keep list current.

1.6 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.7 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe the relationship of various systems and components.

1. Swimming Pool Systems: Show the following:
   a. Locations of underground piping, deck drains, storm drainage, underground conduit.
   b. Connections to waste water, domestic water, and electrical service.

2. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform the Contractor, who shall make suitable modifications and resubmit.
3. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."

B. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: REVIT OR DWG operating in Microsoft Windows operating system.
2. Architectural and Structural Files can be provided in Revit or DWG. MEP/FP, civil and landscape drawings are available in DWG format.
3. File Submittal Format: Submit or post coordination drawing files using format same as the file preparation format and PDF format.

4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
   a. The contractor shall execute a data licensing/use limitation agreement in the form acceptable to the Architect.
   b. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

1.8 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Owner name.
3. Owner's Project number.
4. Name of Architect and CITY.
5. Architect's Project number.
6. Date.
7. Name of Contractor.
8. RFI number, numbered sequentially.
9. RFI subject.
10. Specification Section number and title and related paragraphs, as appropriate.
11. Drawing number and detail references, as appropriate.
12. Field dimensions and conditions, as appropriate.
13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
14. Contractor's signature.
15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Equal to AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.

3. Architect's action on RFIs that may result in a change to the Contract Time, or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and CITY in writing within five (5) days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of web-based Project management software including:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect[and CITY
4. RFI number, including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three (3) days if Contractor disagrees with response.

1.9 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Web-Based Project Software or Hosting Service: Provide, administer, and use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.
    1. Web-based Project software site includes, at a minimum, the following features:
        a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
        b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
        c. Document workflow planning, allowing customization of workflow between project entities.
        d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
        e. Track status of each Project communication in real time, and log time and date when responses are provided.
        f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
        g. Processing and tracking of contract modifications.
        h. Distributing meeting minutes.
        i. Document management for Drawings, Specifications, and coordination drawings, including revision control.
        j. Management of construction progress photographs.
        k. Mobile device compatibility, including smartphones and tablets.

2. Provide web-based Project software user licenses for use of Owner, Owner's Manager Architect, and Architect's consultants.
3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
4. Available software and hosting services include, but are not limited to:
   a. Newforma, Inc.
   b. Procore Technologies, Inc.
   c. Submittal Exchange (Oracle)
   d. PlanGrid
   e. Or equal

B. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model or CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Contractor, subcontractor and other parties shall execute a release form for use of the digital data files.
4. The following digital data files will be furnished for each appropriate discipline:
   a. Floor plans.
   b. Reflected ceiling plans.
   c. Building Elevations

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.10 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Minutes: The Contractor, City and Architect will attend meetings. Party organizing meeting is responsible for conducting meeting and will record significant discussions and agreements achieved. Meeting notes will be distributed by email and posted on the Project Software site.

B. Preconstruction Conference: Architect, Owner and CITY will schedule and conduct a preconstruction conference before starting construction, at a time convenient to all parties no later than [7] seven days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, CITY, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned

parties shall attend the conference. Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Use of web-based Project software.
    h. Procedures for processing field decisions and Change Orders.
    i. Procedures for RFIs.
    j. Procedures for testing and inspecting.
    k. Procedures for processing Applications for Payment.
    l. Distribution of the Contract Documents.
    m. Submittal procedures.
    n. Sustainable design requirements.
    o. Preparation of Record Documents.
    p. Use of the premises
    q. Work restrictions.
    r. Working hours.
    s. Owner's occupancy requirements.
    t. Responsibility for temporary facilities and controls.
    u. Procedures for moisture and mold control.
    v. Procedures for disruptions and shutdowns.
    w. Construction waste management and recycling.
    x. Parking availability.
    y. Office, work, and storage areas.
    z. Equipment deliveries and priorities.
    aa. First aid.
    bb. Security.
    cc. Progress cleaning.

3. Minutes: Architect will record and distribute meeting minutes.

C. Pre-installation Conferences: Conduct a pre-installation conference at the Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Project Manager of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than ninety (90) days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

    a. Preparation of Record Documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Procedures for completing and archiving web-based Project software site data files.
    d. Submittal of written warranties.
    e. Requirements for completing sustainable design documentation.
    f. Requirements for preparing operations and maintenance data.
    g. Requirements for delivery of material samples, attic stock, and spare parts.
    h. Requirements for demonstration and training.
    i. Preparation of Contractor's punch list.
    j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    k. Submittal procedures.
    l. Coordination of separate contracts.
    m. Owner's partial occupancy requirements.
    n. Installation of Owner's furniture, fixtures, and equipment.
    o. Responsibility for removing temporary facilities and controls.

2. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Hold progress meetings at regular intervals commensurate with Construction activities.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Contractor, and Architect, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
        1) The contract shall provide two -week look ahead schedules for review at each meeting.
    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Status of sustainable design documentation.
        5) Deliveries.

6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of Proposal Requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) Documentation of information for payment requests.

4. Minutes: The Architect will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings biweekly or at intervals commensurate with Construction and Administrative activities. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, CITY, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

   a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

   b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Resolution of BIM component conflicts.
4) Status of submittals.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.
10) Work hours.
11) Hazards and risks.
12) Progress cleaning.
13) Quality and work standards.
14) Status of RFIs.
15) Proposal Requests.
16) Change Orders.
17) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Startup construction schedule.
   2. Contractor's As-Planned Construction Schedule.
   3. Construction schedule updating reports.
   4. 2-week look ahead schedules

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
   1. PDF file.

B. Startup construction schedule.
   1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Contractor's As-Planned Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

D. Construction Schedule Updating Reports: Submit with Applications for Payment.

1.4 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

1.5 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1.6 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify the first workday of each week with a continuous vertical line. Outline significant construction activities for first [90] ninety days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.7 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 21 days of the date established the Notice to Proceed.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify the first workday of each week with a continuous vertical line.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.8 2-WEEK LOOK AHEAD SCHEDULES

A. Concurrently with Progress Meetings, prepare two-week look a head schedules describing planned activities, deliveries, and other significant events.

B. The Schedule can be prepared in the following formats:
1. Detailed schedule using scheduling software
2. A bar chart schedule prepared using spreadsheet software.
3. A written schedule breaking down activities by week and number of days.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013233 – PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Preconstruction photographs.
      a. Preconstruction Photographs before the start of each Phase
   2. Periodic construction photographs.

B. Related Requirements:
   1. Section 011401 “Phasing” for phasing requirements.
   2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
   3. Section 024119 "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

A. Digital Photographs: Submit image files within 3 (three) days of taking photographs.
   1. Submit photos by uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
   2. Identification: Provide the following information with each posting on web-based project software site:
      a. Date photograph was taken.
      b. Folders with Description of location, vantage point, and direction if photo

1.4 QUALITY ASSURANCE

A. Photographer Qualifications: The Contractor may take and prepare the photographs as long as they are clear, in focus and accurately record the progress of the work**. A professional photographer is not required** unless the quality of the photographs taken by the Contractor are not acceptable to the Architect and Owner.

1.5 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of twelve (12) megapixels, and at an image resolution of not less than 3200 by 2400 and with vibration-reduction technology. Use flash in low light levels or backlit conditions.

1.6 CONSTRUCTION PHOTOGRAPHS

A. Preconstruction Photographs: Before starting construction at each phase of the project, take photographs of Project site and surrounding properties, existing building, and existing items to remain during construction, from different vantage points, as directed by the Architect and Owner

B. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

C. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take a minimum of twenty (20) photographs each week, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
   1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
   2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
   3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

B. Web-Based Project Management Software: PDF print out of a fully populated submittal log from the project management software is acceptable.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:
   1. Project name.
   2. Date.
   3. Name of Architect.
   4. Name of Contractor.
   5. Name of firm or entity that prepared submittal.
   6. Names of subcontractor, manufacturer, and supplier.
   7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
   8. Category and type of submittal.
   9. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
   10. Drawing number and detail references, as appropriate.
   11. Indication of full or partial submittal.
   12. Remarks.
   13. Signature of transmitter.
   14. Stamp or attached document stating that the Submittal has been reviewed, coordinated an approved by the General Contractor and stating that the submittal is in general conformance with the Contract Documents.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
   2. Notifications: Project Software shall be programmed to control notifications and distribution of documents and notifications.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect will withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow fourteen (14) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow seven (7) days for review of each resubmittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.

B. PDF Format: Create a single bound file, or group products into a single larger file.
1. Submittals containing multiple pdf files of individual components will be returned without action.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
   1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
      a. Physical samples shall be delivered to the Project Site or Architect's Office
   2. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   3. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

      a. Number of Samples: Submit two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

   4. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
      a. Number of Samples: Submit three (3) sets of Samples. Architect will retain [two] Sample sets; remainder will be returned.
         1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
         2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

G. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

H. Certificates:

   1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be

signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

I. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a registered design professional in the Commonwealth of Massachusetts, are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

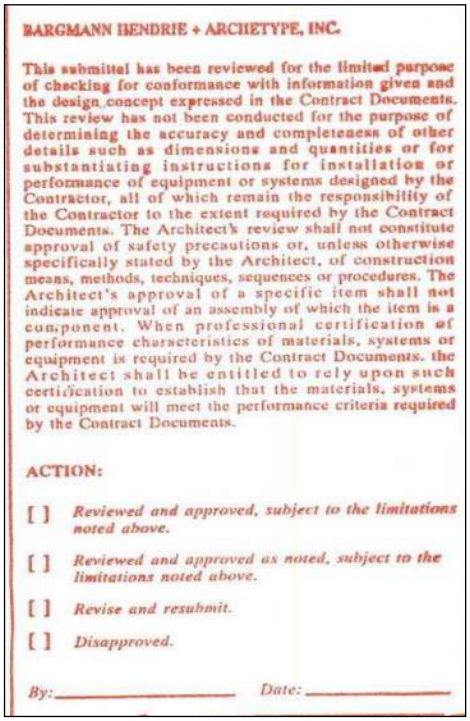
1.9 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp or indication in web-based Project software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1.10 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required.
   1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
   2. Submittals by Web-Based Project Software: Architect will mark-up PDF of reviewed submittal and indicate, on Project software website, the appropriate action.


BARGMANN HENDRIE + ARCHETYPE, INC.

This submittal has been reviewed for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. This review has not been conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities or for substantiating instructions for installation or performance of equipment or systems designed by the Contractor, all of which remain the responsibility of the Contractor to the extent required by the Contract Documents. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the Contract Documents.

ACTION:

[ ] *Reviewed and approved, subject to the limitations noted above.*

[ ] *Reviewed and approved as noted, subject to the limitations noted above.*

[ ] *Revise and resubmit.*

[ ] *Disapproved.*

*By:*_____ *Date:*_____


DELEGATED DESIGN SUBMITTAL REVIEW

☐ REVIEWED

☐ REVIEWED AS NOTED (RESUBMITTAL REQUIRED)

☐ NOT REVIEWED

Review is solely for the purpose of evaluating compliance of the subject design with the performance requirements set forth in the Contract Documents. Neither this submittal review nor any participation in reviews or comments with respect to preliminary or iterative designs shall in any matter or respect diminish or otherwise affect the Contractor's and its Designer's exclusive responsibility for the adequacy, completeness, suitability, reliability, conformity, and compliance of the design with the requirements of the Contract Documents, applicable codes and standards, and applicable professional practices standards.

BY: _____

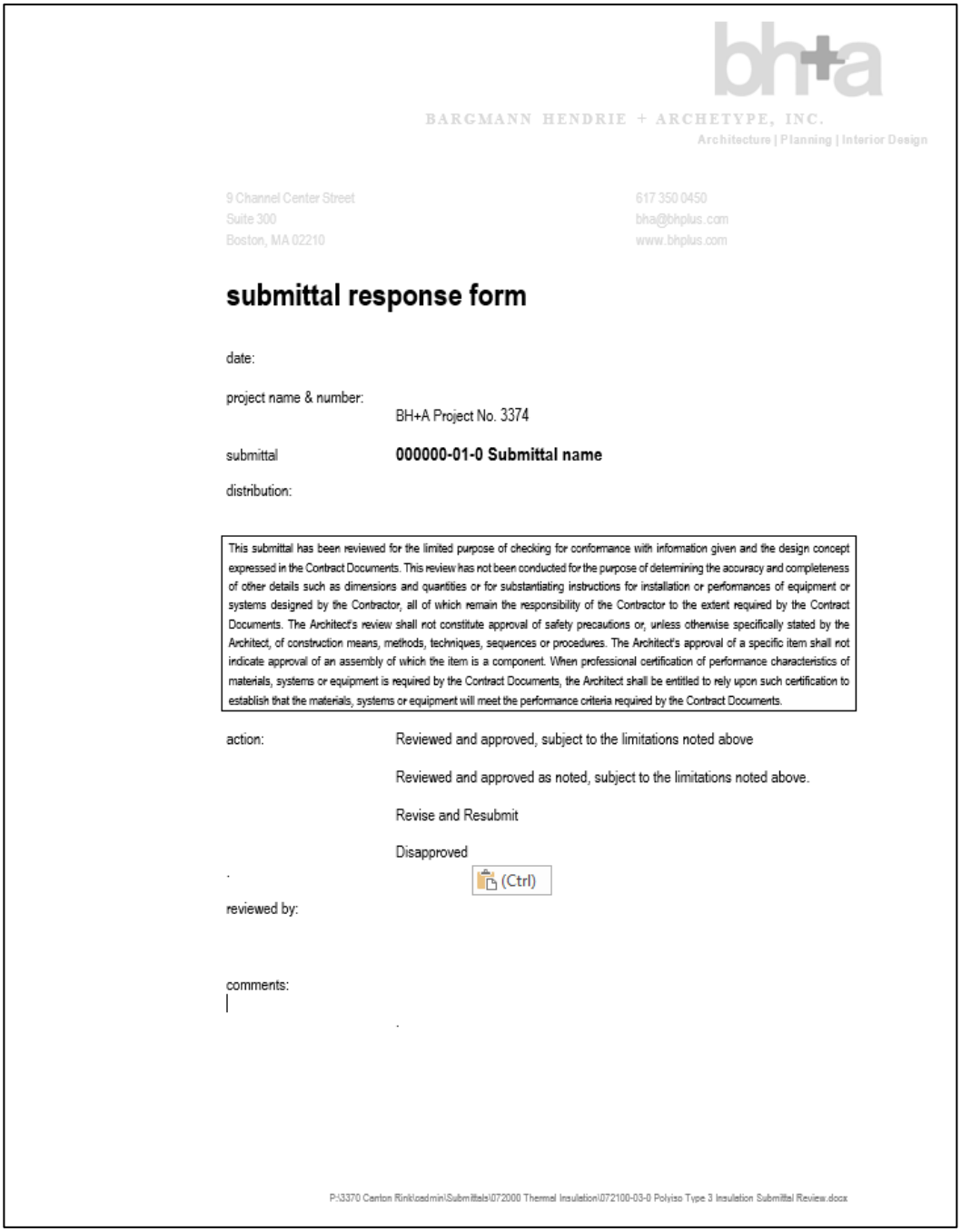
DATE: _____

BARGMANN HENDRIE + ARCHETYPE, INC.

A. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

B. For certain submittals and physical samples, the Architect may attach a submittal response form and provide comments or actions into a single memo format document. The submittal response form contains the following language:

C.



BARGMANN HENDRIE + ARCHETYPE, INC.
Architecture | Planning | Interior Design

9 Channel Center Street
Suite 300
Boston, MA 02210

617 350 0450
bha@bhplus.com
www.bhplus.com

submittal response form

date:

project name & number: BH+A Project No. 3374

submittal **000000-01-0 Submittal name**

distribution:

This submittal has been reviewed for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. This review has not been conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities or for substantiating instructions for installation or performances of equipment or systems designed by the Contractor, all of which remain the responsibility of the Contractor to the extent required by the Contract Documents. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the Contract Documents.

action: Reviewed and approved, subject to the limitations noted above

Reviewed and approved as noted, subject to the limitations noted above.

Revise and Resubmit

Disapproved

(Ctrl)

reviewed by:

comments:

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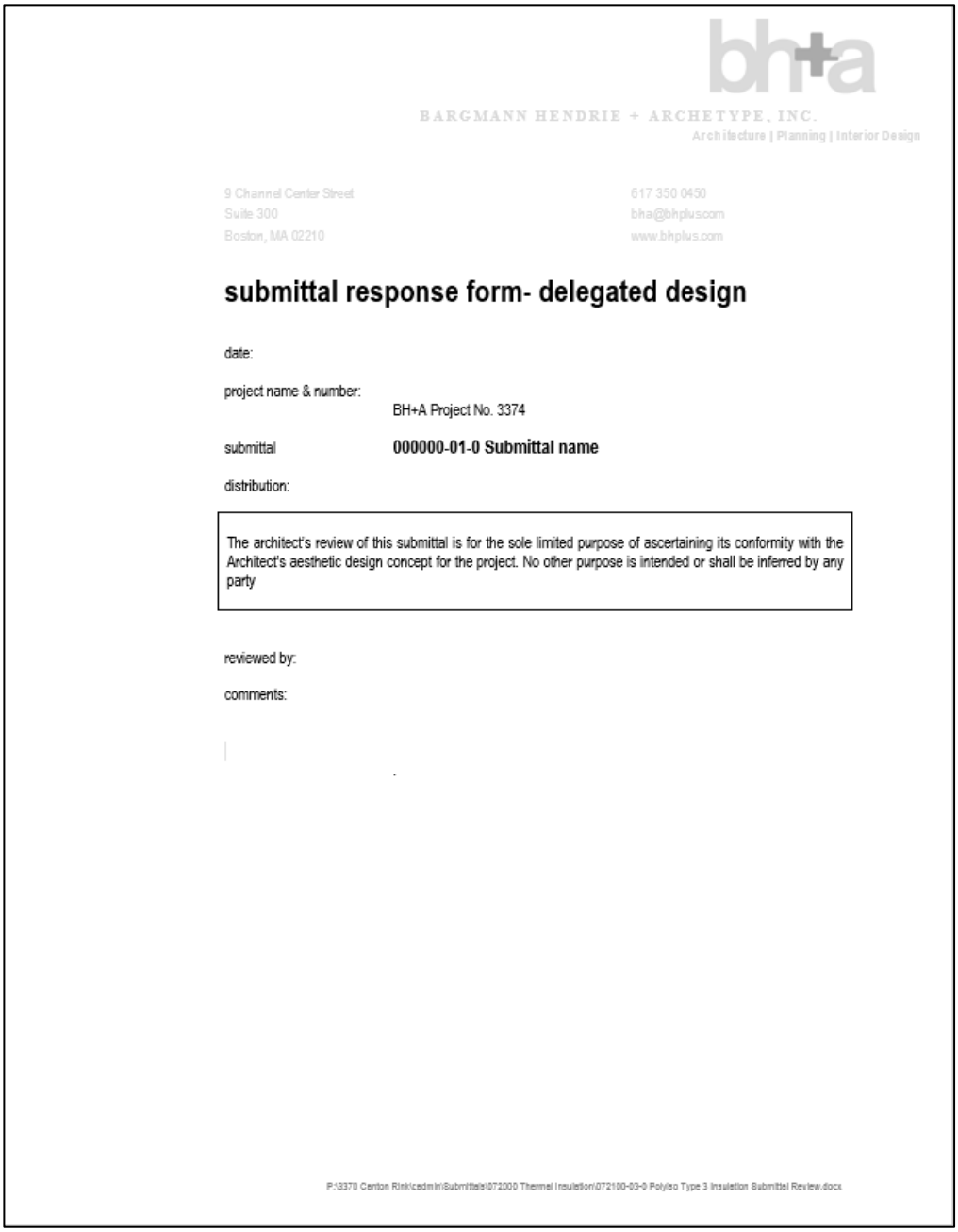
D. Architect's Delegated Design Response Form:



BARGMANN HENDRIE + ARCHETYPE, INC.
Architecture | Planning | Interior Design

9 Channel Center Street
Suite 300
Boston, MA 02210

617 350 0450
bha@bhplus.com
www.bhplus.com

submittal response form- delegated design

date:

project name & number: BH+A Project No. 3374

submittal **000000-01-0 Submittal name**

distribution:

The architect's review of this submittal is for the sole limited purpose of ascertaining its conformity with the Architect's aesthetic design concept for the project. No other purpose is intended or shall be inferred by any party

reviewed by:

comments:

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E.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Specific test and inspection requirements are not specified in this Section.

C. Loam Testing: The Contractor shall collect, submit, and recommend soil improvement amendments of planting soil.

D. Test Reports: Control shall organize and post all Test Results on the Web-based Project Management software.
1. Organize by type of test
2. File in chronological order or by test number

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

D. Mockups: Full-size physical assemblies that are constructed as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as part of permanent construction, consisting of multiple products, assemblies, and subassemblies.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional, licensed in the Commonwealth of Massachusetts, are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS- REVIEWED ONLY

A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or

certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1. Calculations, certifications and stamped and signed shop drawings shall be reviewed by the Architect for conformance with project requirements. Final Delegated Design is the responsibility of the responsible design professional.

1.7 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspection.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.

3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

C. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

D. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

E. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    a. Provide test specimens representative of proposed products and construction.
    b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

F. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location indicated or, if not indicated, as approved by Architect.
2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed. Coordinate date for observation with a regularly scheduled project meeting.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

G. Integrated Exterior Mockups: Construct integrated exterior mockup in agreed upon location. Coordinate installation of exterior envelope materials and products for which mockups are

required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.

H. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
   2. Costs for retesting and reinspection construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
   3. Testing that will be provided by the Owner, include, but may not be limited to:
      a. Hazardous Material Sampling and Monitoring
      b. Concrete Testing
      c. Masonry Testing
      d. Masonry Reinforcing Inspection
      e. Reinforcing Steel Inspections
      f. Shotcrete and Steel Reinforcing Inspections
      g. Earthwork
      h. Environmental Monitoring
      i. Soil Classification for removal/disposal.

B. Usually retain “Contractor Responsibilities” Paragraph below to address testing and inspection and other quality-control activities not explicitly assigned to Owner. See the Evaluations.

C. Retesting/Reinspection: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspection, for construction that replaced Work that failed to comply with the Contract Documents.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

F. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

   1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for CITY and Architect's reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
1. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
2. DOE - Department of Energy; www.energy.gov.
3. EPA - Environmental Protection Agency; www.epa.gov.
4. OSHA - Occupational Safety & Health Administration; www.osha.gov.

C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Coordinate Temporary Facilities and Controls with Project Phasing requirements.

C. Related Requirements:
   1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
   2. Section 011400 “Work Restrictions” for administrative permitting requirements.
      a. Document 011400.01 City of Newton Conservation Commission Order of Conditions

1.3 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, the Owner, Architect, testing agencies, and authorities having jurisdiction.

A. Water Service: Water from Owner's existing water system **may** be available for use without metering. Provide connections and extensions of services as required for construction operations. If a water emergency, or restriction is established during construction, or the existing system is not available, **Contractor shall arrange for supplemental water it his/her own expense.**

B. Filling of the Pool shall be at the Contractor’s expense.

C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
   1. Additional power for equipment requiring voltage or amperage not available at the site, shall be provided by the Contractor.

1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
   1. Coordinate Site Utilization Plan with Phasing Plan specified in Section 011401

B. Implementation and Termination Schedule: Within [15] fifteen days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Erosion and Sedimentation Control Plan: Show compliance with requirements of the City of Newton approvals.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.

B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.

C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.

2.2 CONTRACTOR FIELD OFFICE AND STORAGE

A. Field Offices (Contractor's Option) : Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
   1. Contractor may utilize space within the bathhouse by providing temporary heat and ventilation.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of [8] eight at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures."

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
   1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Contractors site Superintendent, Project Managers and other construction personnel designated by the Contractor shall have use of a cellular telephone with voice, text, camera, and web access.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
2. Utilize designated area within existing building for temporary field offices.
3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Storage and Staging: Use designated areas of Project site for storage and staging needs.

C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

D. Project Signs: Provide Project signs as indicated and specified in Section 015813. Unauthorized signs are not permitted.
1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
a. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touch up signs, so they are legible at all times.

E. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: : Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent parkland, shoreline, and driveways. Comply with requirements of authorities having jurisdiction, Salem Conservation Order of Conditions and requirements specified in the Project Documents.
1. Comply with requirements of Section 11400 Work Restrictions and related Planning Board Decisions.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
   1. Comply with requirements of Section 11400 Work Restrictions and related Planning Board Decisions.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
   1. Comply with requirements of Section 11400 Work Restrictions and related Planning Board Decisions.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction. Pet-Control services shall be scheduled on a regular basis throughout construction with reports filed with the OPM and Authorities having jurisdiction.

G. Site Enclosure Fence: Before construction operations begin furnishing and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
   2. Coordinate extent of fence with Project Phasing Requirements
   3. Option in subparagraph below is only for projects connected to existing construction.
   4. Maintain security by limiting number of keys and restricting distribution to authorized personnel.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
   1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
   1. Protect porous materials from water damage.
   2. Protect stored and installed material from flowing or standing water.
   3. Keep porous and organic materials from coming into prolonged contact with concrete.
   4. Remove standing water from decks.
   5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
   1. Keep interior spaces reasonably clean and protected from water damage.
   2. Periodically collect and remove waste containing cellulose or other organic matter.
   3. Discard or replace water-damaged material.
   4. Do not install material that is wet.
   5. Discard and replace stored or installed material that begins to grow mold.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION 015000

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SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Work of this Section Includes: General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary controls, utilities, support facilities, temporary site fencing, and, if applicable, temporary erosion and sedimentation controls if not indicated in the Documents.

1.3 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at a height 6 inches (150 mm) above the ground for trees up to and including 4-inch (100-mm) size at this height and as measured at a height of 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 ACTION SUBMITTALS

A. Product Data:

1. General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction

B. Mitigation Requirements: As required by jurisdiction or as developed by arborist, for mitigation of damage to trees and other plantings. Include the following:

1. Local ordinances governing tree mitigation.
2. Standards established under the approved tree mitigation report developed by the arborist.
3. "Digital Guide for Plant Appraisal" by Council of Tree and Landscape Appraisers.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For arborist and tree service firm.

B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.6 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

D. Take precautions to protect plants from airborne contaminants, such as paint or fireproofing overspray.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements: Previously used materials may be used when approved by Architect.

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches (2400 mm) apart.

a. Height: 48 inches minimum.
b. Color: High-visibility orange, nonfading.

B. Plywood and Lumber: Comply with requirements in Section 061000 "Rough Carpentry."

C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Ground or shredded bark
2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum

PART 3 - EXECUTION

3.1 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch (25-mm) blue vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.2 TREE PROTECTION

A. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 2-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.
2. Install temporary root-protection matting over mulch to the extent indicated.

B. Trunk Protection: Protect the trunk of each tree to remain as follows:

1. Wrap trunk with orange plastic construction fencing to 2 inches (50 mm) in thickness minimum 1/4-inch (6-mm) closed-cell foam pads. Install 2-by-4-inch wood planks around trunk over wrap at maximum 3 inches (76 mm) apart. Minimum three planks per tree. Band together with no less than three steel bands stapled to the planks to hold them securely in place.

a. Height: 48 inches
b. Trunk protection to remain in place no longer than 9 months. Inspect trunk protection at six-month intervals and loosen if necessary.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones in accordance with requirements in Section 312000 "Earth Moving" unless otherwise indicated.

B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

3.4 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction.

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Do not paint cut root ends.
3. Temporarily support and protect roots from damage until they are permanently covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible in accordance with requirements in Section 312000 "Earth Moving."

B. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.5 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

3.6 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

END OF SECTION 015639

SECTION 015813 - TEMPORARY PROJECT SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the design requirements for the project identification signage and temporary directional signage

B. Painting of framework and supports (work is not part of Section 099100)

C. The contractor shall obtain all relative permits for installation of the temporary project sign.

D. Related Sections include the following:
1. Section 061000- Rough Carpentry
2. Section 015000- Temporary Facilities and Controls

1.3 SUBMITTALS

A. Shop Drawing: Submit shop drawing showing construction, graphics and color .

1.4 PERMITS

A. Submit drawings and obtain the required permits from the City of Newton. Permit fees for signs have been waived.

PART 2 - PRODUCTS

A. Lumber and Plywood: Comply with requirements in Section 061000.

B. Painting: Basis of Design Paint Systems are by Sherwin Williams. Manufacturers providing or equal paint products include:
1. Benjamin Moore & Co.
2. PPG Paints, PPG Architectural Coatings
3. California Paints
4. Or approved equal

PART 3 - EXECUTION

A. Project Identification Sign: Prepare One (1) Project signs in size indicated.
   1. Install Sign as directed by the Owner and Architect
   2. Do not permit installation of unauthorized signs.
   3. Engage an experienced sign fabricator to apply graphics for Project identification signs. Comply with details indicated.
   4. Construct sign of exterior-type Grade B-B high-density concrete form overlay plywood in, no less than 5/8 inch in thickness. Support on posts or framing of preservative-treated wood or steel.
   5. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer or provide weatherproof acrylic sheet over face of sign.
   6. Multiple Colors will be used for field, border and text.
   7. Paint rear face of sign, edges and support framing to protect material
   8. Maintain sign throughout construction; relocate as required. Provide a temporary supports system as required.

B. Paint Systems for Signage Support:
   1. Would Framing Supports:
      a. Prime Coat: Primer, latex for exterior wood.
         1) S-W Exterior Latex Primer, B42, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry, per coat.
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, satin:
         1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

3.2 SIGNAGE TYPES

A. Temporary Construction Identification Sign: 4 Feet by 5 feet (+/-) Sign Text: (Final Artwork and Layout will be provided by Architect in electronic format to Contractor.) Sign shall include, but not limited to:
   1. Painted Field with border.
   2. Name of Project
   3. Color Rending
   4. Names including:
      a. Owner
      b. Town Committee
      c. Architect
      d. Architect’s Consultants
      e. General Contractor

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. This Section is intended to clarify significant changes in specified products or equipment and the information required by the Architect to evaluate the “or equal” nature of a proposed product.

C. This Section does not modify or take precedent over M.G.L. c.30 §39 (b).

D. Related Requirements:
1. Section 012300 "Alternates" for products selected under an alternate.
2. Section 012500 "Substitution Procedures" for requests for substitutions.
3. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product

attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products (or equal products) of additional manufacturers named in the specification.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of comparable product not listed in the specifications. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within seven (7) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1.6 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

B. Use of an approved comparable product or substitutions shall include all work and costs associated with the change including preparation of substrates, reconfiguration of space, power requirements, piping, and similar conditions.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.8 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

2. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience **will** be considered.

a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

D. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."

1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
1. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:
1. Section 011000 "Summary" for limits on use of Project site.
2. Section 011400 “Work Restrictions” for survey and certification requirements required by Authorities having Jurisdiction.
3. Section 013300 "Submittal Procedures" for submitting surveys.
4. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting

and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land survey and professional engineers certifying that location and elevation of improvements comply with requirements.
1. Refer to Section 011400 Work Restriction for specific requirements.

C. Certified Surveys: Submit copies signed by land surveyor in quantities required by Authorities having jurisdiction.

D. Final Property Survey: Submit number of copies required by Authorities having jurisdiction showing the Work performed and record survey data.

1.6 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Certified Survey: On completion of foundation walls, pools, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Temporary Support: Provide temporary support of work to be cut.

C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or

adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

E. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

F. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls".

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural guidelines for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:
1. Section 024116 Structure Demolition for disposition of existing building
2. Section 024119 Selective Demolition for disposition of demolished building elements, and site elements.
3. Section 311000 "Site Preparation" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
1. Follow guidelines established in "Managing Construction & Demolition (C&D) Wastes from the Massachusetts Department of Environmental Protection (MassDEP) https://www.mass.gov/lists/managing-construction-demolition-cd-wastes#project-planning-tools-
2. https://recyclingworksma.com/construction-demolition-materials-guidance/
3. https://www.mass.gov/doc/massachusetts-sample-cd-waste-plan/download
4. https://www.mass.gov/doc/recycling-construction-demolition-wastes-a-guide-for-architects-contractors/download

PART 2 - PRODUCTS

2.1 RECYCLING RECEIVERS AND PROCESSORS

A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:
1. Recyclers listed by the Construction & Demolition Recycling Association https://cdrecycling.org/directory/
2. A qualified recycler licensed in the Commonwealth of Massachusetts

PART 3 - EXECUTION

3.1 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 024119 "Selective Demolition for salvaging demolition waste.

B. Salvaged Items for Sale and Donation: Permitted on Project site.

C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

E. Plumbing Fixtures: Separate by type and size.

F. Lighting Fixtures: Separate lamps by type and protect from breakage.

G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

3.3 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

B. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

C. Metals: Separate metals by type.

D. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

E. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, and other components by material and size.

F. Conduit: Reduce conduit to straight lengths and store by material and size.

G. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.4 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

    a. Comply with requirements in Section 329300 "Plants" for use of clean sawdust as organic mulch.

C. Paint: Seal containers and store by type.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten [10] days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit sustainable design submittals not previously submitted.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten [10] days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.

5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Wipe surfaces of mechanical and electrical equipment[, elevator equipment,] and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
m. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

o. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:
1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit **on digital media acceptable to Architect**, **by uploading to web-based project software site**, or **by email to Architect**. Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least thirty (**30**) days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (**15**) days before commencing demonstration and training. Architect return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within fifteen (**15**) days of receipt of Architect's comments and prior to commencing demonstration and training.

E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, **loose-leaf** binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, **and** subject matter of contents**, and indicate Specification Section number on bottom of spine**. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.

9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format,

identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.11 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:
1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:
1) Submit PDF electronic files of scanned record prints and one (1) of file prints.
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:
1) Submit PDF electronic files of scanned record prints three (3) set(s) of prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Bulletin resulting in a Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Note related Change Orders, record Product Data,] and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.
3. Video Recording Shall be Required for:
    a. Plumbing Winterization and Maintenance
    b. Swimming Pool Filtration, pumps, and chemical controls
    c. Swimming Pool Start up and winterization

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two (2) copies within seven (7) days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Date of video recording.
2. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Videographer Qualifications: A videographer who is experienced photographing demonstration and training events similar to those required.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 PREPARATION

A. Assemble educational materials necessary for instruction into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.7 INSTRUCTION

A. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, with at least fourteen (14) days' advance notice.

B. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

1.8 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.

1. Submit video recordings on thumb drive.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.

c. Business phone number.
d. Point of contact.
e. Email address.

B. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

C. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

D. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of the building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 015639 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective demolition.
3. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.

B. Pre-demolition Photographs: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:
    a. Loose Furnishing
    b. Supplies
    c. Equipment

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 03 01 30 - CONCRETE REHABILITATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Description of Work: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following vertical and horizontal repairs to, previously concealed concrete, spalls and cracks in cast-in-place structural concrete:
   1. Abrasive Blasting of concrete exposed after selective demolition and excavation.
   2. Removal of deteriorated concrete and debris.
   3. Crack repair.
   4. Treatment of deteriorated and/or corroded reinforcing steel.
   5. Preparation of surfaces to receiving patching compound.
   6. Mixing and transportation of patching compound.
   7. Repairs to spalled, delaminated and scaled areas of concrete.
   8. Finishing and curing of patches.
   9. Cleanup of concrete surfaces.
   10. Removal from site of concrete debris resulting from the work.
   11. Incidental work required to perform the repairs.

B. Based on visual inspection, it is not anticipated that supplementation or replacement of reinforcing steel will be required, and such work is not included in the scope of work. However, should removal of spalled concrete reveal reinforcing corrosion which has reduced sections below 75% of original sections the Owner shall immediately be notified, and the contractor shall prepare and submit shop drawing for recommended repairs, and a cost proposal for such repairs.

1.3 REFERENCES

A. Except as shown or specified, the Work of this Section shall conform to the requirements of International Concrete Repair Institute (ICRI).
   1. ICRI Guideline No. 03730 Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.

1.4 PROJECT CONDITIONS

A. Repairs for either cracks or spalls shall not be undertaken if the ambient temperature exceeds 86 degrees F (30 degrees C) or drops below 40 degrees F (10 degrees C) or is forecast within 48 hours after completion of work.

B. Repairs shall not be undertaken in the rain, or if rain is predicted to occur during the repairs. In the event of unexpected precipitation, work shall cease, and all uncured material shall be adequately protected with an impermeable polyethylene sheet.

C. Protect persons, vehicles, building site and surrounding buildings from injury resulting from concrete restoration work.

1.5 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated. Submit manufacturer's technical bulletins, test reports and MSDS on each product.

B. Design Mixes: For each concrete patching mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 SUBMITTALS- WATER REPELLENT

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

B. Manufacturer Certificates: Signed by manufacturers certifying that water repellents comply with requirements.

C. Warranty: Special warranty specified in this Section.

1.7 QUALITY ASSURANCE

A. Source of Materials: Obtain materials for patching, and crack repair from a single source manufacturer to ensure match quality, color, texture and detailing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original unopened containers and packaging, bearing labels as to type and names of products and manufacturers.

B. Deliver and store restoration material in manufacturer's original, unopened containers with the grade, batch and production data shown on the container or packaging.

C. Protect restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.

D. Protect materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

E. Comply with the manufacturer's written specifications and recommendations for mixing, application, and curing of grouts and patching materials.

1.9 CONCRETE RESTORATION SEQUENCING

A. Perform concrete restoration in the following sequence:
   1. Remove water proofing , damp proofing, paint, stains and plant material from all surfaces indicated or required to be restored.
   2. Remove existing unsound materials from areas indicated or required to be restored.
   3. Patch and repair existing concrete structures as indicated or required.
   4. Coordinate repair/restoration with installation of elastomeric and preformed joint assemblies.

PART 2 - PRODUCTS

2.1 ABRASIVE BLASTING

A. Sand Blasting
   1. Determine type of nozzle, nozzle pressure, and blasting techniques required to remove debris and coatings from existing concrete surfaces.
   2. Use abrasive grit of proper type and gradation to expose aggregate and surrounding matrix ready to receive repair material.

2.2 MANUFACTURERS

A. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

2.3 BONDING AGENTS

   1. Or approved equal

B. Latex Bonding Agent, Non-Redispersible: ASTM C1059/C1059M, Type II for use at structural and exterior locations and where indicated].
   1. Plancrete, Mapei
   2. Surebond, Kaufman Concrete Treatments

3. Flex-con Euclid Chemical Company
4. Or approved equal.

2.4 PATCHING MORTAR

A. Patching Mortar Requirements:

1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
2. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend several aggregates if necessary to achieve suitable matches.
3. Coarse Aggregate for Patching Mortar: ASTM C33/C33M, washed aggregate, Size No. 8, Class 5S. Add to patching-mortar mix only as permitted by patching-mortar manufacturer.

B. Polymer-Modified, Cementitious Patching Mortar Packaged, dry mix for repair of concrete and that contains a latex additive as either a dry powder or a separate liquid that is added during mixing.
1. HiCap FT with Surebond, Kaufmann Concrete Treatments
2. Ardex CD Fine Concrete Dressing
3. Planitop Mapei
4. Or approved equal

C. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C109/C109M.

2.5 JOINT FILLER

A. Polyurea Joint Filler: Two-component, semirigid, 100 percent solids, polyurea resin with a Type A Shore durometer hardness of at least 80 according to ASTM D2240.
1. Ardex Ardiseal
2. Euco Qwikjoint , Euclid Chemical Company
3. SurePoxy Flexijoint, Kaufman concrete products
4. Or approved equal

2.6 MISCELLANEOUS MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I, II, or III unless otherwise indicated.

B. Water: Potable.

2.7 MIXES

A. General: Mix products, in clean containers, according to manufacturer's written instructions.

1. Do not add water, thinners, or additives unless recommended by the manufacturer.
2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
3. Do not mix more materials than can be used within time limits recommended by the manufacturer. Discard materials that have begun to set.

PART 3 - EXECUTION

3.1 CONCRETE MAINTENANCE

A. Have concrete-maintenance work performed only by qualified concrete-maintenance specialist.

B. Comply with manufacturers' written instructions for surface preparation and product application.

3.2 PREPARATION

A. Preparation for Concrete Removal: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine the condition of construction to be removed in the course of repair.

B. Surface Preparation for Overlays:

1. Remove delaminated material and deteriorated concrete surface material

2. Abrasive blast to remove existing coatings.
3. Use sand blasting or shot .
4. Sweep and vacuum roughened surface to remove debris[followed by low-pressure water cleaning.

3.3 APPLICATION OF BONDING AGENT

A. Latex Bonding Agent, Type II: Mix with portland cement and scrub into concrete surface according to manufacturer's written instructions. Place patching mortar or concrete while bonding agent is still wet. If bonding agent dries, recoat before placing patching mortar or concrete.

3.4 INSTALLATION OF PATCHING MORTAR

A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer.

3.5 APPLICATION OF POLYMER OVERLAY

A. Apply polymer overlay according to ACI 503.3.

B. Apply to traffic-bearing surfaces, including parking areas and walks.

END OF SECTION 030130

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

2. Work includes providing concrete housekeeping pads under all swimming pool equipment, and floor Plumbing Equipment and Electrical equipment scheduled to mount on the floor.

B. Related Requirements:
1. Section 312000- Earth Moving for preparation of subgrade

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 ACTION s

A. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, water-stops, joint systems, curing compounds, dry-shake finish materials, and others if requested by the Architect

B. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement.
1. All reinforcing shop drawings for concrete and masonry walls shall be shown on walls elevations with a scale of 1/4 in. = 1 ft. - 0 in.

C. Concrete mix design for each mix specified. Supporting test data shall be submitted if requested.

D. Proposed method of curing concrete and associated products.

E. Proposed precautions for hot weather and cold weather concreting.

F. Samples of materials as requested by Architect, including names, sources, and descriptions.

G. Laboratory test reports for concrete materials and mix design test.

H. Description of Methods and Sequence of Placement. For each type of specially-finished concrete provide description of methods and sequence of placement.

I. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where requirements that are more stringent are shown or specified:
1. Massachusetts State Building Code, 9th Edition.
2. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings".
3. ACI 318, "Building Code Requirements for Reinforced Concrete".
4. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".
5. Manual of Standard Practice for Detailing Reinforced Concrete Structures ACI 315.
6. ACI 308, "Recommended Practice for curing Concrete"
7. ASTM C 94, Ready-Mixed Concrete.

B. Concrete Curing and Protection: Submit to the Architect/SER in accordance with the requirements of Contract Documents, detailed methods proposed for use for curing and protection prior to commencement of concrete work. This shall include winter protection and hot weather concrete methods.

C. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.7 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F (1.7 deg C), other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M), and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F (35 deg C).
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents

2.2 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Normal-Weight Aggregates: ASTM C 33 and as specified.

C. Water: Potable.

D. Admixtures, General: Provide concrete admixtures that contain no more than 0.1 percent chloride ions.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

F. Water-Reducing Admixture: ASTM C 494, Type A.

G. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

I. Water-Reducing, Accelerating Admixture: ASTM C494, Type E.

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, except with maximum water-vapor permeance of 0.0183 not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Barrier-Bac; Inteplast Group, Ltd.
      b. Raven Industries, Inc.
      c. Reef Industries, Inc.
      d. Stego Industries, LLC.
      e. W.R. Meadows, Inc.
      f. ISI Building Products
      g. Or approved equal

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
   1. Color:
      a. Ambient Temperature Below 50 deg F (10 deg C): Black.
      b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
      c. Ambient Temperature Above 85 deg F (29 deg C): White.

C. Water: Potable or complying with ASTM C1602/C1602M.

D. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Anti-Hydro International, Inc.
      b. ChemMasters, Inc.
      c. Dayton Superior.
      d. Euclid Chemical Company (The); an RPM company.
      e. Laticrete International, Inc.
      f. Nox-Crete Products Group.
      g. SpecChem, LLC.
      h. Or approved equal

2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: Expansion joint filler composed of a synthetic foam of isomeric polymers in a very small, closed-cell structure. Joint filler shall be non-

absorbent and have a resiliency of 99%. Joint filler shall conform to the following standards and have the following requirements:

1. ASTM D545 using a (1/2" (12.7 mm) thick test specimen).
   a. Compression: 13 psi (9 g/mm²) 89.6 kPa.
   b. Extrusion: 0.1" (2.5 mm).
   c. Recovery: 99.21%.
   d. Water Absorption, volume %: 0.246.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. W.R. Meadows, Inc. Cermar
   b. Alcot Plastics Ltd, Distributed by Best Materials
   c. Masco Masons Supply
   d. Or approved equal

B. Bond Breaker: At all locations where concrete is slab on grade not receiving an expansion or isolation, provide the following:
1. 12-inch wide strip of glass-reinforced felt: ASTM D6757/D6757M, asphalt-saturated, glass-reinforced organic felt or inorganic fiber-based felt.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) Atlas Roofing Corporation - MPS.
      2) CertainTeed Corporation; Saint-Gobain North America.
      3) GAF.
2. Adhesives for temporarily attaching bond breaker to wall before concrete placement:
   a. 3M™ Hi-Strength 90 Spray Adhesive
   b. Loctite Spray Adhesive Professional Performance 300
   c. Roberts 007 Multi-Bond Spray Adhesive

C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for bonding hardened or freshly mixed concrete to hardened concrete application temperature and of grade to suit requirements, and as follows:
1. Types I and II, nonload bearing
2. Types IV and V, load bearing

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least fifteen (15) days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect/SER

C. Footings: Proportion normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi .
2. Maximum Slump: 4 inches at point of discharge (at the truck).
3. Slump may be increased to 6 inches with use of Mid-Range Water Reducing Admixture. (After Field verification of original slump limit)
4. Maximum water-cement ratio: 0.55
5. No substitution of other cementitious materials for Portland Cement.

D. Foundation Walls: Proportion normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4000
2. Maximum Slump: 3 inches at point of discharge (at the truck).
3. Slump may be increased to 6 inches with use of Mid-Range Water Reducing Admixture. (after Field verification of original slump limit)
4. Air-entrained
5. Maximum water-cement ratio: 0.48
6. No substitution of other cementitious materials for Portland Cement.

E. Slab-on-grade and Suspended slabs: Proportion normal-weight concrete with the following properties:
1. Compressive Strength (28 Days): 4000 psi
2. Maximum Slump: 4 inches at point of discharge (at the truck).
3. Slump may be increased to 6 inches with use of Mid-Range Water Reducing Admixture. (after Field verification of original slump limit)
4. Maximum water-cement ratio: 0.55
5. No substitution of other cementitious materials for Portland Cement.

F. Exterior Walks, Aprons, Stairs, Ramps, and Miscellaneous Exterior Structures: Proportion normal-weight concrete with the following properties:
1. Compressive Strength (28 Days): 4000 psi
2. Maximum Slump: 4 inches at point of discharge (at the truck).
3. Slump may be increased to 6 inches with use of Mid-Range Water Reducing Admixture. (after Field verification of original slump limit)
4. Air-entrained
5. Maximum water-cement ratio: 0.44

G. Under no conditions shall water be added to the concrete mixes at the site.

H. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

I. All pumped concrete shall contain mid-range water reducing admixture or high range water reducing admixture (superplasticizer) added at the site. Maintain slumps as specified above

2.7 ADMIXTURES

A. Use mid-range water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for pumping, placement and workability.

B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.

C. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
   1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure: 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.

D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
   1. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to seventy-five 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to sixty (60) minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
   2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers,

blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
   1. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal. Use 6 mil poly to cover rustication keyways to ensure easy removal without chipping concrete.

D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Secure facilities for storage, initial curing, and field curing of test samples, including continuous electrical power.
   4. Security and protection for samples and for testing and inspection equipment at Project site.

3.4 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

3.5 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
   1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
   2. Face laps away from exposed direction of concrete pour.
   3. Lap vapor retarder over footings and grade beams not less than 6 inches (150 mm), sealing vapor retarder to concrete.
   4. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
   5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
   6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
   7. Protect vapor retarder during placement of reinforcement and concrete.
      a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches (150 mm) on all sides, and sealing to vapor retarder.

3.6 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
   1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
   2. Place joints perpendicular to main reinforcement.
      a. Continue reinforcement across construction joints unless otherwise indicated.
      b. Do not continue reinforcement through sides of strip placements of floors and slabs.
   3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
   4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.

2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Bond Breaker- Clean surface to receive bond breaker. Apply even coat of spray adhesive to the backside of the bond breaker strip and apply to wall surface.

F. Doweled Joints:
1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by in writing, but not to exceed the amount indicated on the concrete delivery ticket.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 but not to exceed the amount indicated on the concrete delivery ticket.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).
    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.8 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:
   1. ACI 301 Surface Finish SF-3.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
      a. Patch voids larger than 3/4-inch-wide or 1/2 inch deep.
      b. Remove projections larger than 1/8 inch.
      c. Patch tie holes.
      d. Surface Tolerance: ACI 117 Class A.
      e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

B. Related Unformed Surfaces:
   1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
   2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

C. FINISHING FLOORS AND SLABS

D. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

E. Scratch Finish at Seamless Quartz flooring:
   1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
   2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch (6 mm) in one direction.
   3. Apply scratch finish to surfaces , closely coordinate with seamless quartz flooring manufacturer.

F. Float Finish:
   1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.

2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 (ACI A117M) tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish.

G. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155 (ASTM E1155M), for a randomly trafficked floor surface:
   a. Slabs on Ground:
      1) Specified overall values of flatness, F_F 25; and of levelness, F_L 20; with minimum local values of flatness, F_F 17; and of levelness, F_L 15.

H. Broom Finish at Exterior Concrete Pads at Doors and exterior horizontal surfaces: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.
   a. water to expose slip-resistive [aggregate] [aluminum granules].

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases a minimum of 4 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi at 28 days.

4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
5. Prior to pouring concrete, place and secure anchorage devices.
   a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   b. Cast anchor-bolt insert into bases.
   c. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
1. Cast-in inserts and accessories, as shown on Drawings.
2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply in accordance with manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:
1. If forms remain during curing period, moist cure after loosening forms.
2. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
   a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
   b. Continuous Sprinkling: Maintain concrete surface continuously wet.
   c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
   d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.

D. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:
1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
   a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
      1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
         a) Lap edges and ends of absorptive cover not less than 12-inches (300-mm).

b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.
   a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   b) Cure for not less than seven days.

b. Floors to Receive Seamless Quartz Flooring:
   1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
   2) Rewet absorptive cover and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches (150 mm) and sealed in place.
   3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
   4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

3.11 TOLERANCES

A. Conform to ACI 117 (ACI 117M).

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least one month(s).
   2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

A. Defective Concrete:
   1. Repair and patch defective areas when approved by Architect.
   2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1-part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

D. Repairing Unformed Surfaces:
   1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
      a. Correct low and high areas.
      b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   3. After concrete has cured at least 14 days, correct high areas by grinding.
   4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
      a. Finish repaired areas to blend into adjacent concrete.
   5. Correct other low areas scheduled to remain exposed with repair topping.
      a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations.
      b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete.
      a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
      b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
      c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
      d. Place, compact, and finish to blend with adjacent finished concrete.
      e. Cure in same manner as adjacent concrete.
   7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar.
      a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
      b. Dampen cleaned concrete surfaces and apply bonding agent.
      c. Place patching mortar before bonding agent has dried.
      d. Compact patching mortar and finish to match adjacent concrete.
      e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

3.15 PROTECTION

A. Protect concrete surfaces as follows:
   1. Protect from petroleum stains.
   2. Diaper hydraulic equipment used over concrete surfaces.
   3. Prohibit vehicles from interior concrete slabs.
   4. Prohibit use of pipe-cutting machinery over concrete surfaces.
   5. Prohibit placement of steel items on concrete surfaces.
   6. Prohibit use of acids or acidic detergents over concrete surfaces.
   7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 040001 - MASONRY *(FILED SUB-TRADE BID REQIURED)*

PART 1 - GENERAL

1.1 FILING OF SUB-BIDS

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in with the Awarding Authority at a time and method stipulated in the Bidding Requirements.

B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required in Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.

C. Specific information relating to sub-bidders is set forth in the Bidding and Contract Documents and the Sub-bidders are directed thereto.

D. Sub-bids filed with the Awarding Authority shall be accompanied by a Bid Bond issued by a responsible bank or trust company payable to the *City of Newton* in the amount of five percent of the Bid. A sub-bid accompanied by any other form of bid depository will be rejected.

E. Work to be done under this Section is shown on the Drawings _____

F. The listing of Contract Drawings above shall not limit the Subcontractors responsibility to determine the full extent of his work as required by all Contract Drawings.

G. Include GENERAL CONDITIONS and applicable parts of Section 011000 as part of this Section.

H. Examine all other Sections of the Specifications for requirements, which affect work under this Section whether or not such work is specifically mentioned in this Section.

I. Examine all other Sections of the Specifications for requirements which affect work under this Section whether or not such Work is specifically mentioned in this Section.

J. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to ensure the steady progress of all work under the Contract.

K. Trade Sub-Bid Requirements: None

1.2 SUMMARY

A. This Section includes the following:
1. Masonry Selective Demolition and Repairs
2. Existing Masonry Cleaning
3. Unit Masonry

B. Work of this Section includes all work, notes, and specifications shown on the structural drawings.

C. Required sections: The following Sections contain requirements that are part of this Filed Sub-Bid Section:
   1. Section 040101 – MASONRY PREPARATION
   2. Section 042001 – UNIT MASONRY

1.3 REFERNCES, DEFINITIONS, SYSTEM DESCRIPTION, SUBMITTALS,QUALITY ASSURANCE,DELIVERY, STORAGE, HANDLING, AND PROJECT CONDITIONS

A. Refer to individual Sections:
   1. Section 040101 – MASONRY PREPARATION
   2. Section 042001 – UNIT MASONRY

PART 2 - PRODUCTS

2.1 GENERAL

A. Refer to individual Sections
   1. Section 040101 – MASONRY PREPARATION
   2. Section 042001 – UNIT MASONRY

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to individual Sections
   1. Section 040101 – MASONRY PREPARATION
   2. Section 042001 – UNIT MASONRY

END OF SECTION 040001

SECTION 040101 - MASONRY PREPARATION *(PART OF FILED SUB-BID SECTION 040001)*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Repairing masonry
   2. Replacing and providing new masonry
   3. Cleaning existing masonry surfaces
   4. Selective Demolition of masonry

B. Repair Intent
   1. The intent of the project is to retain as much as possible of the existing concrete and clay brick elements.
   2. The intent is to repair areas of damage, particularly areas where water infiltration has and will otherwise continue to lead to deterioration of the masonry and building wall. Areas of general wear such as small dents and chipped corners are intended to remain.

C. Related Requirements:
   1. Section 024119- Selective Demolition for demolition of other building elements
   2. Section 050531- Metal Fabrication for lintels furnished by others

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

B. Medium-Pressure Spray: 400 to 800 psi (2750 to 5510 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

C. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

D. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage.

E. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

F. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, masonry demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project
   1. Review methods and procedures related to masonry repair and preparation including, but not limited to, the following:
      a. Procedures for cleaning
      b. Procedures for repair
      c. Surface criteria to be applied to existing masonry including fluid applied air barrier and paint.
   2. Selective demolition of masonry and coordination with shoring and bracing of structure.

1.6 SEQUENCING AND SCHEDULING

A. Work Sequence: Perform masonry repair work in the following sequence, which includes work specified in this and other Sections:
   1. Remove plant growth.
   2. Remove loose and peeling coatings.
   3. Inspect masonry for open mortar joints and point them before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
   4. Clean masonry.
   5. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
   6. Remove damaged masonry and prepare area for masonry replacement.
   7. Temporary shoring of openings and structure where for masonry repair
   8. Coordinate selective demolition, openings in masonry for other work.
   9. Repair masonry, including replacing existing masonry with new masonry materials.
   10. Rake out mortar from joints to be repointed.
   11. Point mortar and sealant joints.
   12. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
   13. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used; protection of surrounding materials; and control of runoff during operations. Include provisions for supervising worker performance and preventing damage.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product
   1. Refer to Section 042001- Unit Masonry for masonry units, reinforcing and mortar

B. Samples and Testing of Existing Mortar: Submit testing and analysis from a qualified independent laboratory employed and paid by the Contractor, indicating and interpreting test results relative to physical and chemical properties of existing masonry materials:

1. Mortar: sample and test mortar from each distinct section of the building, for mortar type, color and aggregate composition

1.8 INFORMATIONAL SUBMITTALS

A. Quality-control program.

B. Pre-demolition Photographs Coordinate with General Contractor's preparation of photographs or video showing existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.

1.9 QUALITY ASSURANCE

A. Field Supervision: masonry repair specialist firm shall maintain experienced full-time supervisors on Project site during times that masonry repair work is in progress.

B. Mockups: Prepare mockups of masonry repair to demonstrate surface preparation to receive fluid applied membrane air barrier.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver s to Project site strapped together in suitable packs or pallets or in heavy-duty cartons and protected against impact and chipping.

B. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

F. Handle s to prevent overstressing, chipping, defacement, and other damage.

1.11 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
1. Hazardous material remediation is specified elsewhere in the Contract Documents.

2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
3. It assumed coatings on paint contain lead. Contractor shall take required safety precautions and follow all regulations required to remove, repair and dispose of masonry .

C. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry repair work to be performed according to product manufacturers' written instructions and specified requirements.

D. Temperature Limits: Repair masonry only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.

E. Cold-Weather Requirements: Comply with the following procedures for masonry repair unless otherwise indicated:
1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for seven days after repair.

F. Hot-Weather Requirements: Protect masonry repairs when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks, and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

G. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Source Limitations: Obtain each type of material for repairing masonry (, cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning masonry selective demolition, cleaning, and repair work. Comply with hauling and disposal regulations of authorities having jurisdiction.

2.2 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F (60 to 71 deg C).

C. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.

D. Mold, Mildew, and Algae Remover, Job Mixed: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.

2.3 MASONRY MATERIALS

A. Face : As required to complete masonry repair work.

1. Matching Existing: Units shall match size, and shape of existing work and with physical properties as listed below:
   a. Physical Properties: According to ASTM C67 and as follows:
      1) Compressive Strength: 2100 PSI
   b. Provide specially ground units, shaped to match patterns, for arches and where indicated.
   c. Mechanical chopping or breaking , or bonding pieces of together by adhesive, are unacceptable procedures for fabricating special shapes.

B. Building : ASTM C62, of same vertical dimension as face , for masonry work concealed from view.

2.4 BRICK

A. Exterior Brick: ASTM C55-03, Grade SW. Size and texture to match existing building brick. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated “not effloresced.”
   1. Acceptable brick match includes Glen-Gery- 200 Flashed Matt or approved equal.

2.5 CONCRETE MASONRY UNITS (CMUS)

A. Concrete Masonry Units: ASTM C 90, normal weight unless indicated otherwise manufactured to dimensions 3/8 inch less than nominal dimensions.
   1. Unit Compressive Strength: Provide units with minimum average net compressive strength of 3500 psi.
   2. Weight Classification: Normal weight.
   3. Size: Manufactured to dimensions specified in "Concrete Masonry Units" Paragraph above; 4 in, 6in, 8in, and 12 in bed depths by 8 in by 16 in face.
   4. Refer to Structural Notes for other requirements.
   5. Concrete masonry unit to contain minimum 10% post-consumer recycled content.
   6. Regional Materials: Provide CMUs that have been manufactured within 500 miles of Project site, from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

7. For exterior use: Grade N, Type I - Moisture Controlled

B. Shapes for Block: Provide standard shapes indicated and as required for building configuration. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

C. Concrete Brick Units: ASTM C55, Grade S, Type I - Moisture Controlled; normal weight.

2.6 MORTAR MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction.

B. Hydrated Lime: ASTM C207, Type S.

C. Water: Potable.

D. Mortar and Grout Mixing:
1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
2. Mix grout in accordance with ASTM C94 or thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 Fine or Course grout.
3. Do not use anti-freeze compounds to lower the freezing point of grout.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951.
1. Exterior and Interior Walls: Ladder type, Hot-dip galvanized to ASTM A641 Class 3 after fabrication, cold drawn steel wire conforming to ASTM A82.
2. Wire Size and Spacing: 9 gage at 16" on center. 9 gage side rods with 9 gage cross ties. Joint reinforcing width is to be 2” less than the nominal width of walls as required to position rods for full embedment in mortar with mortar coverage not less than 5/8”.
3. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Multiwythe Masonry.

2.8 Ladder type with 1 side rod at each face shell of hollow masonry units 4 inches or more in width, plus 1 side rod at each wythe of masonry 4 inches or less in width. Rods perpendicular to the wall shall be spread at 16” o.c.

2.9 MANUFACTURED REPAIR MATERIALS

A. Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Conproco Corporation.
   b. Cathedral Stone Products, Inc.
   c. Or approved equal
2. Use formulation that is vapor and water permeable (equal to or more than the), exhibits low shrinkage, has lower modulus of elasticity than s being repaired, and develops high bond strength to all types of masonry.
3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.

B. Water content shall be adjusted only as allowed by the manufacturer in order to reach target values of shrinkage and compressive strength. Shrinkage shall not exceed 0.10 % and compressive strength shall be between 1,500 and 2,250 psi at 28 days as demonstrated by test or specifically documented by manufacturer's literature.

2.10 ACCESSORY MATERIALS

A. Setting Buttons and Shims: Resilient plastic, nonstaining to masonry, sized to suit joint thicknesses and bed depths of s, less the required depth of pointing materials unless removed before pointing.

B. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

2.11 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

B. Do not use admixtures in mortar unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Weather conditions shall be dry. Ambient temperatures shall be between 40°F and 80°F during application operations and for twenty-four hours following the installation. At temperatures above 80°F protective tenting and other pre-approved methods are to be used to maintain reduced surface temperatures and allow for the proper cleaning of the pointing mortar. The surfaces to receive the work shall be as clean and dry as practicable, and all such conditions shall be in conformance with the requirements of this specification, BIA (Brick Institute of America) , NCMA (National Concrete Masonry Association).

B. During the performance of work of this Section, protect existing materials not receiving work at all times from mortar drippings, stains, and damage by the exercise of reasonable care and precautions. Clean or repair all existing materials which are soiled or otherwise damaged by this work to match the original profiles and finishes. Existing materials and finishes which cannot be cleaned or repaired shall be removed and replaced with new work to match the existing.

3.2 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.
   1. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that cleaning methods do not damage surfaces, including joints.
      a. Equip units with pressure gages.
      b. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.
      c. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces. Keep wall wet below area being cleaned to prevent streaking from runoff.

D. Water Application Methods:
   1. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from masonry surface and apply water in horizontal back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.

3.3 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing remaining growth to dry as long as possible before removal. Remove loose soil and plant debris from open joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to planned cleaning methods. Extraneous substances include paint, calking, asphalt, and tar.

3.4 DEMOLITION AND DISMANTLING - GENERAL

A. Provide and install all temporary shoring, bracing and support to surrounding construction before beginning removal. Removal shall be done slowly and methodically to maintain stability to all

remaining elements at all times. The Masonry Subcontractor shall be responsible for maintaining integrity and safety of surrounding construction, in general, during work. All demolition and dismantling of existing masonry shall be performed by the Masonry Subcontractor. Shoring and bracing of existing elements and portions of the structure that are affected by the masonry work shall be done by the Masonry Subcontractor.

3.5 DEMOLITION OF FACEBRICK

A. Carefully remove designated masonry, maintaining support to all surrounding and supported elements that are otherwise dependent upon the masonry being removed for support or stability.

B. Where removed brickwork supports masonry or other overburden, remove it in a sequential manner, installing temporarily shoring or cripples to be sequentially removed when the brickwork is reinstalled.

C. Following removal of face brick, inspect and remove additional masonry that is loose, damaged or can be separated with unassisted hands.

D. Clean the exposed surfaces of the remaining material and remove shards of material that have become loose during work or have shifted from their proper positions. Notify the Architect immediately if additional brickwork from the back-up wythes needs to be removed before proceeding with work.

E. Notify the Architect of any masonry beyond immediate work area, which becomes loosened during work. Stop work immediately, provide additional bracing and review with Architect before resuming.

F. Protect the existing interior structure from the external weather and from dust and debris caused by these operations. Provide weather protection as needed until the external envelope is restored.

3.6 BACK-UP MASONRY EVALUATION AND EXCAVATION

A. Following removal of face brick and cast stone, inspect all exposed back-up masonry and remove the following materials:
   1. All loose, weakened and/or shifted units.
   2. Internal back-up materials that are designated to be removed as part of overall reconstruction and stabilization.
   3. Cracked brick units that follow structural cracks that need to be replaced in order to stitch crack together.
   4. Mortar from all decomposed or cracked mortar joints.

B. Clean the exposed interior surfaces of the remaining material, and remove shards of material, which have become loose during work or have shifted from their proper positions. Notify Architect immediately of the number of brick wythes that need to be removed before proceeding with work.

C. Provide and install all temporary shoring, bracing and support as may be necessary to surrounding construction before beginning removal. Removal and replacement shall be done sequentially to

avoid weakening too much of the structure at one time. Contractor shall be responsible for maintaining integrity and safety of surrounding work as well as the tower, in general, during work per the requirements of Section 020100 – Temporary Shoring and Bracing.

D. Notify the Architect immediately of any adjacent masonry or supported elements beyond the immediate work area which become loosened during work, of rotten wooden elements, or of excessively rusted steel elements that become exposed during the work. Stop the affected work and await Architect's instructions should these conditions be encountered.

3.7 REPAIR OF EXISTING BACK-UP MASONRY TO REMAIN

A. Remove all loose masonry units, mortar and residue from surface of back-up construction without disturbing or weakening or destabilizing the masonry. Employ a "pressure washer" and regulate the nozzle pressure to clean but not damage the surfaces. Nozzle pressure shall be in the range of 600 psi with a 15-degree fan at the tip.

B. Identify and remove loose units and re-set them with new mortar slushed into surrounding voids. Add bricks or stones as may be appropriate to re-stitch the wall to a sound, unfragmented condition.

C. Locate damaged and/or loose brick or stone units to be removed. Pull unit(s) out of wall with a gentle rocking action, driving wedges into surrounding joints only as required to snap this joint off. Stones shall be removed one at a time, bricks may be removed up to 4 at a time.
   1. Set new replacement brick units into wall in orientation and locations of existing damaged units. Pre-wet existing construction and fully butter all contact surfaces of new units during setting, striking mortar at distance of 1" back from the ashlar face of the masonry to allow for final tuck pointing.

D. Grout-inject cracks and small voids encountered, and fill hollow cavities encountered in existing masonry to remain in accordance with this Section.

E. Fill hollow cavities encountered in existing masonry to remain with extended lime-cement grout or mortar per the requirements of this Section.

F. Inspect all joints and rake deteriorated or softened mortar joints to a minimum depth of 1", or as deeply as necessary to reach sound mortar, but not to exceed one half of the thickness of the joint without supplementary means of support. Employ tools that are sharp and will completely cut out joints at intersections without splitting or damaging stones. Drive hardwood shims into joints that will be cut more deeply than 1 ½" to prevent the wall construction from shifting. Cut joints shall match the approved sample patch.

G. Push the new pointing mortar into the joints, evacuating air bubbles with the sharp end of a trowel, and strike surface of joints to match existing surrounding joints. Provide "shed joints" to shed water away from horizontal projections that may otherwise collect water. Hold mortar back from Architecturally exposed surfaces by ½" to 1" to allow for final tuck of finished pointing mortar.

H.

I. Moist-cure all work under a tarpaulin or plastic sheets. Following curing period, maintain weather protection to interior of structure until exterior wall system is replaced.

J. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

3.8 INSTALLATION OF DOWELS, ANCHORS, TENSION RODS AND CONNECTORS

A. Drill holes for embedded anchors, dowels and pinning rods as follows:
   1. Locate holes within the existing masonry so that they are at least 2" from the nearest joint intersection and within the faces of existing units rather than in the joints.
   2. Monitor Conditions of brick or stone units as the drill is advancing into them. Check for vibration or movement of brick units halfway through each by tapping with the bit. Notify the Architect if the brickwork or stonework feels "soft".
   3. All holes greater than ½" diameter shall be drilled using a diamond tipped core drill, dry application on interior surfaces, wet or dry application on exterior surfaces. Do not use a rotary hammer or impact type hammer for holes greater than ½" in diameter.

B. Install Adhesive-Set connectors, pins and dowels as shown on the Contract Drawings and as described below using the applicable Injection System.
   1. Carefully drill holes of the proper oversize diameter for the screen tube (in masonry) and for injection resin or sealants 1/8" larger in diameter than the anchor rod or pin, or as indicated on the Drawings or specified by the manufacturer of the injection system if different.
   2. Locate and size anchors and pins in as indicated in the Contract Documents and as needed per Architect's field instructions following exposure of hidden conditions.
   3. Provide embedment as noted or instructed but not less than 8" embedment at ½" diameter and larger anchors or 4" embedment at anchors of less than ½' diameter.
   4. Incrementally core-drill all holes being careful not to damage or loosen substrate and being careful to avoid embedded metal if any.
   5. Simultaneously with injection of holes, pre-butter rods' surfaces with injection resin so that there is a uniform coating all around the rod of between 1/16" and 1/8" in thickness and insert rods immediately thereafter.
   6. Wipe off excess resin and clean out remaining hole depth. Do not allow resin to leak out of holes and stain stone surface(s). Remove resin immediately if this happens!
   7. Monitor progress and quality of work, adjusting techniques as may be necessary with approval of the Architect. Check that annular space is filled around the end of each rod following insertion. If properly installed, resin should be oozing out beyond end of rod all around annular space, showing that the annular space and the hole are completely filled. Supplementary injection may be necessary due to the presence of voids.

C. Provide stainless steel pins and anchors for re-setting and setting of stone units as follows:
   1. Provide metal dowels as specifically detailed on the contract drawings (modified if necessary, to suit field conditions) or per the field instructions of the Architect based upon existing conditions that must be uncovered for setting of stone units.
   2. Provide all-threaded repair pins to cross all cracks in stone units. Locate these at least 1" from the nearest edges and within middle portions of cracks, with a depth of at least 3" to each side of the crack, quantity= one pin per nine square inches of crack. Actual configuration and locations of pins to be determined by the Architect in the field during removal of the units, assume at least 10 pin installations.

3.9 RE-SETTING BONDED BRICKWORK

A. Bond multi-wythe mass masonry and bonded re-set face brick as follows:
   1. Following removal of two or more masonry withes, the exposed masonry wythe to remain shall be inspected as to its bond to the parent structure. If intact, and full brick headers are not verified to exist at an average maximum spacing of 16" x 24", install "bonded veneer ties" in sufficient quantity for the maximum average spacing between headers and/or brick ties to be 16" x 16", unless shown more densely spaced on the structural drawings.
   2. Subsequent multiple re-built wythes shall be inter-bonded with full brick headers at a maximum spacing of 16 vertical by 24" horizontal.
   3. Install "bonded veneer ties" into the remaining back-up masonry following removal of all stretchers and headers as indicated on a 16" by 16" spacing.

B. Support all wept-cavity veneer on metal flashing, tied to the existing structure with "wept cavity veneer ties" on a 16" by 24" pattern as indicated. Install mortar matt in all cavities and base flashing and weeps at all "weep joints".

C. Brick units shall be re-set to within ¼" of their previous positions and surface alignment, with individual joints' widths along all sides within 1/8" of their cumulative average width per unit. Reconstruct masonry using conventional and accepted techniques. Add header bricks at multi-wythe rebuilds and perpendicular half-bricks (false headers) to single wythe rebuilds on a 24" x 16" pattern. Match all original recesses, header and soldier coursing, either with full or rotated half-bricks and install all stone sills, stone lintels, metal lintels, flashing, accessories and other embedded items as indicated or as needed to match the original construction.

D. Work around windows and doors, toothing and interlocking with existing brickwork to remain.

E. Embed ends of sills in mortar; leave remainder of joint open until final pointing.

F. Recess all mortar joints by 2 ½-times their widths in preparation for final pointing.

G. Moist-cure all completed work for periods of not less than 72 hours.

H. Remove excess mortar from the surface before it sets using a bristle brush or by rubbing the surface with burlap or clean sand. Dried mortar may be removed with chemical excess mortar remove by written permission of the Architect.

I. Perform no mortar work in wet weather or when rain is predicted within two days unless work is protected within waterproof enclosures. Extend waterproof covers securely over work area at the conclusion of each workday.

J. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

K. The Architect reserves the right to reject any brick veneer not meeting requirements of this section or matching the approved test panel and shall have rejected work removed and re-set at no additional cost to the owner.

L. Construct temporary formwork for cantilevered elements and arches, remove after not less than 7-days from completion of masonry re-setting.

3.10 REPLACEMENT OF RUSTED ANGLE LINTELS

A. Remove brick and stone elements supported by rusted angle lintels in accordance with this SECTION to expose lintels. Coordinate work with Shoring Engineer and follow requirements of Section 02 01 00, installing temporary shoring or bracing as needed to safely conduct the work.

B. Following demolition and removal of brickwork for new opening, create 8” wide bearing areas at each end of the top of the opening.

C. Install new galvanized steel angle lintels as indicated on the contract drawings, setting these on a thin film of leveling mortar but not on a full bed so that the angles fit within a coursing joint.

D. Coat the galvanized steel surfaces of the angles that will be in contact with metal flashing with epoxy and allow to dry. Install flashing with end dams in accordance with details.

E. Replace brickwork and stonework around and over lintels, along with flashing and weeps if and as indicated.

3.11 PREPARATION OF JOINTS FOR REPOINTING

A. Rake mortar joints in existing construction in areas designated to be repointed to a minimum depth of 2.5 times the mortar joint width, 1", or as deeply as necessary to reach sound mortar (whichever is greatest), but not to exceed one half of the thickness of the stone thickness without supplementary means of support. Employ tools that are sharp and will completely cut out joints at intersections without splitting or damaging stones or bricks. Raking work shall match the approved test sample.

B. Gently drive wedges or hardwood shims into wide, deep cracks in masonry where there is a possibility that the vertical and in-plane lateral support of masonry work will be compromised during deep raking of the joints. This should at least be done where more than half of the length of a specific joint is removed to a depth of more than one third of the thickness of the stone.

C. Cut flashing reglets in new or existing masonry as indicated on the Contract Drawings.

D. Wire brush clean and then pre-wet the joints and allow for the existing mortar to dry or saturate to a dull, non-glossy finish immediately before applying new mortar.

E. Where applicable, lead-abate all immediate lead-painted masonry surface areas that will be affected by cutting and pointing work, prior to starting masonry operations.

3.12 MORTAR JOINT POINTING

A. Pre-wet prepared mortar joint surfaces until they are saturated but surface dry. At flashing reglets, verify that flashing has been fully installed and is stable.

B. At new or re-set masonry and deeply cut mortar joints Apply a 3/8" base lift of tuck-pointing mortar and allow to cure. Base lift shall have a struck recess for tuck-pointing to lock into.

C. Apply final "tuck" lift of pointing mortar, tooling joints to exactly match the existing joint profiles that are adjacent to the work.

D. Where so specified, point joints and beds with specified sealant after first installing the specified backup material and applying primer if required, all in strict accordance with the printed instructions of the sealant manufacturer. Test all sealants for compatibility prior to use. Tool all sealants to insure maximum adhesion to contact surfaces.

E. Moist cure all work, spraying with a water mist and cover with damp cloth or tarpaulin.

F. Clean mortar from all surfaces following completion and curing of work.

G. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

H. The Contractor shall be responsible for matching the joints of the mock-up surrounding work and shall re-cut and replace any joints that are poorly formed or do not match the mock-up or the surrounding work, as determined by the Architect, at the Contractor's own expense.

I. Moist cure all work, spraying with a water mist and cover with damp cloth or tarpaulin.

J. Chemically clean all surfaces following completion and curing of work, being careful to reveal the mortar aggregate but to not over-etch, weaken or discolor the mortar. Remove excess mortar from the surface before it sets using a bristle brush or by rubbing the surface with burlap or clean sand. If mortar is left on the surface, wash surface clean using dilute solutions of Hydroclean HT-455.

K. Completed work shall match approved sample patch or shall be re-done at the Contractor’s expense.

3.13 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.
   1. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that cleaning methods do not damage surfaces, including joints.

a. Equip units with pressure gages.
b. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.
c. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces. Keep wall wet below area being cleaned to prevent streaking from runoff.

D. Water Application Methods:
1. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from masonry surface and apply water in horizontal back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.

3.14 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing remaining growth to dry as long as possible before removal. Remove loose soil and plant debris from open joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to planned cleaning methods. Extraneous substances include paint, calking, asphalt, and tar.

3.15 PROTECTION

A. Prevent mortar from staining face of surrounding masonry and other surfaces.

3.16 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water applied by low-pressure spray.

3.17 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property.

B. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 040101

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SECTION 042001 – UNIT MASONRY *(PART OF FILED SUB-TRADE SECTION 040001)*

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install:
   1. Concrete masonry unit construction for exterior wall infills and interior partitions.
   2. Clay brick masonry units
   3. Grouts fill for hollow metal steel frames, and wherever ties or anchorage items occur, and as further indicated in the Drawings.
   4. Reinforcing, ties, anchors, and other metal accessories, for anchoring unit masonry together and to other materials.
   5. Compressible joint fillers for control joints in unit masonry work and joints with structural steel.
   6. Control joints in concrete masonry.

B. Place, install and build-in, as work progresses, the following products and materials furnished under the indicated Sections:
   1. Anchor bolts, wood blocking, and anchorage items furnished or set by other trades as specified in individual Sections.
   2. Steel lintels furnished by Section 05 05 31 – Metal Fabrications

C. Build-into place as work progresses, the following products and materials furnished under the indicated Sections:
   1. Section 081113 – Hollow Metal Doors and Frames

1.2 EXAMINATION OF SITE AND DOCUMENTS

A. Contractors are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Filed Subcontractor's failure to familiarize themselves with the

B. Contract Documents or existing conditions. By submitting signing the Contract, the Contractor agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these

standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Concrete Institute (ACI) and American Society of Civil Engineers (ASCE): ACI 530.1/ASCE 6 - "Specifications for Masonry Structures"
2. ASTM A 82 - Steel Web, Plain, for Concrete Reinforcement.
3. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
4. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
6. ASTM A 497 - Welded Wire Fabric; Deformed, for Concrete Reinforcement.
7. ASTM A 580 - Stainless and Heat-Resisting Steel Wire.
8. ASTM A 615 - Deformed and Plain Billet-Steel Bar for Concrete Reinforcement.
9. ASTM A 641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
10. ASTM A 666 - Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar.
11. ASTM B 117 - Salt Spray (Fog) Testing.
12. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
13. ASTM C 5 - Quicklime for Structural Purposes.
14. ASTM C 90 - Load-Bearing Concrete Masonry Units.
15. ASTM C129 - Non-Load Bearing Concrete Masonry Units.
16. ASTM C 140 - Method of Sampling and Testing Concrete Masonry Units.
17. ASTM C 144 - Aggregate for Masonry Mortar.
18. ASTM C 150 - Portland Cement.
19. ASTM C 207 - Hydrated Lime for Masonry Purposes.
20. ASTM C 270 - Mortar for Unit Masonry.
21. ASTM C 387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.
22. ASTM C 404 - Aggregates for Masonry Grout.
23. ASTM C 476 - Grout for Masonry
24. ASTM C 514 - Water Penetration and Leakage Test to Assess Performance of Integral Water Repellent Admixtures.
25. ASTM C 595 - Blended Hydraulic Cement.
26. ASTM C 778 – Specification for Standard Sand.
27. ASTM C 780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
28. ASTM C 1019 - Method of Sampling and Testing Grout.
29. ASTM C 1072 - Method for Measurement of Masonry Flexural Bond Strength.
30. ASTM C 1329 – Standard Specification for Mortar Cement.
31. ASTM C 1357 – Test Methods for Evaluating Masonry Bond Strength.
32. ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
33. ASTM D 2000 - Classification System for Rubber Products.
34. ASTM D 2287 - Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
35. ASTM E 119 - Fire Tests of Building Construction and Materials.
36. ASTM E 447 - Compressive Strength of Masonry Prisms.
37. ASTM E 488 - Strength of Anchors in Concrete and Masonry Elements.
38. ASTM E 518 - Test Method for Flexural Bond Strength of Masonry.
39. ASTM F 593 - Stainless Steel Bolts, Hex Cap Screws, and Studs.
40. ASTM F 594 - Stainless steel nuts.
41. American National Standards Institute Building Code requirements.
42. MCAA – Hot and Cold Weather Masonry Construction.

B. The following reference materials are hereby made a part of this Section by reference thereto:
   1. UL Fire Resistance Directory.
   2. IMI: Masonry Construction Guide Manual.
   3. PCA, "Concrete Masonry Handbook".
   4. NCMA applicable TEK Bulletins.
   5. NCMA TEK Bulletin Nº. 45 - Removal of Stains from Concrete Masonry Walls.

1.4 SEQUENCING

A. Coordinate work of this Filed Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Filed Subcontract, have been received and approved by the Architect.

C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Architect in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

1.5 SUBMITTALS

A. Submit the following under provisions of Section 011000.
   1. Literature: Manufacturer's product data sheets, specifications, performance data, physical properties for each item furnished hereunder.
   2. Material certificates: Provide for the following, signed by manufacturer and Contractor certifying that each material complies with requirements.
   3. Each different cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
   4. Each material and grade indicated for reinforcing bars.
   5. Each type and size of joint reinforcement.
   6. Each type and size of anchors, ties, and metal accessories.

B. Material test reports from a qualified independent laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
   1. Mortar complying with the property requirements of and tested in accordance with ASTM C 270.
   2. Mortar complying with the proportion requirements of ASTM C 270 and tested in accordance with ASTM C 780.
   3. Grout mixes: Include description of type and proportions of grout ingredients.
   4. Masonry units: report for tests performed within the previous six months.

C. Verification samples:
   1. Clay Brick Masonry Units:

1.6 QUALITY ASSURANCE

A. Single-source responsibility for facing units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

B. Single-source responsibility for concrete masonry units: Obtain concrete masonry units for the project from a single manufacturer.

C. Single-source responsibility for mortar materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

1.7 REGULATORY REQUIREMENTS

A. Obtain certificate of compliance from authority having jurisdiction indicating approval of specified products.

1.8 DELIVERY, STORAGE, AND HANDLING

A. General: Do not deliver cement, lime, and similar perishable materials to the site until suitable storage is available. Store such materials in weatherproof structures and ensure that materials are in perfectly fresh condition when brought for use. Protect masonry units and manufactured products of all types from wetting by rain or snow and keep covered when not in use.

B. Masonry Face Units: Handle all masonry units carefully in transit and on the site, so as to keep units whole, with edges sharp, and faces clean and undamaged. Deliver all masonry units on pallets; or handle units individually, and properly stack the same.

C. Aggregates: Deliver, store and handle aggregate materials so as to prevent contamination with earth or other foreign materials.

1. Store cement, lime and similar products under cover and from direct contact with earth or floor slabs.

D. Manufactured items: Deliver manufactured products in original containers plainly marked with product identification and manufacturer’s name.

1. Store metal accessories and the like under cover and from direct contact with ground, and in manner to prevent rust.

E. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or which show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.9 ENVIRONMENTAL CONDITIONS

A. Hot and cold weather requirements shall be in accordance with the recommendations of the Masonry Industry Council as contained in the document "*HOT AND COLD WEATHER MASONRY CONSTRUCTION*" published by the MCAA (Masonry Contractor's Association of America). Enforcement for these requirements shall take place under the following conditions that modify those in the referenced document.
   1. The recommended hot weather requirements for 100 degrees Fahrenheit (37.8 degrees Celsius) shall be enforced for this project when ambient temperatures are above 90 degrees Fahrenheit (32.2 degrees Celsius) under all wind conditions including zero velocity.
   2. Cold weather requirements shall be enforced when ambient temperatures fall below 40 degrees Fahrenheit (4.4 degrees Celsius).

1.10 COORDINATION

A. Coordinate work with that of other trades which require placement and building-in of, as work progresses, anchor bolts, wood blocking, hollow metal frames, fiberglass window units, and anchorage items.

B. Examine all Drawings as to requirements for the accommodation of work of other trades.
   1. Provide all required recesses, chases, slots, and cutouts. Place anchors, bolts, sleeves and other items occurring in the masonry work. Take every precaution to minimize future cutting and patching. Closely coordinate the location and placement of such items.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Acceptable Concrete Masonry Fabricators:
   1. Subject to compliance with the requirements specified herein, Fabricators offering concrete masonry products which may be incorporated in the work include the following, or approved equal:
      a. Jandris Block, Inc., Gardner, MA.
      b. Medway Block Company, Inc., Medway MA.
      c. Or approved equal.

B. Type 1 Load bearing hollow and solid, normal weight concrete masonry units: Conform to ASTM C90, Type 1, Class 1, normal weight, 2-core, 58 percent solid for 2-hour fire resistant construction:
   1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 4, 6, 8, or 12 by 16-inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.
   2. Aggregate: sand and gravel: conform to ASTM C 33.

3. Minimum allowable compressive strength for an individual unit of not less than 1700 psi (net area); and not less than 1,900 psi. (net area) for average of 3 units, when tested in accordance with ASTM C 140.
4. Oven dry density: 125 pounds per cubic foot.
5. Moisture content for average of 3 units, when delivered, not exceeding 35 percent of the total absorption, when tested in accordance with ASTM C 140.

C. Concrete masonry grout blocks: Open end high strength concrete masonry units and slot type strength concrete masonry units for use at reinforced concrete masonry construction where indicated on the Drawings. Conform to all requirements specified above for standard concrete masonry units, and the following additional requirements:
1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16-inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.

a. Fabricate blocks using water-repellent admixture at rate recommended by admixture manufacturer.

2.2 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

B. Clay Face Brick: Facing brick complying with ASTM C216, Grade SW.

C. Acceptable brick match includes Glen-Gery- 200 Flashed Matt or approved equal.

2.3 MORTAR

A. Prepackaged mortar (ready mix) complying with ASTM C 1142, or site-mixed portland cement mortar complying with ASTM C 270 may be used.

B. Admixtures are not permitted except where expressly specified herein or as otherwise approved by Architect for specific field conditions.

C. Color and texture: As approved by the Architect.

D. Mortar materials for site mixed mortar:
1. Portland cement for masonry conforming to ASTM C 150, Type I, non-staining, without air entrainment. Use Type III as necessary for laying masonry in cold weather.
2. For manufactured stone masonry, use white color portland cement.
3. For concrete masonry, use gray color portland cement.

E. Aggregates for manufactured stone mortar: Clean sand, washed uniformly well graded, conforming to ASTM C 144, except for joints 1/4 inch and down use aggregate with 100 percent passing a No. 16 sieve.

F. Aggregates for grout: Conforming to ASTM C 144 for fine aggregate and ASTM C 404, Size 8 or 89.

G. Aggregate for concrete masonry mortar: Clean, washed uniformly well graded sand conforming to ASTM C 144, with the following graduation, and having a fineness modulus between 2.15 and 2.35:

1. Sieve Size Percentage Passing
2. #4..... 100%
3. #8..... 95 to 100%
4. #16..... 70 to 100%
5. #30..... 40 to 75%
6. #50..... 10 to 35%
7. #100..... 2 to 15%
8. #200..... 0 to 5%

H. Mortar pigments: Commercial alkali-resistant, non-fading mortar pigments, oxides of iron where feasible, synthetic type, equal to products of

1. Davis Colors, Beltsville MD.
2. Solomon Grind-Chem Service, Inc., Springfield IL.
3. Landers Segal Color, Inc., Passaic New Jersey.

I. Lime: Approved brand of plastic hydrated lime, conforming to ASTM C 207, Type “S”.

J. Water: Clean and fresh without contaminants.

K. Prepackaged mortar (ready mix)

1. General: complying with ASTM C 1142, factory blended consisting of:
   a. Portland cement: Comply with ASTM C 150, Type I.
   b. Hydrated lime: Type S, complying with ASTM C 207.
   c. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C144.
   d. Admixtures: Prepackaged mortar mixes contain manufacturer’s own proprietary admixtures; additional field admixtures are strictly prohibited.
   e. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials. Water shall be potable.
   f. Pigments: Chemically inert synthetic iron oxide pigments, lightfast, weather resistant, complying with ASTM C-979.
   g. Mortar Color: As selected by Architect from manufacturer’s full range of standard colors.

L. Mortar types:

1. Mortar for masonry below grade or in contact with earth: ASTM C 270 type M using the property specification.
2. Mortar for load bearing masonry: ASTM C 270 type M [S] using the property specification.

3. Mortar for non-load bearing masonry above grade: ASTM C 270 type N using the property specification.
4. Mortar for pointing, dirt and stain resistant type: ASTM C 270 type N using the property specification with added aluminum tristearate, calcium stearate, or ammonium stearate to a quantity of 3 percent of Portland cement weight.

M. Integral water-repellent admixture: Integral liquid polymeric admixture mixed with mortar unit to provide resistance to water penetration.
1. Acceptable products (must be of same type and manufacturer as used for production of concrete masonry units):
a. Addiment, Inc., Doraville, GA, product “Mortar Tite”.
b. Forrer Industries (W.R. Grace & Company). “Dry-Block”.
c. Master Builders, product “Omnicron”.
d. Sonneborne, product “Hydrocide Powder”.
e. Chem-Masters Inc., product “Hydrolox 400”.

2.4 GROUT MIXES

A. Prepackaged grout (ready mix) complying with ASTM C 1107, or site-mixed Portland cement grout complying with ASTM C 476 may be used.

B. Grout for setting equipment, anchor bolts, elevator guide rails, structural steel elements and miscellaneous metals: Non-metallic high-strength controlled expansion grout of flowable consistency, having a compressive strength of 6,500 pounds per square inch (44.8 MPa) at 28 days; slump 8 to 10 inches.
1. Five Star Products, Inc., Fairfield CT, product “Five Star Grout”.
2. L&M Construction Chemicals, Omaha NE, Product: “Crystex”.
3. Master Builders, Cleveland, OH., product “Masterflow 713”.
4. Sika Corporation, Lyndhurst, NJ., product “SikaGrout 212”.
5. Sonneborn Building Products, Minneapolis, MN., product “Sonogrout 10K”.
6. Symons Corporation, DesPlaines, IL., product “Symons Multi-Purpose Grout”.

C. Grout for engineered masonry (core fill): Course grout having a compressive strength of 2,000 to 2,250 pounds per square inch (13.8 to 15.5 MPa) at 28 days; slump 8 to 10 inches.

D. Grout for bond beams and lintels: Fine grout having a compressive strength of 2,500 to 3,000 pounds per square inch (17.2 to 20.6 MPa) at 28 days; slump 8 to 10 inches.

2.5 EMBEDDED FLASHING MATERIALS

A. Flexible Stainless-Steel Flashing where flexible flashing is indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
a. Hohmann & Barnard, Inc.
b. Prosoco
c. York Flashings
d. Or approve equal.
e. A self-adhering stainless steel fabric flashing product with a removable release liner for easy application. The clear adhesive is factory-laminated to a Class A

material consisting of a layer of polymeric fabric with a single sheet of Type 304 or 316 stainless steel bonded to one side.

2.6 REINFORCEMENT AND ANCHORAGE MATERIALS

A. Single wythe longitudinal reinforcement for concrete masonry unit walls and partitions: in overall width 1-5/8 inches less than the overall wall thickness, as manufactured by Dur-O- Wal, Hohmann, AA Wire, or equal.
   1. Interior partitions: Truss design, 9 gage ASTM A 641 class 1 galvanized wire.
   2. Exterior partitions: Truss design, 9 gage ASTM A 641 class 3 hot dipped galvanized wire.
   3. Provide preformed reinforcing sections at intersections of masonry walls and partitions, and whenever walls and partitions change direction.
   4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Hohmann & Barnard, Inc.
      b. Wire-Bond.
      c. Or equal
   5.

B. Masonry-Joint Reinforcement for Multiwythe Masonry:
   1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch (1.6 mm) and maximum vertical adjustment of 1-1/4 inches (32 mm). Size ties to extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Heckmann Building Products, Inc.
      b. Hohmann & Barnard, Inc.
      c. Wire-Bond
      d. Or equal

C. Reinforcing steel, additional to rods which are embedded in concrete: Solid steel reinforcing bars, conforming to ASTM A 615, Grade 60, hot dipped galvanized in accordance with ASTM 123, B2 finish, of sizes indicated on the Drawings.

D. Corrugated-Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.031-inch- (0.79-mm-)thick, stainless steel sheet.
   1. Fastener Screws: Stainless Steel

E. Partition Top Anchors: 0.105-inch- (2.66-mm-) thick metal plate with a 3/8-inch- (10-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

2.7 ACCESSORIES

A. Compressible filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self-expanding, continuous in length, and in width to fill the joint to a point 3/4 inch back from each face of wall or partition.

B. Compressible filler for joints at tops of non-load bearing masonry partitions, and for expansion joints in masonry walls: Closed cell Neoprene or PVC foam board, soft grade, 25 percent thicker than joint width, continuous in length, and in width to fill the joint to a point 3/4 inch back from each face of wall or partition.

C. Premolded control joints for concrete masonry construction: Solid rubber of profile as indicated (to maintain lateral stability of wall), 60-80 shore A hardness.

D. Building paper (to maintain joints open for subsequent application of sealant and backer rod): Nº. 15 asphalt saturated felt.

E. Cleaning solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.8 MIXING MORTARS AND GROUT

A. General: Mix mortar and grout in accordance with the requirements of ASTM C270, and ASTM C476 as applicable.

B. Control batching procedure to ensure proper proportions by measuring materials by volume. Amount of mixing water and mortar consistency shall be controlled by mason.

C. Control batch sizes to allow for use within manufacturer's recommended pot life.

D. Retempering will be permitted only within the first two hours of initial mix or shorter times as directed by manufacturers.

E. Discard all mortar and grout which exceeds the time limits allowed by the manufacturer. Discard mortar that has partially set.

F. Maintain sand uniformly damp immediately before mixing process.

G. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

H. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.

I. Pouring grout shall be fluid consistency (as fluid as possible for pouring without separation of constituent parts).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive the work of this Section.

B. Verify built-in and other items provided by separate Sections of the work are properly sized and located.

C. Verify foundation walls supporting masonry is constructed within tolerances required by code.

D. Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other Sections.

B. Foundations:

1. Do not commence installation until foundations are clean, rough, and level.
2. Sandblast the foundation tops, if necessary, and remove all laitance and foreign material.
3. Verify that the foundation elevation is such that the bed joint thickness shall not vary from specified thickness, and that the foundation edge is true to line with masonry not projecting over more than 1/4".

C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

D. Protect surfaces of windows, door frames, louvers and vents as well as similar finish products with painted and integral finishes from mortar droppings and stains.

3.3 INSTALLATION - GENERAL

A. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase recess and jamb of openings and between adjacent chases and recesses.

B. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.

C. Establish lines, levels and coursing indicated. Protect from displacement.

D. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

E. Isolate masonry partitions from vertical structural framing and where indicated on the Drawings. Maintain joints free from mortar, ready to receive sealant and joint bead back-up.

F. Provide compressible filler at tops of interior masonry partitions abutting structural above.

3.4 COURSING, BONDS AND JOINTS

A. Coursing, joints and bond pattern: Running bond except as otherwise indicated on the Drawings.

B. Joints:
1. Exposed to view masonry: except as specified below, fill all joints with mortar, strike off flush, and when mortar is thumb print hard tool joints with a non-staining tool. Joints shall be free of drying crack.
2. Horizontal joints
   a. Exterior joints at concrete masonry units: Rake joints, brush clean, point with mortar to a flat cut joint. When thumbprint hard, the joints and beds shall be tooled with a round jointer having a diameter 1/8 inch larger than the width of the joint
   b. Interior joints (all): Tool joints flush.
3. Concealed from view masonry, including masonry which will be concealed by flashings and similar materials: Fill joints with mortar and strike joints flush. Concave tool exterior joints below grade.

3.5 CONTROL JOINTS

A. Locate control joints where shown on Drawings, at corners adjacent to openings in masonry, changes in wall height and intersections with structural walls as approved by Architect.

1. Do not continue horizontal joint reinforcement through control joints.

B. Form vertical control joints with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
1. Size control joints in accordance with the requirements of Section 07 92 00 - JOINT SEALANTS.

C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturers recommendation.

3.6 LAYING MASONRY - GENERAL

A. Build the masonry walls and partitions in the various combinations and thickness as indicated on the Drawings.

B. Erect all masonry work in compliance with the line and level tolerances specified herein. Hold uniform joint sizes. Correct, or replace, as directed by the Architect, non-conforming masonry work at no additional cost to the Contract.

C. Lay out coursing before setting to minimize cutting closures or jumping bond, Avoid the use of less-than-half-size units.

D. Laying masonry units:
   1. Lay hollow masonry units with face shell bedding on head and bed joints.
   2. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
   3. Interlock intersections and external corners.
   4. Cut all exposed masonry with a motor-driven carborundum blade saw to ensure straight and clean, unchipped edges.
      a. Lay no unit having chipped edges or face defects where such unit would be exposed to view. Remove any such unit, if installed, and replace with an undamaged unit, and bear all costs, therefore.
   5. Do not spread any more mortar than can be covered before surface of mortar has begun to dry.
   6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove entirely, clean off mortar, and reset with fresh mortar.
   7. Except for cleaning down and repointing, finish all masonry as the walls and partitions are carried up.

E. Build-in reinforcement and anchorage items as the work progresses, grouting for secure anchorage.
   1. Where steel reinforcing rods have been cast into concrete slabs, and left with upturned ends, carefully place masonry units down over the upturned ends of the rods and fill cells of masonry units with specified grout.
   2. Embed prefabricated horizontal joint reinforcing as the work progresses, with a minimum cover of 5/8” (16 mm) on exterior face of walls and 1/2” (13 mm) at other locations. Lap units not less than 6” (152 mm) at ends. Use prefabricated L and T units to provide continuity at corners and intersections. Cut and bend units as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

   3. Except as indicated otherwise, isolate masonry from overhead structure:

      a. Isolate masonry partitions from vertical structural framing members with a control joint.
      b. Isolate top joint of masonry partitions from horizontal structural framing members and slabs, decks or blocking with compressible joint filler.

F. Provide control joints at 30 feet on center maximum spacing and keep clean of mortar droppings.

G. Provide complete protection against breakage and weather damage to all masonry work, including substantial wood boxing around door jambs, over the tops of walls and wherever necessary to protect work at all stages of completion. Protect masonry when not roofed over, at all times when masons are not working on the walls. Apply tarpaulins or waterproof paper, properly weighted, or nailed, to assure their remaining in place to protect masonry from all possible hazards.

H. Point and fill all holes and cracks in new mortar joints with additional fresh mortar; do not merely spread adjacent mortar over defect or use dead mortar droppings. Do all pointing

while mortar is still soft and plastic. If hardened, chisel defect out and refill solidly with fresh additional mortar, and tool or rake joints as specified herein.

I. Protect all masonry from rain prior to, and during the installation thereof. If the temperature is in excess of 80 degrees Fahrenheit at time of installation, lightly moisten contact surfaces of masonry units by brushing with water.

J. Cold/Hot Weather Procedures: No masonry work shall be laid in temperatures below 40 degrees Fahrenheit without the submittal to and review by the Architect of cold weather procedures.
   1. In ambient temperatures below 40 degrees Fahrenheit make provisions to adequately protect the masonry materials and the finished work from frost, including heating of masonry materials.
      a. Heat enclosed work areas as necessary to adequately protect the work of this Filed Sub-Bid. Such additional temporary heat and protection measures required is in addition to the protection furnished by General Contractor under provisions of Section 01 50 00 - TEMPORARY FACILITIES AND CONSTRUCTION, which occurs from November 1st to March 31st.
   2. No frozen work shall be built upon nor shall anti-freeze admixtures be permitted in the mortar mix.
   3. Any completed work found to be affected by frost shall be taken down and rebuilt at no additional expense to the Owner.

3.7 EXTERIOR COMPOSITE MASONRY AT EXISTING BATHHOUSE BUILDING

A. Bond wythes of composite masonry together using one of the following methods:

   1. Individual Metal Ties: Provide ties as indicated installed in horizontal joints, but not less than one metal tie for 4.5 sq. ft. (0.42 sq. m of wall area spaced not to exceed 16 inches (406 mm)] o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (914 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.

      a. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) ties.

   2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

      a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
      b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.

B. Bond wythes of composite masonry together using bonding system indicated on Drawings.

C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.

1. Provide continuity with masonry-joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are indicated at juncture, bond walls together as follows:

1. Provide individual metal ties not more than 8 inches o.c.
2. Provide continuity with masonry-joint reinforcement by using prefabricated T-shaped units.

3.8 BUILDING-IN WORK

A. As work progresses install built-in metal door and glazed frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates and other items to be built-in the work.

B. Install built-in items plumb and level; take care not to distort alignment of such items.

C. Bed anchors of metal frames in adjacent mortar joints. Fill frame voids solid with grout except where joints are indicated to receive caulking and sealant. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
1. Rake joints to receive sealant to a uniform depth of 3/4 inch for installation of caulking and sealant.
2. Do not build-in organic materials subject to deterioration.

3.9 BUILDING-IN LINTELS

A. Install loose lintels over all openings, whether or not scheduled.

B. Where not detailed otherwise, maintain the following minimum bearings for lintels on each side of opening:
1. 6 inches bearing on concrete.
2. 3 inches bearing on steel.
3. 8 inches bearing on masonry.

3.10 REINFORCEMENT AND ANCHORAGE

A. Reinforce horizontal joints with continuous masonry joint reinforcement, spaced 16 inches vertically commencing one course above supporting concrete slab.

B. Place masonry joint reinforcement in first and second horizontal joint above and below openings. Extend 16 inches each side of opening.

C. Place joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches .

E. Install preformed units (or optional field-formed units) at corners, reveals, and offsets in exterior masonry, at intersections of all masonry walls and partitions, and wherever walls and partitions change directions.

F. Do not bridge control and expansion joints in the wall system.

G. Anchor ends of walls to structure with anchors spaced 24 inches, except as otherwise shown.

H. Embed anchors in concrete. Attach to structural steel members. Embed anchorages in every second block.

3.11 PROTECTION OF WORK

A. Loading: Do not apply loading for at least 12 hours after building masonry walls and partitions. Do not apply concentrated loads for at least 3 days after building masonry columns, walls or partitions.

B. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
   2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to un-constructed wythe and hold cover in place.

C. Stain prevention: Provide protection and prevent grout, mortar, and soil from staining the face of exposed masonry and building finishes. Protect base of walls from rain-splashed mud and mortar splatter.
   1. Remove immediately all grout, mortar, and soil that come in contact with such masonry.

3.12 TOLERANCES

A. Maximum variation from true surface level for exposed to view walls and partitions:
   1. Unit-to-unit tolerance: 1/16 inch.
   2. Surface, overall tolerance: 1/4 inch in 10 feet in any direction and 1/2 inch in 20 feet or more.
      a. Where both faces of single wythe wall or partition will be exposed to view, request and obtain decision from the Architect as to which face will be required to conform to the specified surface level tolerance.

B. Maximum variation from plumb: For lines and surfaces of walls do not exceed 1/4 inch in 10 feet, 3/8 inch in any story up to 20 feet maximum. At expansion joints and other conspicuous lines, do not exceed 1/4 inch in 20 feet.

C. Maximum variation from level: For lines of sills, tops of walls and other conspicuous lines, do not exceed 1/8 inch in 3 feet, or 1/4 inch in 10 feet and 1/2 inch in 30 feet.

D. Maximum variation of linear building line: For position shown in plan relating to columns, walls and partitions, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet.

E. Maximum variation in specified height: 1/2 inch per story.

F. Maximum variation of joint thickness: 1/8 inch in 3 feet.

G. Maximum horizontally projected unsupported masonry unit: 1-1/8 inches

3.13 CLEANING

A. Progress Cleaning:
   1. General: Maintain site free of waste materials, debris, and rubbish resulting from the work of this Section.
   2. Remove from work areas surplus and waste materials resulting from the work of this Section. Remove on a continual on-going basis through-out the term of construction.
      a. During the progress of the work, keep the exposed surfaces of masonry and manufactured stone clean at all times, and protected against damage. As each segment of the masonry is erected, dry-brush the surfaces free from mortar spots and droppings.

B. Prior to performing the final cleaning work, examine all face joints in exposed masonry to locate cracks, holes or other defects in the mortar; and point up all such defects and fill with mortar as specified herein. Where necessary, in the opinion of the Architect, cut out defective joints in masonry and replace with new materials, exercising extreme care to match original work.

C. At a time approved by the Architect, perform final cleaning operations on all masonry as specified herein.
   1. Perform the final cleaning work only when the ambient temperature is above 40 degrees Fahrenheit and rising.
   2. Do not use wire brushes or other abrasive tools in the cleaning operations.
   3. Perform final cleaning operations from the top down. If masonry cleaning work is performed after windows, doors, frames, and other work has been installed, provide complete protection for said items; be fully responsible for any damage due to the cleaning operations.
   4. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
   5. Perform final cleaning of masonry units and manufactured stone by scrubbing with stiff bristle fiber brushes and clear water, changing the water frequently.

D. Provide suitable protective coverings for all other surfaces and materials during the final cleaning procedures and bear full responsibility for correcting any damage caused by these operations, to the satisfaction of the Architect.

END OF SECTION 042001

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SECTION 050001 – MISCELLANEOUS METALS *(FILED SUB TRADE REQUIRED)*

PART 1 - GENERAL

1.1 FILING SUB-BIDS

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in with the Awarding Authority at a time and method stipulated in the Bidding Requirements.

B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required in Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.

C. Specific information relating to sub-bidders is set forth in the Bidding and Contract Documents and the Sub-bidders are directed thereto.

D. Sub-bids filed with the Awarding Authority shall be accompanied by a Bid Bond issued by a responsible bank or trust company payable to the *City of Newton* in the amount of five percent of the Bid. A sub-bid accompanied by any other form of bid depository will be rejected.

E. Work to be done under this Section is shown on the Drawings: _____.

F. The listing of Contract Drawings above shall not limit the Subcontractors responsibility to determine the full extent of his work as required by all Contract Drawings.

G. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

H. Examine all other Sections of the Specifications for requirements, which affect work under this Section whether or not such work is specifically mentioned in this Section.

1.2 SUB-SUB BID REQUIREMENTS:

A. None

1.3 SUMMARY

A. Section Includes:
1. Miscellaneous steel to support and brace masonry construction including lintels
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Concrete Filled Metal bollards.
4. Hot dipped galvanizing of items indicated.
5. Stair railing and guardrail assemblies.

B. Products furnished, but not installed, under this Section include the following:
   1. Loose steel lintels.

1.4 ACTION SUBMITTALS

A. Product Data: and shop drawings specified in the following Sections:
   1. 050513- Factory Applied Coatings for Metal
   2. 055000- Metal Fabrications
   3. 055213- Pipe and Tube Railings

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE AND PRODUCT REQUIREMENTS

A. As specified in sections:
   1. 050513- Factory Applied Coatings for Metal
   2. 055000- Metal Fabrications
   3. 055213- Pipe and Tube Railings

PART 3 - EXECUTION

A. Work of this Section also includes Specification Sections:
   1. 050513- Factory Applied Coatings for Metal
   2. 055000- Metal Fabrications
   3. 055213- Pipe and Tube Railings

END OF SECTION 050001

SECTION 050513 – FACTORY APPLIED COATINGS FOR METAL *(PART OF FILED SUB-TRADE SECTION 050001)*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies factory-applied metal coatings to provide Hot-Dip Galvanizing Finish

B. Fabricator may have hot-dip galvanizing applicator provide primer coat at fabricator's option.

C. Related Sections
   1. 055000- Metal Fabrications
   2. 055213- Pipe and Tube Railings

1.3 SUBMITTALS

A. Product Literature for Factory-Applied Metal Coatings: Submit galvanizer's product data sheets for coatings specified in this Section including physical performance test data.

B. Certificate of Compliance for Items Coated by Galvanizer: If requested, submit notarized Certificate of Compliance with invoice for galvanizing, signed by the galvanizer, indicating compliance with requirements of specifications. Include scope of services provided, and quantity and itemized description of items processed.

C. Certificate for review of for Shop Drawing Review by Galvanizer: If requested, submit galvanizer's certification that shop drawings for metal fabrications to receive metal coatings have been reviewed and that fabrications are acceptable to galvanizer for proper application of galvanizing and metal coatings. All drawings shall be signed by the galvanizer to indicate acceptance of design for galvanizing.

D. Certificate of Compliance of Item Identification by Galvanizer: If required, the galvanizer shall mark all lots of material with a clearly visible tag indicating the name of the galvanizer, the type of coatings, and the applicable ASTM standards. If requested, submit certification of compliance that items have been tagged.

E. Galvanizer shall have a written Quality Control/Quality Assurance manual for hot dip galvanizing and factory applied coating.

F. Certification from the American Galvanizers Association that Galvanizer has completed all course requirements and has a certified Master Galvanizer on staff.

1.4 QUALITY ASSURANCE

A. Galvanizer's Qualifications: Engage the services of a qualified galvanizer who has demonstrated a minimum of ten years' experience in the successful application of galvanized coatings specified in this specification in the facility where the work is to be performed.

B. Coordination between Fabricator and Galvanizer: Prior to fabrication and final submittal of shop drawings to Architect, direct fabricators to submit shop drawings to the galvanizer for all metal fabrications to receive factory-applied metal coatings. Direct galvanizer to review fabricator's shop drawings for suitability of materials for galvanizing and coatings and coordinate any required modifications to fabrications required to be performed by the fabricator.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN

A. Coating Applicator: For the purpose of establishing a standard of quality and performance, provide factory-applied metal coatings by Duncan Galvanizing, 69 Norman Street, Everett, MA, 02149, telephone 617-389-8440, fax 617-389-2831, www.duncangalvanizing.com.
   1. Duragalv® Hot-dip galvanizing for iron and steel fabrications.
   2. Option: Primergalv® Hot-dip galvanizing and factory-applied high performance polyamide epoxy primer for iron and steel fabrications.

2.2 GENERAL

A. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process. Galvanizing bath shall contain special high grade zinc and other earthly materials.
   1. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware.
   2. Provide thickness of galvanizing specified in referenced standards.
   3. Fill vent holes after galvanizing, if required, and grind smooth.
   4. Galvanized surface shall be prepared per SSPC SP2 or SP3 to provide a smooth surface removing all runs, drips or sags.
   5. Galvanizing shall exhibit a rugosity (smoothness) of 25 microns or less when measured by a profilometer. Profilometer shall be capable of operating in .1 micron increments. This pertains to those elements that are less than 24 pounds per running foot.

B. Factory-Applied Primer Option over Galvanized Steel: Provide factory-applied polyamide epoxy prime coat over hot-dipped galvanized steel.
   1. Basis-of-Design: PRIMERGALV®.

2. Primer shall be certified OTC/VOC compliant at less than 2.8 lbs./gal. and conform to EPA and local requirements.
3. Apply primer within 12 hours after galvanizing or blasting at the same galvanizer's plant in a controlled environment meeting applicable environmental regulations and as recommended by the primer coating manufacturer. Primer shall have a one year re-coat window for application of finish coat.
4. Polyamide epoxy primer shall be applied at 4-6 mils DFT and meet or exceed the following performance criteria as stipulated by the coatings manufacturer:
    a. Abrasion Resistance: ASTM D 4060 (CS17 Wheel, 1,000 grams load) 1 kg load, 200 mg loss.
    b. Adhesion: ASTM D 4541, 1050 psi.
    c. Corrosion Weathering: ASTM D 5894, 13 cycles, 4,368 hours, 10 per ASTM D 714 for blistering; 7 per ASTM D 610 for rusting.
    d. Direct Impact Resistance: ASTM D 2794, 160 in. lbs.
    e. Flexibility: ASTM D 522, 180 degrees bend, 1-inch mandrel, Passes.
    f. Pencil Hardness: ASTM D 3363, 3H.
    g. Moisture Condensation Resistance: ASTM D 4585, 100 degrees F, 2000 hours, Passes no cracking or delamination.
    h. Dry Heat Resistance: ASTM D 2485, 250 degrees F.
    i. Accelerated Weathering: QUV- ASTM D 4587 QUV A 5000 Hours Passes.
    j. Salt Fog Resistance: ASTM B 117, 5,600 hours No cracking or blisters

C. Warranty: Provide galvanizer's standard warranty that materials will be free from 10 percent or more visible rust for 20 years.

D. MISCELLANEOUS MATERIALS Galvanizing Repair Paint: MIL-P-21035B or SSPC-Paint 20. Provide
1. ZIRP Zinc Rich Cold Galvanizing Compound
2. ZRC Cold Galvanizing Repair Compound
3. Or equal

PART 3 - EXECUTION

3.1 APPLICATION OF FACTORY-APPLIED METAL COATINGS

A. Galvanizing Application: Galvanize materials in accordance with specified standards and this specification. The dry kettle process shall be used to eliminate any flux inclusions on the surface of the galvanized material.

B. Prior to galvanizing, the steel shall be immersed in a flux solution (zinc ammonium chloride). The flux tank must be 12 to 14 Baumé density and contain less than 0.4 percent iron. Use of the wet kettle process is not acceptable. To provide the galvanized surface required, the following procedures shall be implemented:
1. A monitoring recorder shall be utilized and inspected regularly to observe any variances in the galvanizing bath temperature.
2. The pickling tanks shall contain hydrochloric acid with an iron content less than 12 percent and zinc content less than 3 percent. Titrations shall be taken weekly at a minimum.

3. All chemicals and zinc shall be tested at least once a week to determine compliance with ASTM standards. All testing shall be done using atomic absorption spectrometry or x-ray fluorescence (XRF) equipment at a lab in the galvanizing facility.

C. Factory applied primer option: Finish coatings shall be applied under the following conditions.
1. Minimum air temperature shall be 50 degrees F. Surface temperature of steel shall be 50 degrees to 120 degrees F and, in any event, be 5 degrees F higher than the dew point. Humidity shall be 85 percent maximum.
2. The use of iron, steel shot, and aluminum oxide grit as a blast medium, and power wire brushes are not permitted.
3. Surface of substrate shall be dry and free from dust, dirt, oil, grease or other contaminants. Coating and cure facility shall be maintained free of airborne dust and dirt until coatings are completely cured.

3.2 INSTALLATION

A. Installation: Comply with fabricator's and galvanizer's requirements for installation of materials and fabrications, including use of nylon slings or padded cables for handling factory-coated materials.

B. Touch-Up and Repair: For damaged and field-welded metal coated surfaces, clean welds, bolted connections and abraded areas.
1. For galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A 780, modified to 95 percent zinc in dry film. Galvanizing repair paint shall have 95 percent zinc by weight. Basis of design is Zirp by Duncan Galvanizing. Thickness of applied galvanizing repair paint shall be not less than coating thickness required by ASTM A 123 or A 153 as applicable.
2. Touch-up of galvanized surfaces with silver paint, brite paint, or aluminum paints is not acceptable.
3. For factory-applied finish coatings, field-touch-up shall be performed by factory approved personnel for warranties to apply. Touch-up shall be such that repair is not visible from a distance of 6 feet. A touch-up repair kit and touchup instructions shall be provided to the Owner for each type of factory-applied finish upon request.

END OF SECTION 050513

SECTION 055000 – METAL FABRICATIONS *(PART OF FILED SUB-BID SECTION 050001)*

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Miscellaneous steel to support and brace masonry construction
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Metal bollards to receive concrete fill
5. Stair Nosings at Exterior Cast In Place concrete Stairs
6. Hot dipped galvanizing of items indicated.

B. Products furnished, but not installed, under this Section include the following:
1. Loose steel lintels.

C. Related Requirements:
1. Section 033000- Cast-In-Place Concrete for concrete fill of bollards
2. Section 002001 " Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Section 099100 Painting for coordination of primer with finish paint system

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Fasteners.
2. Shop primers.
3. Shrinkage-resisting grout.
4. Metal bollards.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.]Provide Shop Drawings for the following:

1. Miscellaneous framing and supports for applications where framing and supports are not specified in other Sections.
2. Metal bollards.
3. Loose steel lintels.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Research Reports: For post-installed anchors.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.

D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

E. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

F. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.

C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, (ASTM A563M, Class 10S3) heavy-hex carbon-steel nuts; and where indicated, flat washers.
   1. Hot-dip galvanize or provide mechanically deposited, zinc coating .

D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 1 .

E. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior and Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593 and nuts, ASTM F594 .

2.3 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.6 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 80 steel pipe, hot dipped galvanized

B. Fabricate bollards with 3/8-inch- (9.5-mm-) thick, steel No. 4 finish baseplates for bolting to existing concrete slabs Drill baseplates at all four corners for 3/4-inch (19-mm) anchor bolts.

2.7 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

2.8 ABRASIVE METAL NOSINGS, TREADS, AND THRESHOLDS

A. Extruded Units: **Aluminum**, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. American Safety Tread Co., Inc.
      b. Amstep Products.
      c. Armstrong Products, Inc.
      d. Balco; a CSW Industrials Company.
      e. Nystrom, Inc.
      f. Wooster Products Inc.
   2. Source Limitations: Obtain units from single source from single manufacturer.
   3. Provide ribbed units, with abrasive filler strips projecting 1/16 inch (1.5 mm) above aluminum extrusion.
   4. Nosings: Basis of Design Balco Narrow, Ribbed Abrasive, 2 inch width

B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

C. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.

D. Apply clear lacquer to concealed surfaces of extruded units.

2.9 CONCRETE FILL (BY GENERAL CONTRACTOR)

A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.10 STEEL AND IRON FINISHES

A. Galvanizing: As specified in Section 050513

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLATION OF METAL BOLLARDS

A. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch (19-mm) bolts at each bollard unless otherwise indicated.

B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation 4 to 6 inches between the bollard and excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

3.4 INSTALLATION OF ABRASIVE METAL NOSINGS, TREADS, AND THRESHOLDS

A. Center nosings on tread widths unless otherwise indicated.

B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

3.5 REPAIRS

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    a. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099100.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

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SECTION 055213 - PIPE AND TUBE RAILINGS *(PART OF FILED SUB-BID SECTION 050001)*

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Steel pipe railings and guard assemblies.

B. Related Sections:
   1. 033000- Cast-In-Place Concrete

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, which are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Manufacturer's product lines of mechanically connected railings.
   2. Railing brackets.
   3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

   1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
   2. Fittings and brackets.

D. Delegated-Design Submittal: For railings and guardrails, including analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts, responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the Commonwealth of Massachusetts in which Project is located.

B. Welding certificates.

C. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

E. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E894 and ASTM E935.

F. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:
a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
b. Infill load and other loads need not be assumed to act concurrently.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change: 120 deg F (67 deg C), ambient.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch (38-mm) clearance from inside face of handrail to finished wall surface.

2.3 STEEL AND IRON

A. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
1. Provide galvanized finish for exterior installations and where indicated.

B. Plates, Shapes, and Bars: ASTM A36/A36M.

2.4 FASTENERS

A. General: Provide the following:
1. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.

1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

E. Non shrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

F. Anchoring Cement: Factory-packaged, non-shrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and related items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended, so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Form Changes in Direction as Follows:
   1. As detailed.
   2. By bending.
   3. By radius bends of radius indicated.

J. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

N. For railing posts set in concrete, provide steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.

2.7 STEEL AND IRON FINISHES

A. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
   1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

3.4 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or] anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
   1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

3.5 ATTACHING RAILINGS

A. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets and railing end flanges to building construction as follows:
   1. Mechanically attached to solid blocking at framing.

3.6 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 055213

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking, cants, and nailers.
3. Wood furring and grounds
4. Plywood backing panels.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) size or greater but less than 5 inches nominal (114 mm actual) size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal (114 mm actual) size or greater in least dimension.

F. Lumber grading agencies, and abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. SPIB: The Southern Pine Inspection Bureau.
4. WCLIB: West Coast Lumber Inspection Bureau.
5. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. testing agency according to ASTM D5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Power-driven fasteners.
3. Post-installed anchors.
4. Metal framing anchors.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 DIMENSIONAL LUMBER MATERIALS

A. Lumber Grading Rules: NFPA, RIS, SPIB, WCLIB or WWPA.
1. Beam, Joist & Rafter Framing: SPF Species, 1 or 2 grades, size as per drawings, 19 percent maximum moisture content.
2. Non-structural Light Framing: SPF Species, 2 grades, size as per drawings, 19 percent maximum moisture content.
3. Studding: SPF Species, 1 or 2 grades, size as per drawings, 19 percent maximum moisture content. “Stud” grade shall not be used.
4. Wood in Contact with Exterior Masonry and Concrete: SYP Species, 1 or 2 grades, size as per drawings, 19 percent maximum moisture content, pressure preservative treated with alkaline copper quaternary (ACQ) with 60 pound per cubic foot (pcf) retention.
5. Sills & Plates: SPF Species, 1 or 2 grades, size as per drawings, 5 percent maximum moisture content (kiln dried).

6. Solid Posts and Beams: Hem Fir Species, 1 or 2 grades except as required for architectural finish considerations.
7. Nailers & Blocking: SPF construction grade, finished 4 sides, 19% maximum moisture content, sizes as required by items being supported.

2.2 MISCELLANEOUS FASTENERS AND CONNECTORS

A. Provide standard attachment hardware consisting of nails, bolts, screws and standard fittings as noted on the drawings and as required. Hardware for rough carpentry shall be as follows:
1. Bolts and Nuts: AISI / ASME Standard B18.2.1
2. Lag Screws: AISI / ASME Standard B18.6.1
3. Steel Washer Plates: Same as above or ASTM A36 for custom sizes.
4. Spikes: Galvanized, hardened steel conforming to Federal Specification FF-N-105B.
5. Standard Connectors (where specified or allowed): Items as manufactured by the Simpson Strong-Tie Company of San Leandro, CA, or approved equal.
6. Shear Plates: Hot Rolled Pressed Steel Type Satisfying SAE Standard 1010.
7. Nails shall be Common Wire type, hot dip galvanized per ASTM A53 at exposed locations.

2.3 WOOD PRODUCTS, GENERAL

A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.

B. Maximum Moisture Content of Lumber:
1. Boards: 19 percent.

2.4 PRESERVATIVE TREATMENT

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.6 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M .
2. For pressure-preservative-treated wood, use stainless steel fasteners.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, as appropriate for the substrate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with the following:
1. Provide standard galvanized metal connectors for all flush framed beam and joist applications. Capacities shall be suitable for the member and span.

2. Provide all framing in accordance with proper and standard practice, and all governing codes. Contractor shall be prepared to correct any unsuitable conditions per the direction of the Architect.
3. Wood construction is to conform to "National Design Specification for Wood Construction", 2015 edition (NDS 2015).
4. New lumber for structural use is to be surface dried and have a moisture content of not more than 19 percent.
5. Wood construction shall conform to the Massachusetts State Building Code.
6. Wood is to be handled and covered to prevent damage and moisture absorption from snow or rain.

B. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

E. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes [wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 062000 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior and Interior wood trim

B. Related Requirements:
1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

1.5 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 TRIM

A. Composite Lumber Trim: Extruded, expanded PVC with a small-cell microstructure, made from UV- and heat-stabilized, rigid material.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
   a. Ply-Trim, Inc.; DuraBoard.
   b. Royal Moldings Limited; Pro Series Exterior Moldings.
   c. Vycom Corp.; Azek.
   d. Or approved equal
3. Density: Not less than 31 lb./cu. ft. (500 kg/cu. m).
4. Heat Deflection Temperature: Not less than 130 deg F (54 deg C), per ASTM D 648.
5. Coefficient of Thermal Expansion: Not more than 4.5 x 10^{-5} inches/inch x deg F (8.1 x 10^{-5} mm/mm x deg C).
6. Water Absorption: Not more than 1 percent, per ASTM D 570.
7. Flame-Spread Index: 75 or less, per ASTM E 84.

2.2 MISCELLANEOUS MATERIALS

A. Fasteners for Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. For face-fastening siding, provide ringed-shank siding nails.
2. Provide stainless steel fasteners.

2.3 FABRICATION

A. Back out or kerf backs of standing and running trim wider than 5 inches (125 mm), except members with ends exposed in finished work.

B. Ease edges of lumber less than 1-inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1-inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Apply semi-transparent or clear treatment to backside of siding and trim prior to installation.

1. Cut to required lengths and prime ends.
2. Comply with requirements in Section 099001 Painting

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.
2. Scribe and cut exterior finish carpentry to fit adjoining work.
3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
4. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
5. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 INSTALLATION OF TRIM

A. Install flat-grain lumber with bark side exposed to weather.

B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary.

1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

C. Fit exterior joints to exclude water.

1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.5 ADJUSTING

A. Replace exterior finish carpentry that is damaged or does not comply with requirements.

B. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean exterior finish carpentry on exposed and semi exposed surfaces.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

END OF SECTION 062000

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced wall panels
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural panels that are not concealed within other construction.

B. Related Requirements:
1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 123661.10 Solid Surface Countertops

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site.

1.5 ACTION SUBMITTALS

A. Product Data:
1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Miscellaneous materials.

B. Product Data Submittals: For each product.

C. Shop Drawings:
1. Include plans, elevations, sections, and attachment details.
2. Show large scale details.

3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.

D. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.

E. Samples for Initial Selection: For each type of exposed finish.

F. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches for each type, color, pattern, and surface finish required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Certificates: For each type of product including
1. Composite wood products.
2. High-pressure decorative laminate.
3. Adhesives.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.9 FIELD CONDITIONS

A. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70percent during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate

measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL PANELS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of panels indicated for construction, finishes, installation, and other requirements.

B. Grade: Custom.

C. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
a. Abet Laminati Inc.
b. Formica Corporation.
c. Lamin-Art, Inc.
d. Pionite; a Panolam Industries International, Inc. brand.
e. Or approved equal

D. Laminate Cladding for Exposed Surfaces:
1. Vertical Surfaces: Grade HGS.
2. Edges: Grade HGS

E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As selected by Architect from laminate manufacturer's full range in the following categories:
a. Solid colors, matte finish.
b. Patterns, matte finish.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Softwood Plywood: DOC PS 1.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets .

B. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, [170] degrees of opening, self-closing.

C. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid metal.

E. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.

F. Shelf Rests: ANSI/BHMA A156.9, B04013; metal two-pin plastic with shelf hold-down clip.

G. Drawer Slides: ANSI/BHMA A156.9.
   1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount.

      a. Type: Full extension.
      b. Material: Galvanized steel ball bearing slides.
      c. Motion Feature: Self-closing mechanism.

H. Door Locks: ANSI/BHMA A156.11, E07121.

I. Drawer Locks: ANSI/BHMA A156.11, E07041.

J. Grommets for Cable Passage: 2-inch (51-mm)] OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

   1. Color: To be selected from manufacturers full range of colors.

K. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for BHMA finish number indicated.
   1. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base.
   2. Satin Stainless Steel: ANSI/BHMA 630.

L. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

B. Adhesive for Bonding Plastic Laminate: Contact cement.

2.5 FABRICATION

A. Fabricate architectural panels to dimensions, profiles, and details indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition panels to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.

B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips, No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semi-exposed surfaces.

END OF SECTION 064116

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SECTION 07301- EXISTING ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes cutting and patching mechanical equipment into the existing roof membrane.

1.3 PERFORMANCE REQUIREMENTS- MEMBRANE

A. General: Provide installed roofing membrane and base flashings repairs that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with the existing and one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

1.4 SUBMITTALS

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

B. Maintenance Data: For roofing system to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

D. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

E. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

2.2 EPDM ROOFING MEMBRANE

A. EPDM Roofing Membrane: ASTM D 4637, Type I, nonreinforced uniform, flexible sheet made from EPDM, and as follows:
   1. Available Manufacturers:
      a. Carlisle SynTec Incorporated.
      b. Firestone Building Products Company.
      c. GenFlex Roofing Systems
      d. Or approved equal.
   2. Thickness: 60 mils (1.5 mm), nominal.

3. Exposed Face Color: White

2.3 AUXILIARY MATERIALS- MEMBRANE

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.

C. Bonding Adhesive: Manufacturer's standard bonding adhesive.

D. Cold Fluid-Applied Membrane Adhesive: Manufacturer's standard cold fluid-applied bonding adhesive formulated to adhere fleece-backed roofing membrane to substrate.

E. Seaming Material: Single-component butyl splicing adhesive and splice cleaner or Manufacturer's standard synthetic-rubber polymer primer and 3-inch- (75-mm-) wide minimum, butyl splice tape with release film.

F. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.

G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

H. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

I. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch (25 mm) wide by 0.05 inch (1.3 mm) thick, prepunched.

J. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

K. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
   1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

D. Cold Fluid-Applied Adhesive: Apply cold fluid-applied adhesive to substrate at rate required by manufacturer and install fleece-backed roofing membrane.

E. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

F. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

G. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

I. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

J. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

K. Install roofing membrane and auxiliary materials to tie in to existing roofing.

3.4 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.5 CLEANING AND PROTECTION

A. Clean off excess sealants.

B. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

C. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 073001

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SECTION 079200 - JOINT SEALANTS *(FILED SUB-TRADE BID REQIURED)*

PART 1 - GENERAL

1.1 FILING OF SUB-BIDS

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in with the Awarding Authority at a time and method stipulated in the Bidding Requirements.

B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required in Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.

C. Specific information relating to sub-bidders is set forth in the Bidding and Contract Documents and the Sub-bidders are directed thereto.

D. Sub-bids filed with the Awarding Authority shall be accompanied by a Bid Bond issued by a responsible bank or trust company payable to the *City of Newton* in the amount of five percent of the Bid. A sub-bid accompanied by any other form of bid depository will be rejected.

E. Work to be done under this Section is shown on the Drawings _____

F. The listing of Contract Drawings above shall not limit the Subcontractors responsibility to determine the full extent of his work as required by all Contract Drawings.

G. Include GENERAL CONDITIONS and applicable parts of Section 011000 as part of this Section.

H. Examine all other Sections of the Specifications for requirements, which affect work under this Section whether or not such work is specifically mentioned in this Section.

I. Examine all other Sections of the Specifications for requirements which affect work under this Section whether or not such Work is specifically mentioned in this Section.

J. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to ensure the steady progress of all work under the Contract.

K. Trade Sub-Bid Requirements: None

1.2 SUMMARY

A. Section includes joint sealants.

B. Work includes
   1. All joints indicated graphically as sealant or labeled sealant.
   2. Housekeeping sealant between all plumbing fixtures and wall surfaces; this work is not indicated on the drawings.

3. All joints between interior architectural woodwork, finish carpentry items, and equipment and specialties required to close gaps and variations in the substrate.
4. All exterior sealant joints in concrete pavement

C. All sealant joints integral to the installation of windows, doors, storefront, roofing, and thresholds, are not by Section 079200.

D. Sealant joints within the Swimming Pool are provided by the swimming pool subcontractor.

E. Related Sections:
1. Section 033000- Cast-In-Place Concrete for coordination with construction and isolation joints.
2. Section 040001 for masonry control and expansion joint fillers and gaskets.
3. Section 0321313 “Concrete Paving” for coordination with construction and isolation joints.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Qualification Data: For qualified Installer.

F. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

G. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

I. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

J. Field-Adhesion Test Reports: For each sealant application tested.

K. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer[or are below 40 deg F (5 deg C)].
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: (2) two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: (20) twenty years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where sealants are specified to be Nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Dow Corning Corporation; 790.
b. Pecora Corporation; 301 NS.
c. Sika Corporation, Construction Products Division; SikaSil-C990.
d. Tremco Incorporated; Spectrem 1
2. For use on vertical building applications were the joint does not receive paint.

B. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 790.
   b. Pecora Corporation; 301 NS
   c. Tremco Incorporated; Spectrem 800.
2. For use on interior floor surface joints.

C. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant (Option 1): ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Corning Corporation; 786 Mildew Resistant.
   b. Tremco Incorporated; Tremsil 200 Sanitary.
2. For use between all plumbing fixtures and adjacent wall surfaces including but not limited to toilets, urinals and wall mounted lavatories.

D. Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant (Option 2): ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Pecora Corporation; 898.
   b. Or equal.
2. For use on all joints between counters, trim, and interior surfaces not scheduled to receive paint.

2.3 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Bostik, Inc.; Chem-Calk 600.
   b. Pecora Corporation; AC-20+.
   c. Tremco Incorporated; Tremflex 834.
2. For use on all joints between counters, trim, and interior surfaces not scheduled to receive paint.

2.4 URETHANE JOINT SEALANTS

A. Urethane Horizontal Joints: Multicomponent, self-leveling, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Meadows, W. R., Inc.; POURTHANE.
   b. Pecora Corporation; Urexpan NR-200.
   c. Sika; Sikaflex-2c SL.
   d. Tremco Inc.; THC-901.

e. Or approved equal

2. Extent of Use: Exterior joints in horizontal surfaces and exterior slabs on grade, concrete sidewalks, and pool decks.

B. Urethane Vertical Joints, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Pecora Corporation.
   b. Sika Corporation; Joint Sealants.
   c. Tremco Incorporated.
   d. Or approved equal
2. Extent of Use: Exterior and interior joints subject to painting

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean, porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Concrete.
   b. Masonry.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
   a. Metal.
   b. Glass.
   c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:
   1. Exterior and interior standard steel doors and frames.

B. Related Requirements:
   1. Section 087100 "Door Hardware for door hardware for hollow-metal doors.
   2. Section 088001 “Glazing” for glazing installed in hollow metal doors and frames
   3. Section 099001 “Painting” for field painting of hollow metal doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.

2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule. SUBMITTALS NOT FOLLOWING THE REFERENCE NUMBERS, TYPES AND HARDWARE SETS INDICATED IN THE DOCUMENTS WILL BE RETUNRED WITHOUT REVIEW.

1.7 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. DE LA FONTAINE.
4. Fleming Door Products Ltd.; Assa Abloy Group Company.
5. Or approved equal

2.2 STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
   1. Doors:
      a. Type: As indicated in the Door and Frame Schedule.
      b. Thickness: 1-3/4 inches (44.5 mm).
      c. Revise "Face" Subparagraph below if embossed or textured faces are required.
      d. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180)] coating.
      e. Edge Construction: Model 1, Full Flush and Model 3, Stile and Rail.
      f. Edge Bevel: manufacturer's standard beveled or square edges.
      g. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
      h. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
      i. Core: Polyurethane
   2. Frames:
      a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053-inch (1.3 mm), with minimum A60 (ZF180) coating.
      b. Construction: Full profile welded.
   3. Exposed Finish: Prime

2.3 BORROWED LITES

A. Fabricate of metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm.

B. Construction: Full profile welded.

2.4 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.5 FRAME ANCHORS

A. Jamb Anchors:
   1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
   2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).

3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

2.6 MATERIALS

A. Glazing: Comply with requirements in Section 088000 "Glazing."

2.7 FABRICATION

A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 LOUVERS

A. Provide louvers if indicated for doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
   1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
      a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
      b. Install frames with removable stops located on secure side of opening.
   2. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
   3. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors.
   4. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
      a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
      b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
      c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
      d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
   1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections of the installations including the door hardware and to furnish reports to Architect prior to requesting an punchlist inspection.

B. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

C. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes access doors and frames for walls and ceilings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Product Schedule: For access doors and frames.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Acudor Products, Inc.
   2. Babcock-Davis.
   3. Dur-Red Products.
   4. JL Industries (a division of Activar Construction Products Group).
   5. Karp Associates, Inc.
   6. Larsen's Manufacturing Company.
   7. Milcor Inc.
   8. Nystrom, Inc.
   9. Or approved Equal

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges
   1. Description: Face of door flush with frame, with exposed flange and concealed hinge.
   2. Locations: Wall and ceiling

3. Door Size: As required to provide access to service equipment, valve, drain down, test location, etc.
4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch (1.63 mm), 16 gage, factory primed.
5. Frame Material: Same material, thickness, and finish as door
6. Latch and Lock: Cam latch, hex-head wrench operatedCopy first paragraph below and re-edit for each product.

2.3 MATERIALS

A. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

B. Frame Anchors: Same material as door face.

C. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Latch and Lock Hardware:
1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

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SECTION 083313 - COILING COUNTER DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Counter door assemblies.

B. Related Requirements:

   1. Section 06100 "Rough Carpentry" for door-opening framing and corner guards.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of coiling counter door and accessory.

   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

   1. Include plans, elevations, sections, and mounting details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

   1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coiling counter doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain coiling counter doors from single source from single manufacturer.

1. Obtain operators and controls from coiling counter door manufacturer.

2.2 COUNTER DOOR ASSEMBLY

A. Counter Door: Coiling counter door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Cookson; a Cornell/Cookson company.
b. Cornell; a Cornell/Cookson company.
c. McKeon Door Company.
d. Overhead Door Corporation.
e. Or approved equal

B. Door Curtain Material: Galvanized steel

C. Door Curtain Slats: Flat profile slats of 1-1/2-inch center-to-center height.
1. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

D. Bottom Bar: Shall consist of a single steel angle not less than 1½” x 1½” formed to fit slats.

E. Guides: Each guide assembly shall be fabricated of a minimum 1/8” steel angles and channels formed to a box type configuration.

F. Mounting Brackets: Fabricated of hot rolled 1/8” steel plate minimum, brackets shall be provided to house ends of the counterbalance barrel assembly.

G.

H. Hood: Shall be provided to entirely enclose curtain and counterbalance barrel assembly. Hood shall be fabricated 22 gauge G90 galvanized steel and designed to match brackets. Top and bottom shall be bent and reinforced for stiffness.

I. Counterbalance Assembly: Counter shutter shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.

J. Finish: After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for powder coat adhesion. Provide powder coat finish of color as selected by architect from manufacturer's standard RAL powder coat selection chart.

2.3 DOOR CURTAIN MATERIALS AND FABRICATION

A. Door Curtains: Fabricate coiling counter door curtain of interlocking metal slats in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

2.4 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Galvanized Steel: Nominal 0.028-inch- (0.71-mm-) thick, hot-dip galvanized-steel sheet with G90 (Z275) zinc coating, complying with ASTM A653/A653M.

2.5 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.

C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.2 INSTALLATION

A. Perform installation using only factory approved and certified representatives of the counter shutter manufacturer.

B. Install counter shutter assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.

C. Adjust counter shutter installation to provide uniform clearances and smooth non-binding operation.

3.3 PROTECTION AND CLEANING

A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

B. Remove, repair or replace materials which have been damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SECTION 083313

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes new coiling door at building entry.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.

C. Samples for Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For: Installer

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: As indicated on Structural Drawings.
2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
3. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.

2.3 DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cookson; a CornellCookson company.
   b. Cornell; a CornellCookson company.
   c. McKeon Door Company.
   d. Overhead Door Corporation.
   e. Raynor Garage Doors.

f. Or approved equal

2.4 MATERIALS

A. Curtain: Shall be assembled of G90 galvanized steel interlocking slats, cold rolled. Slats shall have endlocks locking each end of alternate slats to act as a wearing surface and maintain slat alignment. Curtain shall be 20 gauge minimum.
1. Slats: Shall be of a cross section not less than 3" wide by 7/8" deep.

B. Bottom Bar: Shall consist of two (2) angles, each not less than 2" x 2" x 1/8" steel formed to fit slats.

C. Guides: Each guide assembly shall be fabricated of a minimum 3" x 3" steel support angle, a 2" x 3" inner guide angle and a 3" x 3" outer guide angle.
1. Provide removable full height neoprene weather stripping on each guide assembly.

D. Mounting Brackets: Fabricated of hot rolled 3/16” steel plate minimum, brackets shall be provided to house ends of the counterbalance barrel assembly.

E. Hood: Shall be provided to entirely enclose curtain and counterbalance barrel assembly. Hood shall be fabricated 22 gauge G90 galvanized steel and designed to match brackets. Top and bottom shall be bent and reinforced for stiffness.
1. Provide a neoprene air baffle located within the hood to limit air infiltration through the top of the coiling curtain.

F. Counterbalance Assembly: Coiling service door shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.

G. Finish: After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for powder coat adhesion. Provide powder coat finish of color as selected by architect from manufacturer’s standard RAL powder coat selection chart.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.

C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.2 INSTALLATION

A. Perform installation using only factory approved and certified representatives of the coiling service door manufacturer.

B. Install coiling service door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.

C. Adjust coiling service door installation to provide uniform clearances and smooth non-binding operation.

3.3 PROTECTION AND CLEANING

A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

B. Remove, repair or replace materials which have been damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 08 39 25 – FLOOD DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. **Single Swing half door and Paired Swing with removable mullion**
2. Door Hardware.

B. Related Sections:

1. Division 03 – Cast-In-Place Concrete.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation instructions.

B. Shop Drawings: Provide shop drawings showing layout, profiles, and product components, including anchorage, hardware, and finishes. Include dimensional plans, applicable material specifications, elevations and sections detailing mounting and connections, and load diagrams.

1. Contractor to provide manufacturer with field measurements and mounting structure prior to commencement of shop drawings.

1.4 CLOSEOUT SUBMITTALS

A. Provide Operation and Maintenance data to include methods for maintaining installed products, precautions against cleaning materials and methods detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer must demonstrate a minimum of five (5) years successful experience in design and manufacture of similar flood related closures. Upon request,

provide supporting evidence including list of installations, descriptions, name and method of contact.

B. Minimum Qualifications: Manufacturer must demonstrate compliance and certification of a Quality Management System administered by the International Organization for Standardization (ISO). Documentation of current certification status to be provided upon request.

C. Welder Qualifications: Welders Certified in accordance with American Welding Society Procedures for applicable material used in production of specified product.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging container with identification markings intact until ready for installation.

B. Protect materials from exposure to moisture during storage.

C. Store materials in a dry, warm, ventilated weathertight location. If outdoor storage is required, block materials to store at an incline, to prevent pooling of any moisture and promote runoff. Tarp materials in a tent-like arrangement, elevated above the product with open sides to allow airflow. Store loose or high value components in a dry, controlled environment.

D. Use caution when unloading and handling product to avoid bending, denting, crushing, or other damage to the product.

E. When using forklifts, use forks of proper length to fully support product being moved. Consult "Approved for Construction" drawings or consult with factory for proper lift points.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's indicated limits.

1.8 COORDINATION

A. Conduct site survey and provide to flood door manufacturer, prior to manufacturer’s commencement of shop drawings, the actual site conditions of the mounting location, to include; material type, dimensions and configuration, interferences with mounting surface, or any other condition that may impact the ability of the flood door to be properly installed.

B. Coordinate work with other operations and installation of adjacent materials to avoid damage.

1.9 WARRANTY

A. Manufacturer’s Standard Warranty: Product to be free from defects in material and workmanship for a period of one (1) year from date of shipment.

PART 2 - PRODUCTS

A. Design flood resistance doors to support, solely or in combinations of, temporary super-imposed live loads as indicated below. All applied types of flood related loadings are transferred from the flood product barriers, solely or in combinations of, by mullion anchorage to structural floor slabs and/or jamb anchorage and direct pressure contact to structural walls or other structural elements.

1. Hydrostatic Loading
2. Hydrodynamic Loading
3. Debris Impact Loading
4. Wave Loading (Dynamic/ Non-Breaking or Broken Wave)
5. Wave Loading (Impact/ Breaking Wave – Below & Above DFE)
6. Wind Loading

B. Engineer Code Practices: Engineer flood products to conform to the design requirements that are based on the latest adopted edition of the International Building Code (IBC). LFRD and/or ASD methodologies are applied as appropriate to align with specific project specifications and/or limited published material data.

C. Water Density: 64 pcf, unless otherwise noted on drawings.

2.2 MECHANICAL ROOM FLOOD DOOR WITH FRAME

A. Description: Hinged, Mechanical Room Flood Door including door frame, door panel, threshold, and door hardware.

1. Basis of Design Manufacturer: PS Flood Barriers™, which is located at: 1150 S. 48th Street, Grand Forks, ND 58201; Toll Free Tel: 877.446.1519; Email: 4psinfo@psindustries.com; Web: www.psfloodbarriers.com or www.psindustries.com

   a. Basis of Design Product: Model: PD-525.
      1) Double Door at Filter Room Entry
      2) Half-height single door at areaway
2. Other manufacturers providing flood doors include:
   a. Flood Control International https://www.specifiedby.com/flood-control-international
   b. Orange Flood Control https://orangefloodcontrol.com/
   c. Or approved equal

B. Single Source Responsibilities: Obtain all watertight doors and flood protection barriers from single manufacturer.

2.3 EQUIPMENT

A. Products Details:

1. Sealing Requirements: Flood Door and compression gasket design shall provide an effective barrier against short-term high-water situations, to the protection level indicated on drawings.
2. Operation: Provide with latching operable from both sides.
3. Mounting/Load Transfer: Anchor to existing structure. Flood Door designed for specified hydrostatic pressure (and other loads as specified) and will transfer loads to adjacent structure.
4. Frames to be anchored utilizing mechanical, chemical or other framing methods as designed. Manufacturer to include all anchors, water-stop, and sealants, as designed.
5. Loading Direction:

    a. Positive Pressure Loading, (direction of loading against flood door so as to further compress gaskets against flood door frame - "seating".

6. Provide rectangular door opening with square corners to facilitate easy passage.
7. Provide compression gasket which do not require air inflation.

2.4 MATERIALS

A. Flood Door to be fabricated from the following type of material;
   1. Steel: Commercial Quality-Low Carbon structural or formed shapes, tubing, and bars of appropriate size and strength with welded construction.

B. Door Panel to be sheeted with sheeting or plate of the following type;
   1. Steel: Commercial Quality-Low Carbon steel of appropriate size and strength, structurally bonded.

C. Gaskets: Factory mounted, compressible rubber type, field replaceable. Gasket does not require air inflation.
   1. Material: UV resistant EPDM, neoprene and rubber unless otherwise noted.

D. Door Frame to be manufactured of the same material type and finish as door panel. Frame to include jambs, header jamb, and threshold members for field locating and installation on structure. Jamb members to be designed and fabricated with appropriate material as required for the loading.

E. Thresholds to be PS Flood Barriers™ proprietary threshold:
   1. Aluminum: 6000 Series Alloy.
      a. 1-1/8 inch raised threshold.

F. Frame Mounting Hard ware: Provide anchors, sealant, and water stop, as required.
   1. Operating Hardware: Provide hardware appropriate for the size and weight of the flood door and loads. Hardware to be factory located on jambs and door panels, as practical. Latching hardware to be as indicated on drawings. Flood door panel to be factory prepared for applicable latching devices.
   2. Aluminum (AL689 finish) Hinge to be continuous type.
   3. Standard Latching/Locking Hardware: Interior Two-Point Wedge Latch with exterior hasp locking device
   4. Deadbolt latch (Elevation above max design water height only).

G. Finish:
   1. Steel Shop Finish: Apply the following paint system in accordance with manufacturer recommendations and instructions;
      a. Primer: One shop coat of manufacturer's standard shop primer (S-W Kemflash Primer).

H. Labeling: Each watertight door and frame will be individually identified for matched installation.

2.5 FABRICATION

A. Fit and factory assemble items in largest practical sections, for shipment to site.

B. Fabricate items with joints tightly fitted and secured.

C. Supply components required for anchorage of fabrications, unless otherwise noted.

D. Conduct shop operational test with factory installed gaskets to verify flood door assembly components operate as designed and flood protective gasket alignment and contact surfaces interact as intended.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until mounting substrates have been properly prepared.

B. If substrate preparation is the responsibility of another subcontractor, notify Architect of uncompleted preparation before proceeding.

C. Inspect opening for compliance with door manufacturer requirements. Verify open conditions are within required tolerances.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's installation instructions, "Approved for Construction" drawings, shipping, handling, and storage instructions, and product carton instructions for installation.

B. Frames must be installed level, square, plumb, and rigid.

C. Perform light or chalk test for gasket alignment, continuity contact and pre-compression prior to field grouting.

D. Sealants, water-stop, and grouting to be applied per product application directions and in accordance with manufacturer's instructions, and "Approved for Construction" drawings.

E. Field Grouting to be completed by appropriate personnel, and in accordance with product application directions, manufacturer's instructions, and "Approved for Construction" drawings.

F. Tolerances: All dimensional requirements must be in accordance with manufacturer's installation instructions and "Approved for Construction" drawings.

G. Products to be operated and field verified that sealing surfaces maintain contact at the correct sealing points.

H. Inspect gaskets for damage, wear, and adhesion. Replace compromised gaskets immediately.

I. Verify that latching assemblies operate freely and correctly.

J. Verify all anchorage is in accordance with manufacture's installation instructions and applicable data sheets.

K. Inspect installation sealants to ensure a watertight juncture.

3.4 FIELD QUALITY CONTROL

A. Field Testing:
   1. Installer to perform hose test of door to frame in accordance with manufacturer’s standard Hose Test Procedure.
   2. Installer to construct temporary water barrier and test installed flood barrier under hydrostatic conditions.

3.5 CLEANING

A. Touch-up, repair or replace damaged products or components before Substantial Completion.

B. Clean all sealing surfaces.

3.6 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION 083925

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes
   1. Furnish and deliver all finish hardware necessary for all doors, also hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware.

B. Related Sections:
   1. Section 081113 – Hollow Metal Doors and Frames

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:
   1. Cabinets of all kinds, including open wall shelving and locks.
   2. Signs, except as noted.
   3. Toilet accessories of all kinds including coat hooks.

1.3 REFERENCES

A. ICC (CABO)/ANSI A117.1 - Accessible and Usable Buildings and Facilities

B. NFPA - National Fire Protection Association
   1. 80 - Standard for Fire Doors and Fire Windows
   2. NFPA 101 - Life Safety Code

C. Applicable state and local building codes.

D. American with Disabilities Act - 1990 Civil Law

E. Massachusetts Architectural Access Board Regulations

F. Door and Hardware Institute - Sequence and Format for the Hardware Schedule

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
1. Type, style, function, size, and finish of each hardware item.
2. Name and manufacturer of each item.
3. Fastenings and other pertinent information.
4. Location of each hardware set cross-referenced to indications on Drawings.
5. Explanation of all abbreviations, symbols, and codes contained in schedule.
6. Mounting locations for hardware.
7. Name and phone number for the local manufacturer's representative for each product.

D. Key Schedule: After a keying meeting between representatives of the Owner, Architect, and the hardware supplier, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. This schedule can be submitted as a part of the hardware schedule or as a separate schedule.

E. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.

1.5 QUALITY ASSURANCE

A. Substitutions: Products are to be those specified to insure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute, submit that product data attached to product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.
1. Items specified, as "no substitution" shall be provided exactly as listed.
2. Items listed with no substitute manufacturers have been requested by Owner/Architect to match existing for continuity and/or future performance and maintenance standards or because there is no known equal product.
3. If no other products are listed in a category other than the one specified, then "no substitution" is implied.

B. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, which has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an accredited Architectural Hardware Consultant (AHC), who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.

C. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Tag each item or package separately with identification related to final hardware schedule and include basic installation instructions with each item or package.

B. Each article of hardware shall be individually packaged in manufacturer's original container.

C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of the Work will not be delayed by hardware losses both before and after installation.

D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.

E. All the hardware shall be handled at this project in a manner to avoid damage, marring or scratching. Any irregularities that occur to the hardware after it has been delivered to the project shall be corrected, replaced or repaired by the Contractor at their expense. All hardware items shall be protected against malfunction due to paint, solvent, cleanser or any chemical agent.

F. No direct shipments will be allowed unless approved by the Contractor.

1.7 WARRANTY

A. Starting date for all warranty periods to be date of manufacture of that hardware item.

B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper usage or abuse.

C. Provide guarantee from hardware supplier as follows:
1. Closers: Ten years, except electronic closers, two years.
2. Exit Devices: Three years, except electrified devices, 1 year.
3. Hinges: Life of the building.
4. All other Hardware: One year.

D. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer’s warranty, at no additional cost to the Owner.

1.8 WARRANTY

A. Provide manufacturer's warrantees as specified in Division 1 and as follows:
1. Closers: 10 years, except electronic closers, 2 years.
2. Exit Devices: 3 years, except electrified devices, 1 year.
3. Hinges: Life of the building.
4. Continuous Hinges: 10 years.
5. All other hardware: 1 year.

B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.

C. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

1.9 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Approval of manufacturers other than those listed shall be in accordance with paragraph below.

B. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product, or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Substitute
Hinges	Ives (IVE)	Hager, McKinney
Continuous Hinges	Ives (IVE)	Roton, Stanley
Flush Bolts	Ives (IVE)	Burns, Rockwood
Locksets & Deadlocks	Schlage (SCH)	Best, Sargent
Door Closers	LCN (LCN)	Sargent
Door Trim	Ives (IVE)	Burns, Rockwood
Overhead Stops	Glynn-Johnson (GLY)	Rixson, Sargent
Stops & Holders	Ives (IVE)	Burns, Rockwood
Thresholds & Weatherstrip	National Guard (NGP)	Reese, Zero
Silencers	Ives (IVE)	Burns, Rockwood
Latch Protector	Ives (IVE)	Burns, Rockwood
Cylinders & Keying	Schlage (SCH)	

(All items listed above may not be included in the hardware sets)

C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

D. Where the exact types of hardware specified are not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having as nearly as possible the same operation and quality as the type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners
1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint” surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely.
4. All hardware shall be installed with the fasteners provided by the hardware manufacturer.

B. Hinges
1. The following is a guide for hinge type required for this specification:
   a. 1 3/4” doors up to and including 3’-0” wide:
      1) Exterior: heavy weight, ball bearing, bronze/stainless steel 4 1/2” high
   b. Quantity of hinges: Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30” of additional door height.
   c. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
      1) Material: Stainless steel pins
      2) Out-Swing Exterior Doors: Non-removable pins
   d. The width of hinges shall be 4" or as required to clear all trim.
2. Provide 3 hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
3. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Interior Doors: Non-rising pins
4. The width of hinges shall be 4 1/2" or as required for clearance.

C. Continuous Hinges
1. Provide continuous hinges fabricated from 14 gauge, 304 stainless steel, with .25" diameter stainless steel hinge pin.
2. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
3. Hinges shall be capable of supporting door weights up to 600 pounds and shall be successfully tested for 1,500,000 cycles.
4. On fire-rated doors, provide continuous hinges that are classified for use on rated doors by a testing agency acceptable to the authority having jurisdiction.
5. Install hinges with fasteners supplied by manufacturer. Hole pattern shall be symmetrically patterned.

D. Flush Bolts
1. Automatic and manual flush bolts shall have forged bronze face plates with extruded brass levers and with wrought brass guides and strikes. Flush bolts for hollow metal doors shall be extension rod type, and wood doors shall have corner-wrap type. Hollow metal doors up to 7'-6" in height shall have 12" steel or brass rods. Manual flush bolts for doors over 7'-6" in height shall be increased by 6" for each additional 6" of door height. Provide dust-proof strikes where scheduled.

E. Coordinators
1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide a bar-type coordinating device, surface applied to the underside of the stop at the frame head.
2. Finish of the coordinator to be prime coat to receive the same finish paint as the door frame.
3. Provide a filler bar of the correct length for the unit to span the entire width of the opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices if required.

F. Mortise Locks
1. Provide mortise locks certified as ANSI A156.13, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. The lock case shall be multi-function and field reversible for handing without opening the case. Cylinders: Refer to 2.04 KEYING.
2. Provide locks with a standard 2-3/4 inches backset with a full 3/4 inch throw stainless steel mechanical anti-friction latchbolt. Deadbolt shall be a full 1 inch throw, constructed of stainless steel.
3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
4. The lever trim shall be solid brass, bronze, or stainless steel, cast or forged in the design specified, with wrought roses and external lever spring cages. Levers shall be thru-bolted to assure proper alignment and shall have a 2-piece spindle.
5. Lever design shall be Schlage 07A.
6. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.
7. Acceptable manufacturers and/or products: Schlage L9000 series, Best 45H series, Sargent 8200 series.

G. Deadlocks
1. Provide mortise deadlock series conforming to ANSI A156 and function as specified. Cylinders: Refer to 2.04 KEYING.
2. Provide deadlocks with a standard 2-3/4 inches backset. Deadbolt shall be a full 1 inch throw, constructed of stainless steel.
3. Provide manufacturers standard strike.
4. Acceptable manufacturers and/or products: Schlage L400 series, Best 38H series, Sargent 4870 series.
5. Provide electro-mechanical deadlocks by KABA/MAS series X-09 and CDX-09. No substitutions for this project will be permitted.

H. Door Closers
1. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder. Cylinder body shall be 1 1/2” in diameter, and double heat-treated pinion shall be 11/16” in diameter.
2. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C “positive pressure” fire test.
3. Spring power shall be continuously adjustable over the full range of closer sizes and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and back check.

4. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).
5. Closers shall not incorporate a pressure relief valve.
6. Closer cylinders and arms (and metal covers when specified) shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification. For exterior doors and doors that open directly to the parking garage, treat closers with SRI - special rust inhibitor.
7. Door closers meeting this specification:
   LCN 4010/4110 series
   Sargent 280 series (no PRV)

I. Flush Bolts
1. Automatic and manual flush bolts shall have forged bronze face plate with extruded brass lever and with wrought brass guide and strike. Flush bolts for plastic doors shall be extension rod type. Plastic doors up to 7'-6" in height shall have 12" steel or brass rods. Provide dust-proof strikes where scheduled.

J. Push Plates: 8" wide x 16" high x .050" thick. Where door stile does not allow 8" wide plates, 4" wide plates may be used.

K. Door Pulls & Push Bars: Solid bar stock, diameter and length as scheduled. Push bars shall be of sufficient length to span from center to center of each stile.

L. Protection Plates: Provide kick, mop, or armor plates as scheduled, with 4 beveled edges. Furnish with machine or wood screws, finished to match plates. Sizes of plates shall be as follows:
1. Kick Plates - 8" high x 2" LWOD on single doors, 1" LWOD on pairs
2. Mop Plates - 4" high x 2" LWOD on single doors, 1" LWOD on pairs
3. Armor Plates - 36" high x 2" LWOD on single doors, 1" LWOD on pairs

M. Door Stops and Holders
1. It shall be the responsibility of the hardware supplier to provide door stops for all doors in accordance with the following requirements:
   a. Wall stops shall be used wherever possible.
   b. Where wall stops cannot be used, provide dome type floor stops of the proper height.
   c. At any opening where a wall or floor stop cannot be used, a heavy duty overhead stop must be used.

N. Thresholds and Gasketing:
1. Thresholds shall be aluminum beveled type with maximum of height of ½"for conformance with ADA requirements. Furnish as specified and per details. Match finish of other items as closely as possible. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available. Where bar-type weather-strip is used with parallel arm mount closers or overhead stops, install the weather-strip first. Do not notch the weather-strip around the closer shoe or the overhead stop. Where bar-type weather-strip is used with coordinators, install the weather-strip before the coordinator.
2. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural

details. Match finish of other items as closely as possible. Size of thresholds shall be as follows:
a. Saddle Thresholds – 1/4 inch high x jamb width x door width
b. Bumper Seal Thresholds – 1/2 inch high x 5 inches wide x door width

3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Acceptable manufacturers and/or products: National Guard, Reese, Zero.

O. Silencers: "Push-in" type silencers for each hollow metal or wood frame, 3 for each single frame, 2 for each pair frame. Omit where gasketing is scheduled.

2.3 FINISHES

A. Finish of all hardware shall be US26D (BHMA 626/652) with the exceptions as follows:
1. Hinges at Exterior Doors: US32D (BHMA 630).
2. Continuous Hinges: US28.
3. Push Plates, Pulls, and Push Bars: US32D (BHMA 630).
4. Protection Plates: US32D (BHMA 630).
5. Overhead Stops and Holders: US32D (BHMA 630).
6. Door Closers: Powder Coat to Match.
7. Wall Stops: US32D (BHMA 630).
8. Latch Protectors: US32D (BHMA 630).
9. Weatherstripping: Clear Anodized Aluminum.
10. Thresholds: Mill Finish Aluminum.

2.4 KEYING

A. All locks and cylinders shall be construction master keyed and master keyed per the Owner's instructions, with standard interchangeable small format cylinders. Acceptable cylinders, Schlage Sargent, Best

B. Provide 3 keys per lock, 10 construction master keys, and a total of 6 master keys for each group.

C. All master keys shall be delivered directly to the Owner by the hardware supplier, who shall obtain a receipt for delivery of same.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

3.2 INSTALLATION

A. All hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware. For technical assistance, if necessary, installers may contact the manufacturer's rep for the item in question, as listed in the hardware schedule.

B. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.

D. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

F. All operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

G. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint-Sealers."

3.3 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Clean adjacent surfaces soiled by hardware installation.

D. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

3.4 PROTECTION

A. Provide the proper protection of all items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

3.5 HARDWARE SCHEDULE

A. Provide hardware for each door to comply with requirements of Section “Finish Hardware,” hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

B. It is intended that the following schedule includes all items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

3.6 HARDWARE SETS

A. Set A Office
1. Hinges: Continuous
2. Lockset: Office
3. Wall Bumper
4. Closer: Parallel Arm

B. Set B Entry Exterior
1. Hinges: Continuous
2. Lockset: Entry Lockset
3. Closer with hold open.
4. Kick plate on key side
5. Weatherstripping full set
6. Threshold, full width of opening

C. Set C Dutch Door
1. Hinges: Continuous Hinge
2. Lockset: Entry
3. Flush Bolt: Mounted on Upper leaf to connect to lower leaf
4. Wall Bumper; Lower leaf
5. Wall Bumper with Hook and Eye: Upper Leaf
6. Door Pull: Upper Leaf non-key side
7. Weather-stripping: Full set including bottom of upper leaf
8. Threshold, full width of opening

D. Set D: Toilet/Shower Rooms
1. Hinge: Continuous
2. Lockset: Privacy lock with occupancy indicator
3. Auxiliary Lock Class Room Function
4. Kickplate: keyside
5. Door Stop: Wall mounted
6. Closer: Parallel Arm

E. Set E Entry Exterior
1. Hinges: Continuous
2. Lockset: Auxiliary Lock Entry Function
3. Push Plate
4. Door Pull
5. Closer: Parallel Arm Mount
6. Kick plate on room side
7. Weatherstripping full set
8. Threshold, full width of opening

F. Set F Passage
1. Hinges: Continuous
2. Auxiliary Lock- Entry Function
3. Push Plate
4. Door Pull
5. Closer: Parallel Arm Mount
6. Kick plate on key side
7. Door stop with hold open hook

G. Set G Locker Room
1. Hinges: Continuous
2. Push Plate
3. Door Pull
4. Closer: Parallel Arm Mount
5. Kick plate on key side

H. Set H: Padlock
1. Heavy duty padlock with removable core to match locks.

I. Set J: Chain Link Fencing
1. Coordinate Keying of Exit Device with Building Keying
2. Heavy duty padlock with removable core to match locks for off-season security

END OF SECTION 08 71 00

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SECTION 088000 – GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:
   1. Glass for doors
   2. Glazing sealants and accessories.

B. Related Requirements:
   1. Section 081113- Hollow Metal Doors and Frames for doors scheduled to receive glass
   2. Section 102800- Toilet Accessories for mirrors provided as toilet accessories

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

A. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."

1.5 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass the following products; 12 inches (300 mm) square.
1. Low-E Insulating Glass

C. Film Sample: 12 by 12 inch sample of film applied to clear glass

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.8 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass.

B. Product Test Reports: For insulating glass for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranties.

1.9 QUALITY ASSURANCE

A. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, and insulating glass.

B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

C. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

D. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

E. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

F. Safety Glazing Products: Comply with testing requirements in 16 CFR 120 .
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency, acceptable to authorities having jurisdiction.
   2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

   1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers Glazing: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Pilkington, NSG Group
   2. AGC North America
   3. Viracon
   4. Guardian Glass

5. Oldcastle Building Envelope
6. Syracuse Glass Company
7. Vitro Architectural Glass, a PPG Company
8. Or approved equal

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

1. Minimum Glass Thickness for Lites: 6 mm.

2.4 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.

2.5 GLAZING SEALANTS

A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

PART 3 - EXECUTION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

G. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

H. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

I. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

D. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

3.7 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

3.8 GLASS SCHEDULE

A. Glass Type Fully Tempered: Clear fully tempered float glass.
1. Minimum Thickness: 6 mm .
2. Safety glazing required.

END OF SECTION 088000

SECTION 09 33 00 – TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Repairing and Replacing Wall Tile

B. Related work:
   1. Section 102116.19- Plastic Shower and Changing Compartments for coordination of layouts and compartment brackets.
   2. Section 220000- Plumbing for coordination of shower units attached to tile wall.

1.3 SUBMITTALS -TILE

A. Product Data: For each type of tile, mortar, grout, and other products specified.

B. Tile Samples for Initial Selection: Manufacturer's color charts consisting of actual tiles or sections of tiles showing the full range of colors, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving color selection.

C. Grout Samples for Initial Selection: Manufacturer's color charts consisting of actual sections of grout showing the full range of colors available for each type of grout indicated.

1.4 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

1.7 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS PORCELAIN AND CERAMIC TILE

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following, or approved equal:
1. Glazed ceramic wall tile:
   a. American Olean Tile Company, Lansdale PA.
   b. Dal-Tile Corporation, Dallas TX. (Basis of Design)
   c. United States Ceramic Tile Company, Sparta OH.
2. Mortars, adhesives & Grouts:
   a. Bostik Corp. (Hydroment), Middleton MA.
   b. C-Cure Chemical Company, Inc., Houston TX
   c. Custom Building Products, Inc., Seal Beach, CA.
   d. Laticrete International, Inc., Bethany CT
   e. Mapei Corporation, Elk Grove IL.
   f. TEK Special Construction Brands, Inc. (division of HB Fuller), Arlington Heights IL.

2.2 TILE TYPES

A. Porcelain Tile
1. Porcelain tile

a. Glazed Porcelain Tile with slip resistant treatment. Rated for floor, wall and countertop applications.
b. Nominal 4 ¼ by 4 ¼ inch porcelain body, eased-edges. or approved equal.

2. Performance Characteristics ASTM
   a. Water Absorption per ASTM C373: < 0.5%
   b. Breaking Strength per ASTM C648: >275 lbs.
   c. Scratch Hardness per ASTM MOHS: 8.0
   d. Chemical Resistance per ASTM C650: Resistant
   e. Abrasion Resistance per ASTM C1027: 4
3. Colors and Patterns:
   a. Match Existing Tile in Men's Showers

2.3 SETTING MATERIALS -TILE

A. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:

1. Mixture of Dry-Mortar Mix and Latex Additive: Mixture of prepackaged dry-mortar mix and liquid-latex additive complying with the following requirements:
   a. Latex Additive: Acrylic resin.
   b. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.

2.4 GROUTING MATERIALS-TILE

A. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:

1. Mixture of Dry-Grout Mix and Latex Additive: Mixture of factory-prepared, dry-grout mix and latex additive complying with the following requirements:
   a. Sanded Dry-Grout Mix: Commercial portland cement grout complying with ANSI A118.6 for materials described in Section H-2.1, for joints 1/8 inch (3.2 mm) and wider.
   b. Latex Additive: Acrylic resin.

2.5 CRACK TREATMENT AT CONCRETE CONSTRUCTION JOINTS

A. Anti-fracture membrane for crack suppression and substrate crack isolation:
1. Acceptable products include the following, or approved equal:
   a. Mapei product: "Plani/Lastic".
   b. Laticrete product "Blue 92".
   c. Custom Building Products "Crack Buster Pro" or Fracture Free
   d. TEC product 1flex Crack Isolation Membrane.
   e. Bostik Corp. (Hydroment), product "Hydroment Gold".

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayment and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

D. Grout tile to comply with the requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

3.4 WALL TILE INSTALLATION - TCNA NUMBER W244C WITH THIN-SET

A. General: Install in accordance with ANSI A108.5, TCNA installation method number W244C, and as additionally specified herein below. Apply materials in strict accordance with the written instructions and recommendations of setting materials manufacturer.
   1. Setting materials: Latex modified Portland cement (ANSI A118.4).
   2. Grout materials: Acrylic modified Portland cement (unsanded) grout (ANSI A118.6).

B. Install latex modified Portland cement mortar bed to a thickness recommended by manufacturer.

C. Grouting:
   1. Allow tile to fully set prior to grouting; do not grout in less than 24 hours after installation of tile.
   2. Grout tile joints in accordance with ANSI A108.10 and as additionally specified.

3.5 INSTALLATION – GROUT –CERAMIC TILE

A. Remove spacers, ropes, glue, and similar foreign matter prior to grouting.

B. Force the maximum amount of the approved grout into joints in accordance with pertinent recommendations contained in ANSI A108.10.

C. Fill in joints of cushion-edge tile to depth of the cushion; fill joints of square-edge tile flush with the surface.

D. Fill all gaps and skips. Do not permit mortar or mounting mesh to show through grouted joints.

E. Provide hard finished grout, which is uniform in color, smooth and without voids, pin holes, or low spots.

F. Remove all excess grout immediately after installation thereof, wash and rinse tile free from grout film, and tool grout to a uniform density throughout.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09 33 00

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SECTION 09 51 00 – ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes:
   1. Ceilings consisting of acoustical panels and exposed suspension systems.

1.3 SUBMITTALS

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

B. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

C. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

B. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units equal to 2.0 percent of amount installed.
2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
1. Armstrong World Industries, Inc.
2. BPB Celotex Corporation; Architectural Ceilings Marketing Dept.
3. USG Interiors, Inc.
4. Ecophon Certainteed, Inc.
5. or approved qual.

2.2 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.

B. Panel Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3, including those referencing ASTM E 1264 classifications.

2.3 ACOUSTICAL TILE DESCRIPTIONS

A. Nodular, Mineral-Base Acoustical Panels for Acoustical Ceiling Type 1 at Lifeguard and First Aid Space: Where this designation is indicated, provide acoustical panels, complying with the following:

1. Products: Provide the following or approved equal:
2. Armstrong Optima
3. Thickness: 1- inch
4. Size: 24 by 24 inches
5. Color: White

B. Nodular, Mineral-Base Acoustical Panels for Acoustical Ceiling Type 2 at Gender Neutral Toilet and Toilet Shower Spaces: Where this designation is indicated, provide acoustical panels, complying with the following:

1. Products: Provide the following or approved equal:
2. Armstrong Kitchen Zone
3. Thickness: 5/8 inch
4. Size: 24 by 24 inches
5. Color: White

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

2.5 SUSPENSION SYSTEMS DESCRIPTION

A. Suspension System for Acoustical Tile Ceilings:
1. Lifeguard First Aid Ceiling: Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/653M, G01 (Z001) coating designation, with prefinished 9/16-inch- wide metal caps on flanges; other characteristics as follows:
   a. Structural Classification: Intermediate-duty system.
   b. End Condition of Cross Runners: Coupling.
   c. Face Design: Flush face.
   d. Cap Material: Steel sheet
   e. Cap Finish: Painted white
   f. Basis of Design: Armstrong 9/16 inch Suprafine®

2. Gender Neutral Spaces Ceiling: Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
   a. Structural Classification: Heavy-duty system.
   b. End Condition of Cross Runners: Butt-edge type.
   c. Face Design: Flat, flush.

d. Cap Material: Steel or aluminum cold-rolled sheet. Coordinate finish with metal type selected.
e. Cap Finish: Painted White
f. Basis of Design: Armstrong 15/16 inch Prelude®

2.6 ACOUSTICAL SEALANT

A. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

B. Products: Subject to compliance with requirements, provide one of the following:
1. BA-98; Pecora Corp.
2. Tremco Acoustical Sealant; Tremco, Inc.
3. USG Acoustical Sealant
4. or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

3.4 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

3.5 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders and comply with layout shown on reflected ceiling plans.

3.6 INSTALLATION

A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
2. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
3. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
3. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
4. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

3.7 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095100

SECTION 096700 - SEAMLESS QUARTZ FLOORING

PART 1 - GENERAL

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes seamless epoxy surfacing material, integral base, including surface preparation, primers and finish coats. Work includes:
   1. ¼ to 3/8 inch (approximate) floor with high solids top coat for general application.
   2. Work includes
      a. abrasive blasting of existing floor and wall to remove existing paints and coatings in bathhouse
      b. new application on existing concrete floor

B. Related Section:
   1. Division 3 Section “Cast-in-Place Work” for coordination of concrete finishing and epoxy flooring application.
   2. Division 7 Section "Joint Sealants" for sealants installed with epoxy flooring

1.3 SUBMITTALS

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

B. Shop Drawings: Include installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

   1. Control Joint Details
   2. Wall Base Details
   3. Transition Details

C. Samples for Initial Selection: Manufacturer's color plates showing the full range of colors and patterns available.

D. Samples for Verification: For each type, material, color, and pattern of epoxy flooring and accessory required showing the full range of color, texture, and pattern variations expected. Label each epoxy flooring sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

   1. Epoxy: 6-inch- (150-mm-) square Samples.

E. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

F. Qualification Data: For qualified Installer.

G. Material Certificates: For each type of epoxy flooring material or product, from manufacturer.

H. Maintenance Data: For epoxy flooring to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is acceptable to epoxy flooring manufacturer to install manufacturer's products.

B. Source Limitations: Obtain primary epoxy materials from one source from a single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

1.5 DELIVERY STORAGE AND HANDLING

A. Deliver material to job site in clean, clearly labeled containers and inspect prior to start of job.

B. Store material in a dry, enclosed area protected from the elements. Keep temperature of storage area between 60o and 90o F.

1.6 ENVIRONMENTAL REQUIRMENTS

A. Cure new concrete no less than 28 days under good conditions. Follow manufacturer’s guidelines to check concrete substrate for proper readings before proceeding with flooring installation.

B. Verify that substrate is properly equipped with vapor barriers and perimeter drains.

C. Verify supply of adequate utilities, including electric, water, heat (between 60o and 90o F.) and lighting of no less than 80 ft candles measured at floor surface.

D. Free work area of other trades during, and for a period of 24 hours, after floor installation.

E. Protect finished floor from damage by subsequent trades.

1.7 WARRANTY

A. Submit a one-year warranty against defects in material and workmanship upon substantial completion of installation.

PART 2 - PRODUCTS

2.1 BASIS-OF-DESIGN

A. Basis-of-Design Product: Subject to compliance with requirements, provide epoxy flooring by DUR-A-FLEX, INC. or a comparable product by one of the following:
1. DEX-O-TEX by CrossField Products, Corp.
2. Crown Polymers, LLC
3. Tennant Company Eco-Crete System
4. Or approved equal.

B. Standard Flooring: Dur-A-Flex, Inc, Hybri-Flex EQ (self leveling broadcast quartz), epoxy/aliphatic urethane topcoat seamless flooring system.
1. System Materials:
   a. Topping: Dur-A-Flex, Inc, Poly-Crete MD resin, hardener and SL aggregate.
   b. The broadcast aggregate shall be Dur-A-Flex, Inc. Q11 quartz aggregate.
   c. Broadcast: Dur-A-Flex, Inc. Dur-A-Glaze #4, epoxy based two-component resin.
   d. Seal coats: Dur-A-Flex, Inc Dur-A-Glaze #4, epoxy-based, two-component resin.
   e. Top coat: Dur-A-Flex, Inc. Poly-Thane 2HS aliphatic urethane 2 component resin.
2. Patch Materials
   a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to ¼ inch).
   b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Poly-Crete WR.

C. Standard Flooring: Tennant Company Eco-Cree System shall be:
1. 1st Coat: Eco-Crete MF with quartz broadcast
2. 2nd Coat: Eco-MPE with quartz broadcast
3. 3rd Coat: Eco-MPE
4. 4th Coat: Eco-HTS 100

2.2 BASIS OF DESIGN PRODUCT REQUIREMENTS

A. Topping — Poly-Crete SL

1.	Percent Reactive	100 %
2.	VOC	0 g/L
3.	Bond Strength to Concrete ASTM D 4541	400 psi, substrates fails
4.	Compressive Strength, ASTM C579	7,250 psi
5.	Tensile Strength, ASTM D 638	750 psi
6.	Flexural Strength, ASTM D 790	4,400 psi
7.	Impact Resistance @ 125 mils, MIL D-3134,	160 inch lbs
8.	No visible damage or deterioration	

B. Broadcast Coat — Dur-A-Glaze #4 Resin

1.	Percent Reactive,	100 %
2.	VOC	<4 g/L
3.	Water Absorption, ASTM D 570	0.04%
4.	Tensile Strength, ASTM D 638	4000psi

5.	Coefficient of thermal expansion ASTM D 696,	2 x 10^{-5} in/in/F
6.	Flammability ASTM D-635	Self-Extinguishing
7.	Flame Spread/ NFPA 101 ASTM E-84	Class A

C. Topcoat — Poly-Thane 2 HS

1.	VOC	320.8 g/L
2.	60 Degree Gloss ASTM D523	90+
3.	Tensile strength, ASTM D 638	7,000 psi
4.	Elongation ASTM D2370	9%
5.	Abrasion Resistance ASTM D-460	10 mg loss
6.	CS 17 1,000 gm load, 1,000 cycles	
7.	Potlife @ 68 F	2 hours
8.	Dry properties, 72°F, 50% R.H.	6-8 hours
9.	hard Dry	12 hours
10.	Full Chemical resistance	7 days

2.3 PRODUCT MIXING

A. Mix on site with manufacturer supplied mixing and measure apparatus to ensure a timely, accurate mix ratio and minimize waste.

PART 3 - EXECUTION

3.1 INSPECTION

A. Moisture Testing: Perform anhydrous calcium chloride test ASTM F 1869-98.
   1. Perform three tests for the first 1,000 sf and then one test per 1,000 sf after that.
   2. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 12 lbs/1,000 sf/24 hrs.
   3. If the vapor drive exceeds 12 lbs/1,000 sf/24 hrs provide a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.

3.2 PREPARATION

A. Create a surface profile with a steel shot blast machine, scarifier, and dust-free diamond grinders for edges. Remove all unsound areas of existing epoxy flooring.

B. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.

C. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges

D. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.

E. Verify that surface is dry and perfectly clean, free of all oil, grease, detergent film, sealers and/or curing compounds.

3.3 INSTALLATION – STANDARD FLOORING

A. General: The system shall be applied in five distinct steps as listed below:
1. Substrate preparation
2. Topping/overlay application with quartz aggregate broadcast.
3. Resin application with quartz aggregate broadcast.
4. Topcoat application
5. Second topcoat application.
6. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
7. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
8. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
9. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping
1. The topping shall be applied as a self-leveling system as specified by the Architect. The topping shall be applied in one lift with a nominal thickness of 1/8 inch.
2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. SL Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using ½ inch "v" notched squeegee, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a loop roller.
6. Quartz aggregate shall be broadcast to excess into the wet material at the rate of 0.8 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

C. Broadcast
1. The broadcast coat resin shall be applied at the rate of 50 sf/gal.
2. The broadcast coat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume and shall be thoroughly blended by mechanical means such as a high speed paddle mixer.
3. Quartz aggregate shall be broadcast into the wet resin at the rate of 0.5 lbs/sf.
4. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Topcoat
   1. The first topcoat shall be squeegee applied with a coverage rate of 50 sf/gal.
   2. The topcoat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume and shall be thoroughly blended by mechanical means such as a high speed paddle mixer.
   3. The first topcoat will be back rolled and cross rolled to provide a uniform texture and finish

E. The second topcoat shall be roller applier with a coverage rate of 300 sf/gal.

F. The finish floor will have a nominal thickness of ¼ to 3/8 inch.

3.4 CLEANING AND PROTECTION

A. Cleaning:

   1. Remove debris and application materials from installation and adjacent areas.
   2. Wash surfaces with cleaner according to written recommendations and manufacturer's written instructions; rinse surfaces with water and allow to dry thoroughly.

B. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that epoxy flooring is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096700

SECTION 09 91 00 - PAINTING *(FILED SUB-TRADE REQUIRED)*

PART 1 - GENERAL

1.1 FILING OF SUB-BIDS

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in with the Awarding Authority at a time and method stipulated in the Bidding Requirements.

B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required in Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.

C. Specific information relating to sub-bidders is set forth in the Bidding and Contract Documents and the Sub-bidders are directed thereto.

D. Sub-bids filed with the Awarding Authority shall be accompanied by a Bid Bond issued by a responsible bank or trust company payable to the *City of Newton* in the amount of five percent of the Bid. A sub-bid accompanied by any other form of bid depository will be rejected.

E. Work to be done under this Section is shown on the Drawings _____

F. The listing of Contract Drawings above shall not limit the Subcontractors responsibility to determine the full extent of his work as required by all Contract Drawings.

G. Include GENERAL CONDITIONS and applicable parts of Section 011000 as part of this Section.

H. Examine all other Sections of the Specifications for requirements, which affect work under this Section whether or not such work is specifically mentioned in this Section.

I. Examine all other Sections of the Specifications for requirements which affect work under this Section whether or not such Work is specifically mentioned in this Section.

J. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to ensure the steady progress of all work under the Contract.

K. Trade Sub-Bid Requirements: None

1.2 SUMMARY

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following: surface preparation and field painting of the following:
   1. Exposed exterior items and surfaces.
   2. Exposed interior items and surfaces.
   3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

4. Items that are factory primed or require back-paint primer that are part of the work of this section includes, but are not limited to:
   a. Metal Fabrications exposed to view
   b. Wood trim
   c. Finish Carpentry
   d. Hollow metal doors and frames
   e. Access Doors

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
   1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
   1. Prefinished items include the following factory-finished components: Light Fixtures
   2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
      a. Furred areas.
      b. Ceiling plenums.
      c. Pipe spaces.
      d. Duct shafts.
   3. Finished metal surfaces include the following:
      a. Anodized aluminum.
      b. Stainless steel.
      c. Chromium plate.
   4. Operating parts include moving parts of operating equipment and the following:
      a. Valve and damper operators.
      b. Linkages.
      c. Sensing devices.
      d. Motor and fan shafts.
   5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Work of this section includes all scaffolding, staging, hoisting, and rigging required to perform the work.

E. Related Sections
   1. Section 05 05 31 - Metal Fabrications for shop priming ferrous metal.
   2. Section 06 16 00- Sheathing for MDO faced ceilings.
   3. Section 06 20 00 – Finish Carpentry for surface preparation.
   4. Section 06 20 13 – Exterior Finish Carpentry for finish and back finishing wood siding
   5. Section 08 11 13- Hollow Metal Doors and frames for shop finish primer
   6. Section 08 31 13- Access Doors for shop finish primer
   7. Section 09 29 00 - Gypsum Board or surface preparation for gypsum board.

8. Divisions 21, 22, 23 and 26: Painting of mechanical and electrical work that is exposed to view.

1.3 SCHEDULE OF PAINT TYPES

A. Exterior and interior paint types are scheduled at the end of this Section. The following types shall be used as follows:
   1. Exterior: (Including Filter and Storage Room
      a. Concrete: Low Lustre
      b. CMU: Low Lustre
      c. Wood: Semi-Gloss, except where deep colors are required.
      d. Plywood: Low Lustre
      e. Ferrous Metal Typical: Exposed to View: Semi-Gloss
      f. Ferrous Metal Not Exposed to View: Low Lustre
   2. Interior:
      a. Concrete: Semi-Gloss
      b. CMU: Semi-Gloss
      c. Gypsum Board: Egg Shell on walls in all public areas.
      d. Gypsum Board Ceilings: Low Lustre
      e. Plaster In All Public Areas: Eggshell
      f. Woodwork: Semi-gloss
      g. Ferrous Metal: Semi-Gloss
      h. Zinc-coated metal: Semi-gloss

1.4 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

   1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
   2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
   3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
   4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
   5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.5 REFERENCES:

A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D 4263 - Indicating Moisture in Concrete by the Plastic Sheet Method.

C. ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

D. International Concrete Repair Institute (ICRI) Guideline No. 03732 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

E. SSPC-SP 1 - Solvent Cleaning.

F. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.

G. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.

1.6 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.

C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Submit Samples on the following substrates for the Architect's review of color and texture only:
   a. Stained or Natural Wood: Provide two 4-by-8-inch (100-by-200-mm) samples of natural- or stained-wood finish on actual wood surfaces.
   b. Ferrous Metal: Provide two 4-inch- (100-mm-) square samples of flat metal and two 8-inch- (200-mm-) long samples of solid metal for each color and finish.

D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.

1. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
   a. Wall Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m) of wall surface.
   b. Small Areas and Items: The Architect will designate an item or area as required.

2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
   a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.

3. Final approval of colors will be from job-applied samples.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1.9 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
   1. ICI Dulux Paints . (ICI).
   2. Benjamin Moore & Co. (Moore).
   3. PPG Industries, Inc. (PPG).
   4. Sherwin-Williams Co. (S-W)
   5. Or approved equal

B. Transparent Wood Finish:
   1. Cabot Stains
   2. Or Approved Equal

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

   1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Match colors indicated by reference to manufacturer's color designations. Basis of design color on Schedule shall be used to match colors by other manufacturers.

D. Colors: Provide color selections made by the Architect. Each room, element, or surface may contain multiple colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
   1. Provide barrier coats over incompatible primers or remove and reprime.
   2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
   3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
   4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
   5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
   1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
   2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
   3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
   1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
   2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
   3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:
   1. Piping, pipe hangers, and supports.
   2. Tanks.
   3. Ductwork.
   4. Insulation.
   5. Motors and mechanical equipment.
   6. Accessory items.

G. Electrical items to be painted include, but are not limited to, the following:
   1. Conduit and fittings.
   2. Switchgear.
   3. Panelboards.

H. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

J. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

3.6 EXTERIOR PAINT SCHEDULE

A. Concrete Nontraffic Surfaces:
   1. Latex System:
      a. Prime Coat: Primer sealer, latex.
         1) S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils (0.203 mm) wet, 3.2 mils (0.081 mm) dry.
      b. Prime Coat: Latex, exterior, matching topcoat.
      c. Intermediate Coat: Latex, exterior, matching topcoat.
      d. Topcoat: Latex, exterior, low sheen.
         1) S-W A-100 Exterior Latex Low Sheen, A12 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

B. CMU Substrates:
   1. Latex System:
      a. Block Filler: Block filler, latex, interior/exterior:
         1) S-W PrepRite Block Filler, B25W25, at 75 to 125 sq. ft. per gal. (1.84 to 3.07 sq. m per liter).
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, low sheen.
         1) S-W A-100 Exterior Latex Low Sheen, A12 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

C. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates:
   1. Water-Based Light Industrial Coating System:
      a. Prime Coat: Primer, water based.
         1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils (0.127 to 0.254 mm) wet, 2.0 to 4.0 mils (0.051 to 0.102 mm) dry.
      b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
      c. Topcoat: Light industrial coating, exterior, water based, semi-gloss.
         1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils (0.064 to 0.102 mm) dry, per coat.

D. Wood Substrates Opaque Finish: Including exposed wood items not indicated to receive shop-applied finish.
   1. Latex System:
      a. Prime Coat: Primer, latex for exterior wood.

1) S-W Exterior Latex Primer, B42, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry, per coat.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss:

1) S-W Solo Acrylic Semi-Gloss, A76 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

E. Plastic Trim Fabrication Substrates: Including architectural PVC, plastic, and fiberglass items.

1. Latex System:

a. Prime Coat: Primer, bonding, water-based:

1) S-W PrepRite ProBlock Latex Primer/Sealer, B57-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss:

1) S-W Solo Acrylic Semi-Gloss, A76 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

3.7 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates:

1. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer sealer, latex, interior:

1) S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils (0.203 mm) wet, 3.2 mils (0.081 mm) dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c. Topcoat: Light industrial coating, interior, water based, eggshell:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

B. CMU Substrates

1. Water-Based Light Industrial Coating System:

a. Block Filler: Block filler, latex, interior/exterior:

1) S-W PrepRite Block Filler, B25W25, at 75-125 sq. ft. per gal. (1.84 to 3.07 sq. m per liter).

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c. Topcoat: Light industrial coating, interior, water based, semi-gloss:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

C. Metal Substrates (Aluminum, Steel, Galvanized Steel, Exposed to View Steel Structure .

1. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer, rust-inhibitive, water based:

1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils (0.127 to 0.254 mm) wet, 2.0 to 4.0 mils (0.051 to 0.102 mm) dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c. Topcoat: Light industrial coating, interior, water based, semi-gloss:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

D. Wood Substrates Opaque Finish: Including exposed wood items not indicated to receive shop-applied finish.
   1. Latex System:
      a. Prime Coat: Primer sealer, latex, interior:
         1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.
      b. Intermediate Coat: Latex, interior, matching topcoat.
      c. Topcoat: Latex, interior, semi-gloss:
         1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat.

E. Gypsum Board Ceiling Substrates:
   1. Latex System:
      a. Prime Coat: Primer bonding, water-based.
         1) S-W PrepRite ProBlock Latex Primer/Sealer, B57-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, low-sheen.
         1) S-W A-100 Exterior Latex Low Sheen, A12 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

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SECTION 101423.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes
   1. Room-identification signs that are directly attached to the building.

1.2 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.3 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For room-identification signs.
   1. Include fabrication and installation details and attachments to other work.
   2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
   3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
   1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
   1. Room-Identification Signs: Full-size Sample.

E. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Deterioration of finishes beyond normal weathering.
      b. Deterioration of embedded graphic image.
      c. Separation or delamination of sheet materials and components.

PART 2 - PRODUCTS

2.1 ROOM-IDENTIFICATION SIGNS

A. Basis of Design Manufacturer – Raised, Melamine Plastic Signs “Graphic Blast MP)
   1. Best Sign Systems, 1202 N. Park Ave., Montrose, CO 8140; Telephone 1-800-235-2378; Fax 1-970-249-0223; E-mail sales@bestsigns.com

B. Signs shall have the following characteristics:
   1. Tactile characters/symbols shall be raised 1/32 inch from sign plate face for ADA compliance.
   2. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable
   3. unacceptable.
   4. Text on signs needing to comply with ADA shall be accompanied by Grade 2
   5. braille.
   6. All letters, numbers and/or symbols shall contrast with their background – either light characters on a dark background or dark characters on a light background
   7. Characters and background shall have matte finish.

2.2 Material

A. Sign material shall consist of melamine plastic approximately 1/8-inch-thick, with background painted a contrasting color.

B. Lettering font style shall be sans-serif and selected by Architect, upper case letters.

C. Sizes of letters and numbers shall comply with sample graphics indicated on the Drawings.

D. Letters and numbers shall be centered on sign.

E. Grade 2 braille shall be placed directly below last line of letters or numbers.

F. Corner Style, Square

G. Frame/Border: None

2.3 SIGN SIZE

A. Signage shall be proportionally sized based on the text and graphics, or as indicated in this Section

2.4 SIGN SCHEDULE

A. Provide one sign for each room or space scheduled on the drawings including closets, corridors, storage spaces. Each sign shall have name, number and Type II Braille.
1. OFFICE (Provide 2)
2. ALL GENDER TOILET
3. ALL GENDER TOILET/SHOWER with International Symbols- Provide 2
4. LIFEGUARD
5. FIRST AID
6. MEN'S LOCKER ROOM
7. WOMEN'S LOCKER ROOM
8. MEN'S SHOWER
9. WOMEN'S SHOWER
10. STORAGE (PROVIDE 3)
11. CUSTODIAN (PROVIDE 2)

B. Provide 4 no smoking signage with text, international symbol, and Type II Braille; locations to be determined in the field by the Architect and Owner.

2.5 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.
1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive

away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

2.6 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423.16

SECTION 102116.19 - PLASTIC SHOWER AND DRESSING COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Solid-plastic compartments in Men’s Shower Room and new Shower doors mounted directly to CMU partitions and Women’s Shower

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For shower and dressing compartments.
   1. Include plans, elevations, sections, and attachment details.
   2. Retain first subparagraph below if required, or revise to suit Project.
   3. Show locations of cutouts for compartment-mounted accessories.
   4. Show locations of centerlines of drains.

C. Samples for Initial Selection: For each type of compartment material indicated.
   1. Include Samples of hardware and accessories for material and color selection.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
   1. Each type of material, color, and finish required for compartments, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for the Work.
   2. Each type of hardware and accessory.
   3. Curtain Fabric: 12-inch- (305-mm-) square swatch or larger as required to show complete pattern repeat, from dye lot used for the Work, with specified treatments applied. Mark top and face of material.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of shower and dressing compartment.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For shower and dressing compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Clothing Hook: Three (3) clothing hook(s) with associated fasteners.
   2. Fasteners: Twelve (12) fasteners of each size and type.
   3. Curtain Rod: Three (3) curtain rod(s) with associated fasteners.
   4. Curtain Hooks: Twelve (12) curtain hooks.
   5. Soap Holder: Three (3) soap holder(s) with associated fasteners.
   6. Seat: One (1) seat(s) with associated fasteners.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of fixtures, drains, walls, columns, ceilings, and other construction contiguous with shower and dressing compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and the Massachusetts Architectural Access Board Regulations for shower and dressing compartments designated as accessible.

2.2 SOLID-PLASTIC COMPARTMENTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   1. Accurate Partitions Corp.; ASI Group.
   2. General Partitions Mfg. Corp.
   3. Global Partitions; ASI Group.
   4. Knickerbocker Partition Corporation.
   5. Metpar Corp.
   6. Scranton Products

B. Configuration: Shower and dressing compartments As indicated on Drawings.
   1. Standard 3 x 3 showers in shall have two shower curtains to segregate the wet area from the drying area of the shower stall.

C. Enclosure Style: Overhead braced.

D. Panel and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges and with homogenous color and pattern throughout thickness of material.
   1. Color and Pattern: One color and pattern in each room; as selected by Architect from manufacturer's full range] [match toilet compartments specified in Section 102113.19 "Plastic Toilet Compartments"

E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; solid plastic.
   1. Plastic Color and Pattern: Contrast with pilaster, as selected by Architect from manufacturer's full range.

F. Headrail with Hooks: Manufacturer's standard, continuous, extruded-aluminum headrail or cap with curtain hooks running in concealed track; with antigrip profile; in manufacturer's standard finish.

G. Full-Height Brackets (Continuous) Type: Manufacturer's standard design; solid plastic or clear-anodized extruded aluminum.
   1. Plastic Color and Pattern: Contrast with panel, as indicated by manufacturer's designations, Contrast with panel, as selected by Architect from manufacturer's full range.

2.3 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).

C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

D. Stainless-Steel Castings: ASTM A 743/A 743M.

2.4 ACCESSORIES

A. Soap Holder: Surface-mounted, seamless stainless-steel soap dish.

B. Anchorages and Fasteners: Manufacturer's standard, exposed fasteners of stainless steel, chrome-plated steel, or solid brass, finished to match the items they are securing; with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. Use countersunk, flush-type bolt heads or otherwise make fasteners inconspicuous if exposed on opposite side of panel from hardware or accessory item. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.5 FABRICATION

A. Overhead-Braced Compartments: Manufacturer's standard, corrosion-resistant supports, leveling method, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling method.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install compartments rigid, straight, level, and plumb. Secure compartments in position with manufacturer's recommended anchoring devices.
   1. Clearances for Dressing Compartments: Maximum 1/2 inch (13 mm) between pilasters and panels; 1 inch (25 mm) between panels and walls.
   2. Full-Height (Continuous) Brackets for Dressing Compartments: Secure panels to walls and to pilasters with full-height brackets.
      a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
      b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Compartments: Secure pilasters to floor, and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous headrail to each pilaster with no fewer than two fasteners.

C. Curtains: Install curtains to specified length, and verify that they hang vertically without stress points or diagonal folds.

3.2 ADJUSTING

A. Curtain Adjustment: After hanging curtains, test and adjust each track or rod to produce unencumbered, smooth operation. Steam and dress down curtains as required to produce crease- and wrinkle-free installation. Remove and replace curtains that are stained or soiled or that have stress points or diagonal folds.

END OF SECTION 102116.19

SECTION 102123 – PRIVACY CURTAIN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes hospital type privacy curtain mounted between the Lifeguard Room and First Aid Room.

1.3 PERFORMANCE REQUIREMENTS

A. Design Requirements: Provide hospital type privacy curtain to screen opening that is approximately 7’-4” high by 8’-0” wide. Specifications assume a 72-inch curtain suspended on 6-inch carrier chains, leaving an approximately 6-inch gap between the floor and curtain.

1.4 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Shop Drawings: Show installation details and location of each cubicle system.

C. Selection Samples: Full fabric swatch collection.

1.5 DELIVERY STORAGE AND HANDLING

A. Deliver materials in unopened factory packaging.

B. Inspect materials at delivery to verify.

C. Store products in manufacturer's unopened packaging until ready for installation.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Imperial Fastener Company
   2. InPro Corporation
   3. Salsbury Industries
   4. Or approved equal

2.2 MATERIALS

A. Track: Surface mounted hospital cubicle track.
   1. Track: Material: Extruded aluminum, minimum 0.050 inches (1.3 mm) thick; clear anodized finish.
   2. Dimensions: Minimum 3/4 inch high by 1-1/4 inches (32 mm) wide.
   3. Track Attachment: Screw attachment through track or provide manufacturer's hard ceiling support set.
   4. Track Splice: None. Provide continuous length of track.
   5. Provide molded thermoplastic end caps.
   6. Curtain Carriers: Dual wheel style, 2.2 per linear foot (2.2 per 305 mm) plus one.
   7. Chain Extensions: Provide 6-inch chain extensions on the carriers.

B. Curtain:
   1. Curtain Fabric: 100 percent Trevira polyester. Material is flame resistant meeting fire safety test NFPA #701.
   2. Color: Solid color to be selected from Manufacturer's Standard colors.
   3. Top hem: 1 ½ inch wide triple thick double lock stitched.
   4. Side hem: ½ inch wide double thick single lock stitched.
   5. Bottom hem: 1 ½ inch wide double thick double lock stitched.
   6. Vertical Seams: ½ inch wide double turned double lock stitch.
   7. Grommets: Rustproof metal grommets spaced 6 inches O.C.
   8. Height: 72 inches
   9. Width: Sized to cover opening described in Performance Requirement Article of this Section.

C. Tie Back: Provide manufacturer's standard wall mounted tie-back accessory.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

C. Complete all finishing operations, including painting, before installation.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and Architect's drawings.

B. Install track secure, rigid, and true to framed opening.

C. Secure track to head of opening.

D. Slide carriers onto track.

E. Install end cap or other stop device.

F. Install curtains on carriers. Test for smooth operation of curtains.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. Remove debris, and clean surfaces per manufacturer's instructions, upon completion.

END OF SECTION 102123

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SECTION 102813 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes:
   1. Toilet accessories
   2. Infant Care Products
   3. Adult Care Products

B. RELATED SECTIONS
   1. Section 10116.19 - Plastic Shower and Dressing Compartments for mounting and coordination with shower areas and coordination with compartment integral shower rod and hooks

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

B. Samples: For each accessory item to verify design, operation, and finish requirements.

C. Approved full-size Samples will be returned and may be used in the Work.

D. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.

E. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.

F. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.4 QUALITY ASSURANCE

A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

B. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering accessories that may be incorporated into the Work include, but are not limited to, the following:
   1. Toilet Accessories:
      a. ASI-American Specialties (Basis of Design Shower Seats)
      b. Bobrick Washroom Equipment, Inc. (Basis of Design)
      c. Bradley Corporation.
      d. World Dryer, www.worlddrryer.com is an acceptable manufacturer for hand dryers
      e. Or approved equal
   2. Infant-Care Products:
      a. Koala Kare- Bobrick Washroom Equipment, Inc. (Basis of Design)
      b. Bradley Corporation.
      c. ASI American Specialties, Inc
      d. Diaper Deck & Co.
      e. Safe-Strap Company, Inc.
      f. Or approved equal
   3. Adult Care Products:
      a. Max-Ability; https://max-ability.com/ (Basis of Design)
      b. Foundations: https://www.foundations.com/adult-changing-station.html
      c. Or approved equal

B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

2.2 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six (6) keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units' level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

3.3 TOILET ACCESSORY SCHEDULE

A. TBA-1; Grab Bar Toilets: Where this designation is indicated, provide stainless-steel grab bar complying with the following:
1. Products: Bobrick model B.6806 x 42 inch or approved equal.
2. Material: Stainless-Steel Nominal Thickness: 18 gage
3. Mounting: Concealed with manufacturer's standard flanges and anchors
4. Gripping Surfaces: Manufacturer's standard slip-resistant "peened" texture
5. Outside Diameter: 1-1/2 inches (38 mm) for heavy-duty applications

B. TBA-2 – Surface mounted Toilet Paper Dispenser unit : As follows:
1. Supplied by City Vendor Installed by Contractor

C. TBA-3 – Liquid Soap Dispenser
1. Supplied by City Vendor Installed by Contractor

D. TBA- 4 Surface Mounted Paper Towel
1. Supplied by City Vendor Installed by Contractor

E. TBA-5-36 Shower Bar, Hooks and Curtains for Showers with CMU Partitions
   1. Extra-Heavy-Duty Shower Curtain Rod
      a. Basis of Design: Bobrick Model B-6047 x 36.
      b. Length: 36 inches (915mm).
      c. Curtain Rod: 18-8, Type 304, 18 gauge (1.2mm) stainless steel tubing with satin finish.
      d. Outside Diameter: 1-1/4 inches (32mm).
      e. Flanges: One-piece, die-formed, 18-8, Type 304, 20 gauge (1.0mm) stainless steel with satin finish.
   2. Shower Curtain Hooks
      a. Basis of Design: Bobrick Part No. 204-1 Shower Curtain Hook.
      b. Materials: 18-8, Type 304, 0.09-inch (2mm) diameter stainless steel.
      c. Operation: Can be used with 1 inch and 1-1/4-inch (25 and 32mm) diameter rods.
   3. Shower Curtain
      a. Basis of Design: Bobrick Model 204-2.
      b. Width: 42 inches (1065mm), requires 7 hooks.
      c. Basis of Design: Bobrick Model 204-3.
      d. Curtain: Opaque, matte white, 0.008 inch (0.2mm) thick vinyl containing antibacterial and flame-retardant agents; hemmed bottom and sides.
      e. Grommets: Nickel-plated brass, along top edge every 6 inches (150mm).
      f. Height: 72 inches (1830mm).

F. TBA-6- Mirror
   1. Frameless, Stainless Steel Mirrors:
   2. Size: 23-1/2 inches (597mm) W x 35-1/2 inches (902mm) H.
   3. Mirror: 18-8, Type 304, 20 Gauge (0.9mm) stainless steel polished to a No. 8 mirror finish, 1/4-inch (6 mm) return. Four corner countersunk holes to provide flush fit of mounting screws with mirror surface.
   4. Backing: 1/4 inch (6mm) thick tempered Masonite.
   5. Mounting Hardware: Four countersunk sheet metal screws included with unit.

G. TBA-7 – Surface Mounted Waste Receptacle
   1. Basis of Design: Bobrick Classic Series Model B-279.
   2. Reusable Liner: Heavy gauge vinyl, reinforcement for grommet holes at top.
   3. Receptacle: All-welded, 18-8, Type 304 stainless steel with satin finish with four spot-welded interior hooks for attaching the vinyl liner; 22 gauge (0.8mm) one-piece front and sides, 26 gauge (0.5mm) one-piece back and bottom, hemmed top edge, bottom with recessed finger grip.
   4. Reusable Liner: Heavy gauge vinyl, reinforcement for grommet holes at top.
   5. Capacity: 6.4 gallons (24.2 L).
   6. Mount in Compliance with MAAB, 30 inches AFF.

H. TBA-8- 36 - Folding Shower Seat : 36 by 36-inch Showers
   1. Basis of Design: ASI Model 8205 – L or R, L-shaped Folding Shower Seat.
   2. Basic Construction Requirements:
      a. Folding Shower Seat (Handed): Model 8205. Meets MAAB Accessibility Guidelines and needs of physically disabled or elderly. Seat is sponge cushion covered with off-white Naugahyde mounted on 1/2 in (13 mm), marine-grade plywood. Frame, support legs, flanges, bracket are type 304 satin stainless. Reversible self-locking mechanism.

I. TBA- 9-30 Grab Bar Showers: Where this designation is indicated, provide stainless-steel grab bar complying with the following:
   1. Products: Bobrick model B-68616 Two Wall Shower Stall 24 by 36 inch
   2. Material: Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
   3. Mounting: Concealed with manufacturer's standard flanges and anchors
   4. Gripping Surfaces: Manufacturer's standard slip-resistant "peened" texture
   5. Outside Diameter: 1-1/2 inches

J. TBA-10 Diaper-Changing Station: Where this designation is indicated, provide infant-care product complying with the following:
   1. Products: Bobrick model KB-200-01 or approved equal.
   2. Horizontal, Surface-Mounted Unit: Diaper-changing station with surface-mounted, mil-dew-resistant, high-density, molded polyethylene body that folds horizontally against wall when not in use; projects not more than 4 inches (100 mm) from wall when closed; and is engineered to support a minimum of 250-lb (113-kg) static weight when opened. Provide unit with pneumatic shock-absorbing operating mechanism, built-in dispenser for sanitary liners and universal instruction graphics, and safety messages in 6 languages and Braille
   3. Color : Grey

K. TBA-14 Adult- Changing Station: Where this designation is indicated, provide adult changing station complying with the following:
   1. Max-Ability Pressalit Care 3000 Adult Changing Station
   2. Description: Heavy duty aluminum frame with pneumatic counterbalance. Powder lacquered stainless steel mounting brackets and anchors.
   3. Length: 69 inches minimum to 75 ¼ inches
   4. Width: 30 inches minimum
   5. Weight Capacity: 400 lbs.
   6. Fixed height fold away design
   7. Safety Rail: stores and locks under table; aluminum and foam construction; for fold up models provide safety strap
   8. Removeable polyurethane foam mattress

L. TBA-15 - Robe Hook:
   1. Basis of Design: Bobrick Model B-233.
   2. Mounting: Secured from front.
   3. Projection from Wall: 1-1/8 inch
   4. Construction: All welded construction 11 gauge (3.2mm), 18-8, Type 304 stainless steel with satin finish on exposed surfaces.
   5. Configuration: Bar Plate bent and welded to square retainer piece; all edges eased and rounded.
   6. Fasteners: Tamper-resistant, flat-head, hex-socket, stainless steel machine screws.

END OF SECTION 102813

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SECTION 104400 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Portable fire extinguisher.(total of 2)
   2. Mounting Brackets
   3. Signage Related to fire extinguisher
   4. Inspection and tagging of fire extinguishers by certified inspection company.

1.2 SUBMITTALS

A. Product Data: For fire-protection specialties.
   1. Fire Extinguishers: Include rating and classification.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.

1.4 COORDINATION

A. Coordinate size of cabinets to ensure that type and capacity of fire extinguishers are accommodated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 MANUFACTURERS

A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Babcock-Davis.
   b. Guardian Fire Equipment, Inc.
   c. JL Industries, Inc.; a division of the Activar Construction Products Group.
   d. Larsens Manufacturing Company. (BASIS-OF-DESIGN MFGR)
   e. Nystrom, Inc.
   f. Potter Roemer LLC.
   g. Or approved equal

B. Products Descriptions: Subject to compliance with requirements, provide products that meet the descriptive requirements specified in the Fire-Protection Schedule at the end of Part 3.

2.3 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each indicated.
   1. Valves: Manufacturer's standard
   2. Handles and Levers: Manufacturer's standard.
   3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container 10-A:120-B:C, 20-lb (9.1-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

C. Wet-Chemical Type at Concession Area: UL-rated 2-A:1-B:C:K, 20-lb (9.1-kg) nominal, with potassium acetate-based chemical in stainless-steel container; with pressure-indicating gage.

2.4 FIRE-PROTECTION MOUNTING

A. Bracket: Manufacturer’s standard mounting bracket

B. Accessories:
   1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
      a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
         1) Location: Applied to cabinet door.
         2) Application Process: Decals
         3) Lettering Color: Red
         4) Orientation: Horizontal
      b. Provide Fire Extinguisher 3-way sign. Architect will locate in the field. , 2 way sign shall be 4 x 12inch panels with 1 inch flanges on the side. Material shall be 0.060 polystyrene plastic with 7/32 inch holes, one at top and bottom of each flange.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.6 STEEL FINISHES

A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.

B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
1. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for blocking.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing fire-protection specialties.

B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
1. Fasten mounting brackets to structure and cabinets, square and plumb.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust cabinet doors that do not swing or operate freely.

B. Refinish or replace cabinets and doors damaged during installation.

C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion

3.4 FIRE EXTINGUISHER SCHEDULE

1. Type 1
   a. UL Rating: 10A-120B:C
   b. Bracket mount: L-shaped wall bracket with two metal retaining straps with quick release clasps.
   c. 3-Way Signage mounted above extinguisher.
   d. Provide 2 units: One In Lobby and one in lifeguard room.

END OF SECTION 104400

SECTION 105126 – PLASTIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Provide solid plastic lockers.
   1. 3 tiers in bathhouse lobby

B. Provide designated Accessible markings with International Symbol permanently located on the locker door.

C. Related work:
   1. Section 033000- Cast-In-Place Concrete for Concrete Curb supporting lockers.

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.
   2. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. Government:
   1. Massachusetts Architectural Access Board Regulations (MAAB)
   2. U.S. Architectural & Transportation Barriers Compliance Board. Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets for each type of product indicated include fabrication details, description of materials and finishes.

B. Shop Drawings: Include overall locker dimensions, floor plan, elevations, sections, details, and attachments to other work. Include choice of options with details.

C. Samples for Selection: Furnish samples of manufacturer's full range of colors for initial selection.

D. Samples for Approval: Furnish a physical sample of the material in the selected color.

   1. Size: 6 by 6 inch (102 by 102 mm) in type of finish specified.

1.5 INFORMATIONAL SUBMITTALS

A. Installation instructions.

B. Warranty: Sample of special warranty.

1.6 MAINTENANCE SUBMITTALS

A. Operation and Maintenance Data.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 years' experience in the manufacture of plastic lockers.

B. Installers Qualifications: An experienced Installer regularly engaged in the installation of lockers for a minimum of 3 years.

C. Source Limitations: Obtain plastic lockers and trim accessories from single manufacturer.

D. Accessibility Requirements: Comply with requirements of MAAB, ADA/ABA and with requirements of authorities having jurisdiction.

E. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 100 or less.
2. Smoke-Developed Index: 450 or less.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver plastic lockers to the site until the building is enclosed and HVAC systems are in operation. Deliver plastic lockers in manufacturer's original packaging. Store in an upright condition. Protect plastic lockers from exposure to direct sunlight.

B. Ship plastic lockers fully assembled.

C. Lift and handle plastic lockers from the base not the sides.

1.9 WARRANTY

A. Special Manufacturer's Warranty: 20 year against rust, delamination or breakage of plastic parts under normal use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of Bradley Corporation, Menomonee Falls, WI 53051, (800)272-3539, fax (262)251-5817; Email info@BradleyCorp.com; Website www.bradleycorp.com.

B. MATERIALS

1. High Density Polyethylene (HDPE): 30 percent pre-consumer recycled content polyethylene thermoplastic formed under high pressure into solid plastic components.
2. Stainless-Steel Sheet: ASTM A 666, Type 304.
3. Fasteners: Tamper-Resistant Fasteners: Stainless steel torx-head screws.

a. Locker Connectors: No. 10-24 sex bolts.
b. Anchors: Type and size required for secure anchorage.
c. Drilled-in-place Masonry Anchors: Minimum 1/4 by 1-3/4-inch (6 by 44 mm) screws.

C. Tufftec Lockers by Scranton Products is an acceptable manufacturer offering plastic lockers meeting these specifications

2.2 STANDARD PLASTIC LOCKERS

A. Locker Configuration: Three **and** five tiers.

B. Locker Dimensions

1. Height, Nominal: 72 inch (1829 mm) overall.
2. Width:
   a. 18 inches (305 mm) at 3 tiers in Bathhouse
3. Depth:
   a. 18 inches (305 mm) at 3 tiers in Bathhouse

C. Material: HDPE plastic.

D. Sides, Tops, Bottoms, Dividers, and Shelves: 3/8 inch (10 mm) thick HDPE plastic with smooth finish.

E. Locker Tops: Flat top. Top shall extend wall to wall and close gap above end filler panels.

F. Doors: Fabricate from a single piece 1/2-inch (13 mm) HDPE plastic.

1. Doors and Frame: 1/2 inch (13 mm) thick HDPE plastic with matte texture finish with ventilation slots.
2. Handle: ADA/ABA Compliant handle fabricated from injection molded plastic.
3. Locks: Standard hasp**.**

4. Hinges: Continuous piano hinges, .05 inch/18 gauge (1.27 mm) thick type 304 stainless steel fabricated to wrap around edges of door and frame and attached with stainless steel tamper-resistant screws.

   a. Finish: Powder coated to match color of locker.

5. Latch Bar: Full-height latch bar constructed of 1/2-inch (13 mm) HDPE plastic secured to locker with stainless steel tamper-resistant screws.

G. Color: As selected by Architect from manufacturer's full range.

H. Accessories:

1. Coat Hooks: Black polycarbonate double hook.
2. End Panels: 3/8 inch (10 mm) thick, with color and finish matching locker body.
3. Filler Panels: 1/2-inch (13 mm) HDPE filler panel, with color and finish matching locker body, attached with 3/8 inch (10 mm) thick HDPE solid plastic angle bracket.
4. Number Plate: White acrylic with black film coating, laser etched with number specified. Provide one per locker.
5. Locker Base: Concrete base as shown on drawings

2.3 LOCKER FABRICATION

A. Fabricate locker box from a single sheet of HDPE solid plastic with corners fused together. Weld frames and shelves to box assembly. Provide all welded construction of locker parts without dovetail slots or metal fasteners. Add welded gussets in single tier full height lockers.

B. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

C. Hardware Attachment: All hinges, handles, hasps, hooks, latch bars, and locks attached with tamper-resistant screws.

D. Provide ventilated panels where indicated.

E. Filler Panels: Fabricated in unequal leg angle shape; finished to match lockers.

F. Finished End Panels: Fabricated with 3/8 inch (10 mm)**]**wide edge dimension, configured to conceal fasteners and holes at exposed ends of plastic lockers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lockers in climate-controlled environment, shielded from direct sunlight.

B. General: Install on floor or other firm support. Install level, plumb, and true.
1. Attach filler pieces to lockers with male-female sex bolts.
2. Position first locker according to submittal layout. Square and plumb the locker using concealed shims. Secure the locker to the wall at the top and bottom of the locker.

Position second locker next to first, square and plumb to align the tops and bottoms; and temporarily clamp lockers together. Drill four holes through the sides of the lockers and connect lockers using sex bolts provided by manufacturer.

C. Accessories: Fit exposed connections of trim, fillers, and closures together to form tight, hairline joints, with concealed fasteners and splice plates furnished by locker manufacturer. Install as indicated on approved shop drawings.

1. Coat Hooks: Attach with at least two fasteners.
2. Identification Plates: Identify plastic lockers with approved identification numbers. Attach plates to each locker door.
3. Filler Panels: Attach with concealed fasteners.
4. Finished End Panels: Attach at ends indicated.

3.2 FINAL CLEANING

A. Clean locker interior and exterior surfaces.

B. Remove packaging and construction debris and legally dispose of off-site.

END OF SECTION 105126

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SECTION 10 73 00 – ALUMINUM WALKWAY COVERS -SHADE STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Design, fabrication, and installation of welded extruded aluminum walkway covers used as shade structures in the following shapes:
   1. Single slope cantilever
   2. Gable roofs

B. Units shall have integral drainage gutter and downspout system.

C. Units shall be designed to receive future lightweight solar panels weighting between 2 to 5 lbs. per square foot

1.3 REFERENCES

1.4 The Aluminum Association (AA):
   1. The Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. American Architectural Manufacturers Association (AAMA):
   1. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum.
   2. AAMA 2603, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   3. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Society of Civil Engineers (ASCE):
   1. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

D. American Society for Testing and Materials (ASTM):
   1. ASTM B 209, Specification for Aluminum and Aluminum- Alloy Sheet and Plate.
   2. ASTM B 221, Specification for Aluminum and Aluminum- Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   3. ASTM C 150, Specification for Portland Cement.
   4. ASTM C 404, Specification for Aggregates for Masonry Grout.

E. American Welding Society (AWS):
   1. ANSI/AWS D1.2, Structural Welding Code - Aluminum.

1.5 SYSTEM DESCRIPTION

A. Design Requirements:
1. Design Walkways in accordance with The Aluminum Design Manual 2000.
2. Comply with the wind requirements of ASCE 7.
3. Comply with the Massachusetts Building Code 9th Edition.
4. Provide an all welded extruded aluminum canopy system complete with internal drainage. Non-welded systems are not acceptable.
5. Provide expansion joints to accommodate temperature changes of 120 degrees F. Provide expansion joints with no metal to metal contact

1.6 SUBMITTALS

A. Product Data: Manufacturer's product information, specifications, and installation instructions for canopy components and accessories.

B. Shop Drawings: Include plan dimensions, elevations, and details.

C. Design Data: Design calculations bearing the seal of a Registered Professional Engineer, licensed in the state where the project is located. Design calculations shall state that the canopy system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least ten years of experience in the design, fabrication, and erection of extruded aluminum canopy systems.

B. Installer Qualifications: Have canopy installed by manufacturer, third party installation is not acceptable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The design is based on products fabricated by: Peachtree Protective Covers, Inc., 3255 South Sweetwater Rd., Lithia Springs, GA 30122, 770-439-2120, fax 770-439-2122.
1. Comparable products by the following manufacturers also will be acceptable:
2. Dittmer Architectural Aluminum.
3. Avadek Walkway Cover Systems.
4. Or Approved Equal.

B. Design Profiles
1. Sloped, 2 post Cantilevered Bent Structures were indicated.
2. Ridge Vent, 4 post structures were indicated.

2.2 MATERIALS

1. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.
2. Fasteners: Aluminum, 18-8 stainless steel, or 300 series stainless steel.
3. Protective Coating for Aluminum Columns Embedded in Concrete: Clear acrylic.
4. Gaskets: Dry seal santoprene pressure type.
5. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.

2.3 FABRICATION

A. General:
   1. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.
   2. Welding: In accordance with ANSI/AWS D1.2.
   3. Gutter Frame Construction: Factory assemble gutter fascia frames to form a one-piece welded frame. Make welds smooth and uniform using an inert gas shielded arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Gutter frames constructed by mechanically fastening components together are not acceptable.
   4. Deck Construction: Fabricate from extruded modules that interlock in a self-flashing manner. Positively fasten interlocking joints creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each.

B. Beams: Where applicable provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner.

C. Deck: Extruded self-flashing sections interlocking into a composite unit.

D. Gutter Fascia: Where applicable provide “j-shaped” gutter fascia capable in manufacturer’s standard sizes.

E. Fascia: Where applicable provide manufacturer’s standard fascia in standard sizes.

F. Hanger Assemblies: Provide extruded aluminum hanger rods in manufacturer’s standard shapes and sized to meet the loads seen by canopy.

2.4 FINISH

A. Factory Finishing: Finish designations prefixed by AA comply with system established by the AAMA for designating aluminum finishes.

B. High performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer’s written instructions.
   1. Fluoropolymer Two-Coat Coating System: Manufacturer’s standard two-coat, thermocured system consisting of specially formulated inhibitive primer and

fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.2 ERECTION

A. Erect canopy true to line, level, and plumb.

B. Provide hairline miters and fitted joints.

3.3 CLEANING

A. Clean all canopy components promptly after installation.

3.4 PROTECTION

A. Protect materials during and after installation.

END OF SECTION 107301

SECTION 10 73 02 – ALUMINUM WALL HUNG CANOPY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Design, fabrication, and installation of welded extruded aluminum canopy system at new areaway to filter room.

1.3 REFERENCES

1.4 The Aluminum Association (AA):
1. The Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. American Architectural Manufacturers Association (AAMA):
1. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2603, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
3. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Society of Civil Engineers (ASCE):
1. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

D. American Society for Testing and Materials (ASTM):
1. ASTM B 209, Specification for Aluminum and Aluminum- Alloy Sheet and Plate.
2. ASTM B 221, Specification for Aluminum and Aluminum- Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
3. ASTM C 150, Specification for Portland Cement.
4. ASTM C 404, Specification for Aggregates for Masonry Grout.

E. American Welding Society (AWS):
1. ANSI/AWS D1.2, Structural Welding Code - Aluminum.

1.5 SYSTEM DESCRIPTION

A. Design Requirements:
1. Design Walkways in accordance with The Aluminum Design Manual 2000.
2. Comply with the wind requirements of ASCE 7.

3. Comply with the Massachusetts Building Code 9th Edition.
4. Provide an all welded extruded aluminum canopy system complete with internal drainage. Non-welded systems are not acceptable.
5. Provide expansion joints to accommodate temperature changes of 120 degrees F. Provide expansion joints with no metal to metal contact

1.6 SUBMITTALS

A. Product Data: Manufacturer's product information, specifications, and installation instructions for canopy components and accessories.

B. Shop Drawings: Include plan dimensions, elevations, and details.

C. Design Data: Design calculations bearing the seal of a Registered Professional Engineer, licensed in the state where the project is located. Design calculations shall state that the canopy system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least ten years of experience in the design, fabrication, and erection of extruded aluminum canopy systems.

B. Installer Qualifications: Have canopy installed by manufacturer, third party installation is not acceptable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The design is based on products fabricated by: Peachtree Protective Covers, Inc., 3255 South Sweetwater Rd., Lithia Springs, GA 30122, 770-439-2120, fax 770-439-2122.
1. Comparable products by the following manufacturers also will be acceptable:
2. Dittmer Architectural Aluminum.
3. Avadek Walkway Cover Systems.
4. Or Approved Equal.

2.2 MATERIALS
1. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.
2. Fasteners: Aluminum, 18-8 stainless steel, or 300 series stainless steel.
3. Protective Coating for Aluminum Columns Embedded in Concrete: Clear acrylic.
4. Gaskets: Dry seal santoprene pressure type.
5. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.

2.3 FABRICATION

A. General:
1. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.
2. Welding: In accordance with ANSI/AWS D1.2.
3. Gutter Frame Construction: Factory assemble gutter fascia frames to form a one-piece welded frame. Make welds smooth and uniform using an inert gas shielded arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Gutter frames constructed by mechanically fastening components together are not acceptable.
4. Deck Construction: Fabricate from extruded modules that interlock in a self-flashing manner. Positively fasten interlocking joints creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each.

B. Beams: Where applicable provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner.

C. Deck: Extruded self-flashing sections interlocking into a composite unit.

D. Gutter Fascia: Where applicable provide “j-shaped” gutter fascia capable in manufacturer’s standard sizes.

E. Fascia: Where applicable provide manufacturer’s standard fascia in standard sizes.

F. Hanger Assemblies: Provide extruded aluminum hanger rods in manufacturer’s standard shapes and sized to meet the loads seen by canopy.

2.4 FINISH

A. Factory Finishing: Finish designations prefixed by AA comply with system established by the AAMA for designating aluminum finishes.

B. High performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer’s written instructions.
1. Fluoropolymer Two-Coat Coating System: Manufacturer’s standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.2 ERECTION

A. Erect canopy true to line, level, and plumb.

B. Provide hairline miters and fitted joints.

3.3 CLEANING

A. Clean all canopy components promptly after installation.

3.4 PROTECTION

A. Protect materials during and after installation.

END OF SECTION 107301

SECTION 123661.16 SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Solid surface material countertops.

1.3 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:
   1. Countertop material, 6 inches (150 mm) square.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Avonite Surfaces.
      b. E. I. du Pont de Nemours and Company.
      c. Formica Corporation.
   2. Type: Provide Standard type
   3. Colors and Patterns: As selected by Architect from manufacturer's full range.

B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

C. Seale underside of plywood with 2 coats of water-based polyurethane.

2.2 ANGLE SUPPORT FOR COUNTERS

A. Wall mounted support brackets equal to Rakks or equal
   1. Rangine Corporation, 330 Reservoir Street, Needham, Massachusetts 02494; 800-826-6006; www.rakks.com.
   2. Material: Fabricate components from extruded aluminum sections complying with ASTM B221, 6063-T5 alloy and temper.
   3. Factory applied finishes: Exposed aluminum surfaces shall be free of scratches and other serious blemishes and be factory finished with clear anodized coating complying with AAMA 607.1 - MM10C22A31.
   4. Size Counter: Provide Surface Mount EH Counter Support Brackets with Rounded Ends sized for counter depth:
      a. Standard size with rounded ends to meet counter depth.
      b. Brackets at no more than 24 inches O.C.

2.3 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
   1. Grade: Custom.

B. Configuration:
   1. Front: Straight, slightly eased at top
   2. Backsplash: Straight, slightly eased at corner.
   3. End Splash: Matching backsplash

C. Countertops: 3/4-inch- (19-mm-)] thick, solid surface material with front edge built up with same material.

D. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.

E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

F. Joints: Fabricate countertops without joints.

G. Cutouts and Holes:
   1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
      a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.
   2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.4 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten sub-tops to cabinets by screwing through sub-tops into corner blocks of base cabinets. Shim as needed to align sub-tops in a level plane.

D. Secure countertops to sub-tops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

G. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 131100 - GENERAL PROVISIONS FOR SWIMMING POOL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Construction of a two new swimming pools and a spray deck
   1. Lap Pool with zero depth ramp and accessible lift
   2. Zero Depth Pool with zero depth entry, accessible lift, water slide, and water features
   3. Recirculating Spray Deck with filtration system

B. Coordination of excavation and for swimming the pool construction, piping, and related equipment. Hand trimming of excavation as required.

C. Construct monolithic pool tanks including ramps, stairs, and other appurtenances. Pool tanks are a delegated design item.

D. Construction of integral, cast-in-place or precast surge tanks including deck hatches, ladders, and all required appurtenances for new zero depth pool and reconfiguration of existing surge tank for the lap pool.

E. Pool finishes including standard plaster, colored aggregate plaster finish and tile markings.

F. Complete perimeter recirculation gutter systems including provision for zero depth entry, gutter channel and return tube, fiberglass grating, gutter convertors.
   1. Lap pool shall have fully recessed gutters at the racing ends of the pool
   2. A qualified pool subcontractor may design, engineer, and construct a field formed gutter with tile finishes, piping, and grating in lieu of stainless steel gutter system.

G. Filter Basis of Design: Neptune Benson (Evoqa) High Rate Sand Filter systems including all piping, gages, valves, and required appurtenances for a complete system

H. Pool pumps including mounting bases and variable frequency drives (VFD’s).
   1. Provide two pumps for each pool. Pumps shall be sized for entire pool volume and flow rates; pump shall be designated primary and secondary.

I. Complete automatic chemical control systems and sanitation systems for both pools.

J. Ultra Violet (UV) Treatment for the two pools and the spray deck.

K. Permanent swimming pool deck and safety equipment specified in the Documents

L. Swimming Pool Safety Winter Safety Covers

M. Final engineering and design of pool filtration and recirculation equipment.

N. Water Features:
1. Water features as specified
2. Main drains and piping.
3. Feature circulation pump, manifold with control and flow valves, in ground manifold box.
4. Piping between main drains, pump and features

O. The hiring of a Massachusetts licensed surveyor for a gutter survey to confirm that the gutters are installed level and shall provide a wet stamped hydraulic report that the gutter was installed and meets the required volume turnover rate in accordance with 105 CMR 435.00. Grade shots shall be taken at a minimum of 4 feet on center around the perimeter at the gutter lip. Survey is to be performed prior to grouting of the gutter. The Contractor shall use this survey and submit Record Drawings of the installation. See Special Conditions for closeout documents.

P. The Contractor shall arrange and pay all costs associated with filling the pool. This includes connecting to a municipal source that can be metered or trucking in water for the initial fill for the pools. Contractor shall provide all pool chemicals as needed for start-up, testing the system, and training, until Substantial Completion. The chemicals used for start-up shall not be included in the inventory of chemicals being provided to the Owner as part of the Contract. The Contractor shall provide the following Chemicals at Substantial Completion. Ten (10) containers of chlorination pellets, ten (10) containers of acid pellets, and all other chemicals required to operate the pool for a period of four weeks after Substantial Completion. Pool staff training as required and is specified elsewhere in the contract documents.

Q. Refer to the following Sections for detailed descriptions of the Work required for this Contract.
1. 131110 –Swimming Pool Recirculation and Filtration Equipment
2. 131113 – Swimming Pool Construction
3. 131146- Swimming Pool Deck Equipment
4. 131413 – Swimming Pool Water Features and Spray Deck

1.3 REFERENCES:

A. The following references are made related to the Swimming Pool work:
1. NSF: National Sanitation Foundation
2. NSPI: National Spa and Pool Institute.
3. ANSI: American Nation Standards.
4. APSP: The Association of Pool & Spa Professionals
5. ASTM: American Society for Testing and Materials.
   a. ASTMC-581
   b. ASTM Specification D-2150.
6. NEC: National Electric Code (NFPA 70)
7. UL: Underwriters Laboratories.

1.4 SUBMITTALS

A. Refer to requirements as specified in
   1. 131110 –Swimming Pool Recirculation and Filtration Equipment
   2. 131113 – Swimming Pool Construction
   3. 131146- Swimming Pool Deck Equipment
   4. 131413 – Swimming Pool Water Features and Spray Deck

1.5 QUALITY ASSURANCE

A. The swimming pool subcontractor must normally perform swimming pool construction and maintenance with his own employees.

B. The Swimming pool Sub-contractor must have at least ten (10) years experience in the construction of the type of swimming pool and equipment herein specified."

C. The Swimming Pool Sub-contractor must list at least ten (10) public swimming pools containing similar design features. Provide references and phone numbers for verification that the pools have been completed and are operating in a satisfactory manner.

D. The Swimming Pool Sub-contractor must have the ability to provide Performance and Payment Bonds in the amount of 100% of the pools subcontract amount. The Pool Sub-contractor must provide the bonds; bonds issued to the General Contractor on behalf of a pool subcontractor are not acceptable.

E. The Swimming pool Sub-contractor must maintain an in-house service organization to provide pre and post-construction service and design consultation. This Contractor must be staffed with people knowledgeable in the areas of pool construction, equipment filtration system operations and maintenance, have a demonstrable expertise in pool water chemistry. This Company must maintain and inventory of commonly needed spare parts. This Swimming Pool Sub-contractor must have available a system to monitor the effectiveness of the operator's handling of the filtration and chemical equipment, including facilities for water analysis and on-site observation of the operator's methods and competence. The Swimming Pool Sub-contractor shall furnish complete evidence that he has the facilities, equipment, personnel and financial capability to complete all phases of this section."

F. The Swimming Pool Subcontractor must have Certified dry-mix shotcrete Nozzlemen if the dry-mix shotcrete process is used.

G. Other requirements pertaining to Equipment Quality Assurance are specified in:
   1. 131110 –Swimming Pool Recirculation and Filtration Equipment
   2. 131113 – Swimming Pool Construction
   3. 131146- Swimming Pool Deck Equipment
   4. 131413 – Swimming Pool Water Features and Spray Deck

1.6 DELIVERY STORAGE & HANDLING, PROJECT CONDITIONS, WARRANTY, AND EXTRA MATERIALS

A. Refer requirements specified in:
1. 131110 –Swimming Pool Recirculation and Filtration Equipment
2. 131113 – Swimming Pool Construction
3. 131146- Swimming Pool Deck Equipment
4. 131413 – Swimming Pool Water Features and Spray Deck

PART 2 - PRODUCTS

2.1 POOL EQUIPMENT

A. Refer requirements specified in:
1. 131110 –Swimming Pool Recirculation and Filtration Equipment
2. 131113 – Swimming Pool Construction
3. 131146- Swimming Pool Deck Equipment
4. 131413 – Swimming Pool Water Features and Spray Deck

2.2 STARTUP AND ENGINEERING SERVICES

A. Provide the services of an experienced swimming pool operating instructor for a period of not less than three (3) days during the initial start-up. During this period, the Owner's designated representatives shall be thoroughly instructed in all phases of the swimming pools' operation.

B. The Contractor performs the first season start-up and shall train the Owner in conjunction with this start-up. The Contactor shall perform the initial fall shut-down of the swimming pool and train the Owner in conjunction with this shut-down.
1. The fall-shut down includes installation of the pool winter safety covers

C. Videotaping: Training shall be video recorded to capture the demonstration and training. Record each training session separately. It is not the intent of the Project to require a professional videographer; a Contractor employee capable of taking clear, in focus videos can perform the task.
1. Provide adequate lighting.
2. Provide narration.
3. Video shall be converted and submitted on a thumb-drive to the Owner.

EXECUTION

D. Refer requirements specified in
   1. 131110 –Swimming Pool Recirculation and Filtration Equipment
   2. 131113 – Swimming Pool Construction
   3. 131146- Swimming Pool Deck Equipment
   4. 131413 – Swimming Pool Water Features and Spray Deck

END OF SECTION 131100

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SECTION 131110 – SWIMMING POOL RECIRCULATION AND FILTRATION EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Delegated Design: This Section requires the final design and engineering of the pool filtration and recirculation system including accessory water features specified in other Division 13 sections. Sizes indicated within Division 13 drawings and specifications are to be construed as preliminary sizing and must be confirmed by Contractor.

B. Work includes complete filtration and recirculation systems for Lap and Zero Depth Pools including recirculation system for the water features.

C. Provide all swimming pool filtration/recirculation equipment, and necessary work to completely install the specified equipment as indicated on the Drawings and specified herein, including:
   1. Filter systems with all required components
      a. Neptune Benson High Rate Sand Filters
   2. Circulating pumps and motors and VFD's
   3. Piping and valves
   4. Main Drains for filtration, water features, and seasonal drain down connections.
   5. Automatic Chemical Controllers
   6. UV Sanitation System for Lap and Zero Depth Pool
   7. Sanitation
      a. Erosion Chlorine Feeder
   8. Chlorine and pH feed system
   9. pH Balance:
      a. Erosion Acid Feeder
   10. Surge/Balance tank valves, piping and accessories including deck level "tee" valve assemblies, tank hatches, and tank access ladders.
   11. Automatic water level control chambers
   12. Assembly and installation of all equipment
   13. Specialty start-up chemicals
   14. Pipe labels and permanent mounted pool and filter diagrams
   15. Start-up service
   16. Training
   17. First Season Shut Down and Winterization of pools (including training).

D. The work under this section shall include the furnishing and installation of a stainless steel perimeter recirculating gutter system. The system shall consist of an overflow channel filtered

water supply channel, finished edge, drain converters (two at lap pool, three at Family Pool), supply converters and other accessories as listed.
1. Work includes Certification of gutter installation by a licensed surveyor.

E. Coordinate bonding for all equipment within the pool tanks as specified in Section 26 00 00.

F. Coordinate emergency shut-off of pumps with work specified in Section 26 05 26.

G. Design, furnish, and install all required piping to make complete and operable systems.

H. Furnish 3 (three) Sets of Operation/Maintenance Manuals of all equipment and systems. Manuals shall include proper start-up and shutdown procedures. Clearly identify elements associated with the Indoor Pool and the Outdoor Pool.

I. Provide framed and mounted diagram of filter systems, operation and backwash procedures, and piping. Furnish and install number equipment plates, valve tags, and pipe labels to correspond to instructions.

J. Startup Service and pool Winterization Service with instruction to the Owner's shall be given the first season the pool is placed into operation. Training shall be videotaped.

K. Provide complete and coordinated filtration room design based on specific filter system submitted.

L. Shelving and mounting boards made of durable materials required for pool equipment and accessory installation.

M. Coordinate plumbing connection of fresh water line to pool make-up equipment.

N. Provide sidewall drain, valve with "tee" handle and pipe connected from pools to storm to provide off-season run off of rain and snow melt.

1.3 GUTTER PERFORMANCE REQUIREMENTS

A. It is the intent of the specifications that the swimming pool perimeter gutter system channel flow and surface cleaning be maintained under all conditions of operation and that no water be discharged to waste except when backwashing the filters or emptying the pool.

B. The gutter system shall be sized to accommodate a flow capacity equal to 100% of the pool system recirculation rate.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workman who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Obtain filters and gutter system from single manufacturer.

C. Filters: The filter system to be furnished under this Section shall be a pressure type, high rate rapid flow sand system and the product of a manufacturer regularly engaged in the fabrication of filters for at least ten years. The filters shall bear the National Sanitation Foundation (NSF) seal of approval, Standard #50 for sand type filters, and be designed to produce a turnover rate of six (6) hours in the pool.

D. The filter manufacturer shall have factory technicians or factory authorized representatives to provide technical support, service, and maintenance on the filter.

E. The filter system shall be supplied complete by the manufacturer and shall include internals, face piping and valves, gauge panel with tubing and petcocks, sight glass, air relief connection, bottom drain connection with internal strainer.

F. Main Drains shall conform to the entrapment protection standards of the ASME/ANSI A112.19.8 performance standard, or any successor standard regulating such swimming pool drain covers

1.5 PROPRIETARY NAMES

A. Due to the specialized nature of certain components required for this Project, the Specifications, in some instances, refer to various components by trade or manufacturers name.

B. Whenever a proprietary (trade) name is used within this Specification Section, it is used for informational purposes to describe a standard of required function, dimension, appearance and quality. References to materials by trade name, make or model number shall not be construed as limiting competition. It is the intent of the Work to be in full compliance with M.G.L. c.30, 39M (b).

1.6 QUALIFICATIONS

A. Gutter Surveyor: A surveyor licensed in the Commonwealth of Massachusetts shall perform the gutter survey.

1.7 EXAMINATION OF DOCUMENTS

A. The contractor is expected to examine and be thoroughly familiar with all Contract documents and with the conditions under which the work will be carried out. The Owner and designer will not be responsible for errors, omissions and/or charges for extra work arising from the Contractor’s failure to familiarize themselves with the Contract Documents.

1.8 QUALITY ASSURANCE

A. All work in conjunction with this Project as specified herein shall be done under the supervision of a single Contractor who shall have ultimate overall responsibility for the project.

B. Perform work in strict accordance with manufacturer’s instructions.

C. The work of this Section is to be performed by a Contractor having a minimum of twenty (20) years documented experience installing filtration equipment and associated piping and systems for swimming pools having a minimum capacity of 175,000 gallons or more. The Contractor shall submit a list of at least three (3) references for Projects that are similar to the Work of this contract in size, scope and materials. The references shall include the project title, description of work performed, contact person, telephone number and contract amount.

D. Without additional cost to the Owner, provide such other labor, materials and equipment as are required to complete the Work of this Contract in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials, equipment and associated labor are called for elsewhere in the Documents.

E. The Contractor shall furnish a competent Project Superintendent satisfactory to the Owner who shall supervise all Work under this Contract and who shall remain on duty at the site throughout the Contract period while Work is in progress. The Contractor shall arrange for inspection and/or supervision by the manufacturer's representatives as required.

1.9 DELEGATED DESIGN SHOP DRAWING(S)

A. Furnish shop drawing(s) in sufficient detail to show design criteria, calculations, fabrication, installation, and anchorage. Drawing(s) shall include filter room layout, piping diagrams, power wiring diagram and control wiring diagrams for equipment. Drawing(s) shall be stamped by a Professional Engineer licensed by the Commonwealth of Massachusetts.

B. At the conclusion of the work, the Contractor shall provide to the Owner (3) opaque hard copies and (2) copies in pdf format on a CD or thumb-drive, of the final delegated design shop drawings including all of the changes and additions to reflect the work as actually installed.

1.10 SUBMITTALS

A. Filter, Recirculation, and Chemical Control and Feed Equipment
   1. Catalog cuts and product data for each item.
   2. Shop drawings of the items of equipment being provided, indicating the dimensions, material and welding characteristics of the filter tanks, lining, exterior face piping, internal manifolds and laterals, filter media and recirculation system components.
   3. Operating instructions, embracing the operational functions and recurring maintenance processes involved in connection with the complete filtration and chemical treatment system.

B. Gutter Submittals:
   1. Shop drawings for the gutter system installation including; layout, section layout, corner details, line anchor detail and layout, grating detail and grate support layout, converter details and converter locations, piping connections, drains and return fittings; all. dimensions and requirements
   2. Submittal shall be coordinated with Section 131113 including plaster and tile finishes.
   3. Drawings shall also address gutter details at zero depth entry, tops of ramps and tops of stair.

4. Upon request, provide detailed hydraulic calculations showing the gutter channel flow capacity.

1.11 MANUALS AND INSTRUCTIONS

A. A total of three copies of an Operations and Maintenance Manual shall be furnished to the Owner. The manual shall be in an indexed loose-leaf notebook and also provide on thumb drive in an identical PDF Version in digital format. The cover page shall indicate the Contract Title, the Contract Number, and the Site Location. The manual shall include all approved shop drawings and details as well as complete instructions relative to the care and operation of all equipment supplied under this Contract.

B. The manual shall include the following:
1. Table of contents
2. Complete schematic drawings of all systems.
3. Complete wiring diagrams of all electrical/electronic systems.
4. Start-up and shut-down procedures.
5. Winterization Procedures
6. Maintenance, cleaning and replacement of components, filters, trainers, etc.
7. Required lubrication
8. Systems troubleshooting chart(s)
9. Recommended list of spare parts
10. Complete parts list
11. List of manufacturers, along with names, addresses and telephone numbers of recommended repair and service companies.
12. Manufacturer data, indicating where multiple model type and size listings are included, clearly and conspicuously indicate those that are pertinent to this Contract.

1.12 GUARANTEES and WARRANTIES:

A. The Filter System equipment supplier shall guarantee that the equipment to be furnished under this Contract is of the correct capacity, that the various parts are designed to operate correctly and in conjunction with each other, that if the installation is made in accordance with their drawings and operated in accordance with their instructions, the system will perform the prescribed functions correctly. The water entering the pool will be clear, bright, free from suspended matter visible to the unaided eye, will not produce any toxic effect or impart undesirable taste, odors or colors and will be judged sanitary to the satisfaction of all authorities having jurisdiction.
1. Filter manufacturer shall guarantee that backwashing requirements (except during initial start-up and conditioning cycle) shall not be more frequent than once in seven days if the system is operated in accordance with the manufacturers published instructions.

B. Upon completion of the work of this Section, and as a condition of its acceptance, deliver the following warranties to the Owner:
1. Recirculation piping system: One (1) year warranty.
2. The manufacturer shall guarantee the gutter system for a period of five (5) years for materials and workmanship if the system is operated in accordance with written

instructions. The fiberglass grating included with the system shall carry the original manufacturer's warranty for one (1) year.

3. Filter tank internals, valves and accessories: Three (3) year guarantee.
4. Pool pumps and motors: One (1) Year guarantee.
5. Filter tanks: Fifteen (15) year limited non-prorated warranty.

C. In the event of failure of any part or parts during the guarantee periods the affected part or parts shall be replaced promptly upon written notice by the Owner at no expense.

D. The "EQUIPMENT SUPPLIER" shall guarantee that the equipment to be furnished is of the correct capacity, that the various parts are designed to operate correctly and in conjunction with each other, that if the installation is made in accordance with the project drawings and operated in accordance with the suppliers instructions, the system will perform the prescribed functions correctly, the water entering the pool will be clear, bright, free from suspended matter visible to the unaided eye, and will be sanitary to the satisfaction of all authorities having jurisdiction.

1.13 WARRANTY-UV SANITATION

A. A factory trained representative of the manufacturer shall perform all warranty work. Manufacturer to warranty Ultraviolet chamber and Spectra Touch Control panel for a period of 5 years(see requirements) excluding lamps, quartz and seals. Medium pressure Ultraviolet bulbs shall be warranted for a period of 8,000 hours. Intermittently operated lamps (≥ 1 on/off cycles per day) will be replaced free of charge should failure occur prior to 4,000 hours and replacement will be prorated between 4,000 and 8,000 hours.

B. Manufacturer must maintain spare or replacement parts in the USA for same day or no longer than next day delivery in North America, other areas based on expedited delivery available.

C. A Service Agreement (twice per year maintenance) from a qualified factory certified distributor shall be provided to initiate the service in order to maintain the five year warranty.

1.14 HOISTING, SCAFFOLDING AND PLANKING

A. The work to be done under this Section of the specifications shall include the furnishing, set-up and maintenance of all derricks, hoisting machinery, scaffolds, staging, and planking as required for the work.

PART 2 - PRODUCTS

2.1 FILTER SYSTEM MANUFACTURERS

A. Basis- of- Design: Documents are based on equipment of Evoqua Neptune Benson, Inc. and is used for informational purposes to describe a standard of required function, dimension, appearance and quality.

B. Acceptable Filtration Equipment Manufacturers are:

1. Evoqua Neptune Benson, Inc.
2. https://www.evoqua.com/en/evoqua/products--services/filtration-systems/sand-filters/srf/
3. Paddock Pool Equipment, Rock Hill, SC 800-324-1111
   https://www.paddockindustries.com/products/filtration/vertical-pressure-sand-filters-and-high-flow-pressure-sand-filters/
4. ADG Whitten Commercial Pool Equipment Cohoes, NY
   https://www.aquaticgroup.com/products/commercial-pool-equipment/filtration-systems/

C. Filtration System Capacity
   1. Lap Pool Main:
      a. The filter system shall consist of two filter tanks, side by side configuration, with a total effective area of 55.4 square feet. Filtration rate shall not exceed 15 gallons per square foot of filter area. System flow rate shall be 650 gpm in order to turn over a capacity of 234,400 gallons within a six (6) hour turnover period. System is based on Neptune-Benson Model 4872SHFFG 6R – Side by Side Dual Tank Configuration
   2. Zero Depth Pool:
      a. The filter system shall consist of one filter tanks, with a total effective area of 27.7 square feet. Filtration rate shall not exceed 15 gallons per square foot of filter area. System flow rate shall be 385 gpm in order to turn over a capacity of 92,500 gallons within a four (4) hour turnover period. System is based on Neptune-Benson Model 4872SHFFG 6R – single tank.

2.2 FILTER SYSTEM REQUIREMENTS

A. The system shall be supplied complete by the manufacturer and shall include: internals, face piping and valves, gauge panel with tubing and petcocks, sight glass, air relief connection, bottom drain connection with internal strainer.

B. System shall be fabricated and fully assembled at the manufacturer's plant for pressure testing and dimensional verification. System shall be knocked down for shipping purposes in subassemblies for minimum field assembly. (Vertical) Underdrain manifold shall be factory installed and shipped in place; lateral piping is intended to be assembled in the field. (Horizontal) Underdrain manifold and lateral piping manifold shall be factory installed and shipped in place.

2.3 FILTER TANK

A. The filter tank shall be suitable for 50 psi working pressure and hydrostatically tested to 75 psi. All material to be high quality Type A-36 carbon steel or better.

B. All welding shall be performed by qualified operators. Joints shall be butt or fillet welded inside and out by manual or automatic process. Welded joints shall have complete penetration and fusion with little or no reduction of the thickness of the base metal. Welds shall be free of coarse ripples, grooves, overlaps, abrupt ridges or valleys. All welded surfaces shall be chipped and brushed clean, when necessary, leaving no slag or splatter.

C. Drain out system shall consist of a ¾" T304 stainless steel coupling mounted to the bottom of the tank. Each coupling to be fitted with a slotted PVC sand retainer. Air relief connection shall be a ¾" T304 stainless steel coupling provided on top of the tank.

D. Adjustable jack legs shall be used to support the filter tank. Access to the tank shall be provided by a 14" x 18" manhole with two (2) cast or forged curved yokes located in the top of the tank. Manhole seat shall be complete with one piece ¼", neoprene gasket and positioned so that internal pressure from the filter will augment the seat. No additional hardware or through bolts will be allowed.

E. Each filter tank shall be equipped with the necessary flanges and connections for the internal and external piping. All tank connections 2" and under shall be 150 lb. T304 stainless steel threaded full couplings. All tank connections 3" and over, shall be heavy steel flush mounted bosses drilled and tapped on both sides to receive standard flanged fittings.

F. Tank shall be equipped with a UL listed grounding lug

G. Filter Interior Lining

1. All interior surfaces shall be grit blasted to white metal condition with a 3-4 mil profile. Blasted surfaces shall be cleaned of all dust or blast residue. Lining shall be applied as soon as is practical on the same day blasting is done.

2. Flexsol 3000® or manufacturer's equivalent shall be a urethane, 100% solid plural component lining. Hardness shall be 75 durometer on the shore D scale. Break tensile strength shall be 4000 psi with elongation of less than 10%. Adhesion shall be greater than 2500 psi.

3. Application of lining shall be done by experienced applicators using a high pressure, high temperature plural component system. All wetted surfaces including flange faces, manway rings and manway covers shall be lined to 100 mils +/- 10 mils WFT.

4. Hardness shall be verified after curing to ASTM D 2240 standard.

5. Manufacturer shall submit for approval a sample piece of coated steel to determine flexibility, abrasion tolerance and adhesion integrity.

6. Lining shall meet the NSF toxicity standard unconditionally and shall be approved for use with the NSF approved filter.

7. The filter manufacturer shall bear the responsibility for suitability of lining and shall be the sole source for the specified warranty

H. Exterior Filter Coatings

1. Prepared steel surfaces shall be free of weld spatter and fabrication contaminants. Steel surfaces shall be solvent washed and wired brushed to assure complete grease/oil removal.

2. One coat of a high solid epoxy with cross-link polymerization cure shall be applied for a total developed film thickness of 4-6 mils.

3. This factory-applied coating is a base coat only. Manufacturer to supply a min. 32 oz. can of touchup paint. Manufacturer's recommends exterior coating of filter tanks with suitable epoxy. Pool Contractor shall apply a final coat of epoxy paint on filters equal to;
   a. S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

I. Internal Filter Components

1. The filter shall consist of flex tube elements, filter tube sheet, stainless steel lift shaft and internal flow diversion assembly.

2. The filter elements shall be flexible tubes that provide the support structure for the media. The outer wall of each element shall be fabricated of multi-filament high strength polyester braid. Each element shall have an internal T304 stainless steel spring, which acts a support structure for the braided filament.

3. The filter element tube sheet shall be fabricated of T304 stainless steel and provide both support for the top of the element assembly as well as watertight seal to prevent media from escaping the filter tank.

4. The lift shaft shall be fabricated from T304 stainless steel and provide the internal connection between the filter element tube sheet and the external bump mechanism.

5. The filter influent connection shall be fitted with a T316 stainless steel flow diversion assembly to eliminate disturbance to the filter elements during operation.

6. All stainless-steel wetted fasteners shall be Type 304.

7. NOTE: Systems utilizing rigid elements with replaceable filter septum shall not be considered.

J. Filter Internal Piping

1. The internal distribution system shall be a horizontal header/lateral arrangement. The header shall be Schedule 80 PVC construction, capped on one end and flanged on the other end. Lateral connections shall be spaced no more than 6" on the centers and shall be 1½" FPT connections.

2. Underdrain laterals shall consist of 1½" Schedule 80 PVC pipe with .012" wide machined double slotted openings on 1/8" centers. Machined openings shall be designed to retain all media particles as small as .30 mm particle size. Molded or drilled openings or retainer screens will not be acceptable. Each lateral shall be fabricated complete with a socket cap on one end and male adapter on the other. Both fittings to be solvent welded to the slotted pipe. Laterals shall be designed and sized at the factory so as to be installed in the field and cover the entire cross sectional area of the filter. Laterals shall be fitted with a rubber 0-ring to allow for proper positioning of the machined openings.

3. Over drain laterals shall consist of 1½" Schedule 80 PVC pipe with 1/2" wide machined slotted openings on 1 1/4" centers for filter tanks sizes up to 60". Filter tanks 66" up to 120" shall consist of 1½" Schedule 80 PVC pipe with 1/4" wide machine slotted openings on 1 1/4" centers. Over drain laterals shall be designed and sized at the factory so as to provide uniform distribution and unrestricted flow during filter and backwash cycles

4. .All hardware in wetted areas shall be stainless steel or non-metallic.

2.4 FILTER FACE PIPING

A. External face piping shall be Schedule 80 PVC pipe and fittings. Flanges shall be located so as to allow for easy dismantling of face piping. All fittings shall be solvent cemented.

B. Piping shall be drilled and tapped where necessary to accommodate gauge tubing connectors.

C. All valves 3" – 12" shall be constructed with cast aluminum ASTM S12A housing and fully coated with Rilsan on all interior and exterior surfaces. Internal components include EPDM resilient lining, Rilsan coated ductile iron disc and T304 stainless steel shaft. Valves 14" and larger shall be constructed with cast iron housing epoxy coated and with nylon coated ductile iron disc.

D. Standard accessory items shall include sight glass rated for 50 psi with polycarbonate glass, remote mounted gauge panel with two 4½" diameter pressure gauges, ¼" petcocks, ¼" poly vent tubing with PVC compression adapters.

E. Face piping shall be fully factory assembled, knocked down and crated for shipment. The warranty of the face piping shall be provided by the filter manufacturer. Field gluing or assembly of the face piping by anyone other than the filter manufacturer will not be accepted.

F. Face piping arrangement shall be as indicated on the drawing

2.5 AUTOMATIC AIR RELIEF VALVE

A. 1" valve shall be provided to automatically and continuously release air in the filter. The valve shall be fabricated of plastic with Buna-N seals. A plumbing kit shall be provided with two (2) PVC ball valves to allow manual air relief and isolation of the automatic valve. Valves fabricated of cast iron, bronze or stainless steel shall not be acceptable

2.6 SINGLE LEVEL LINKAGE

A. A clevis and rod linkage shall connect the four butterfly valves provided with the face piping. Assembly shall be designed so that filter and backwash cycles can be accomplished by simply raising or lowering the operating handle.

B. Connecting pieces shall vary with size of face piping in order to operate with suitable mechanical advantage.

C. All linkage parts shall be T304 stainless steel.

D. Linkage shall be designed so that all valves operate simultaneously eliminating the possibility of water hammer action. Each valve shall be adjustable to provide for accurate positioning and tight shut off.

E. All linkage components shall be grit blasted to a 1.2 mil profile. Blast media shall be completely non-ferric. F.

F. All linkage components shall be finish coated with 3-4 mils DFT of Type 316 pigmented stainless steel paint.

2.7 THREE (3) WAY VALVE

A. A mechanical linkage shall connect two (2) valves in order to create simultaneous movement.

B. Connecting pieces shall vary with the size of face piping in order to operate with suitable mechanical advantage.

C. All linkage parts shall be T304 stainless steel.

D. Linkage shall be designed so that filter and backwash cycles can be accomplished by repositioning a pair of valves.

E. Each pair of valves shall be operated as specified with lever, gear or electric actuation.

F. All linkage components shall be grit blasted to a 1-2 mil profile. Blast media shall be completely non-ferric.

G. All linkage components shall be finish coated with 3-4 mils DFT of Type 316 pigmented stainless steel paint.

2.8 LEVER OPERATORS DOMINION

A. Valves shall be provided with 6 position latch lock handles.

B. Latch lock handles shall be constructed of epoxy coated cast aluminum and shall include a spring loader lever for position lock.

C. Lever shall be capable of holding the disc in any of the locking positions with no movement up to the full pressure rating of the valve.

2.9 GEAR OPERATORS

A. Valves shall be provided with infinite position gear operators.

B. Gear case (body) shall be constructed of cast iron painted internally and externally for maximum protection.

C. Enclosure shall be sealed to IP65 and maintenance free.

D. Self-locking gearing shall be capable of holding the disc in any position with no movement up the full pressure rating of the valve.

E. Gear operator shall provide 90° of travel with ± 5° adjustment in closed position.

F. Gear operator shall include a non-corrosive sealed indicator for remote visibility.

G. Gear operator shall include manual adjustment capabilities.

2.10 MEDIA

A. Gravel support media of a hard coarse aggregate with a subangular grain shape with a particle size of 1/8" x 1/4" shall be used on the inside of the bottom head to the elevation where the filter media commences. The specific gravity shall not be less than 2.5. Support media shall be placed by hand to avoid damage to the underdrain system and leveled before the addition of the upper layer of filter media. Concrete underfill is not recommended. Support gravel shall be delivered and stored in 100 pound bags (approximately one cubic foot) for ease of handling and elimination of possible contamination. Media shall be free from minerals which may precipitate onto pool surfaces.

B. Sand shall be a carefully selected grade of hard, uniformly graded silica material. Media shall be naturally rounded particles of silica or milled angularly shaped particles of silica quartz. Sand shall have a particle size between .45mm and .55 mm.(#20). No more than 1.5% shall be allowed to pass through a #40 sieve (.0164”). Uniformity coefficient shall not exceed 1.53. Specific gravity to be not less than 2.5. Filter shall contain a minimum bed depth as shown on the drawings. Systems which do not provide a minimum bed depth as shown on the drawings will not be acceptable. Sand shall be delivered and stored in 100 pound bags (approximately one cubic foot) for ease of handling and elimination of possible contamination. Media shall be free from minerals which may precipitate onto pool surfaces.

2.11 FILTER SYSTEM PACKAGING

A. All filter piping and valves shall be factory assembled and knocked down into sub-assemblies for shipment.

B. The components shall be carefully packaged in a totally enclosed wooden crate to prevent damage during transport.

2.12 SINGLE TANK/CELL BACKWASH

A. The backwash system shall be capable of backwashing one filter at a time through sequencing of butterfly valves.

2.13 FILTER VFD'S

A. Variable Frequency Drive (VFD) shall be provided with each filter (one per filter pump) for control of the filter pump motor.

B. The VFD shall include a dial potentiometer to set ramp up/down speed of the filter pump motor.

C. The VFD shall be wired into the RMF controller for on/off and run confirm functions.

D. The VFD shall meet UL standards.

E. The VFD shall be equipped with a bypass. SED2 bypass options shall send the motor to bypass mode based on an easily accessible door-mounted selector or based on the drive's programmable relay. A bypass pilot light shall provide indication of the bypass mode. The bypass mode shall provide overload protection. Contactors shall be electrically and mechanically interlocked. An essential services mode shall send the motor to bypass regardless of the selected mode.

2.14 FILTER FLOW METERS

A. A digital flowmeter shall be included with a 4-20mA 0-10 VDC analog output.

B. The flowmeter shall be wired into the VFD to provide automatic speed control of the filter pump motor.

C. The VFD shall compensate for varying filter head losses by maintaining the specified flowrate with the 4-20mA output signal of the flowmeter.

2.15 CIRCULATING PUMPS AND MOTOR FOR POOL

A. Pumps General:
1. The pump casing shall be ASTM 48, class 30, cast iron capable of hydrostatic test @ 150% of maximum discharge pressure and have replaceable suction wear rings(s). The interior of the pump casing including the influent and effluent connections shall be sandblasted to near white metal per ISO 8501-SaZ.5. The pump casing shall be preheated and lined with Scotchkote 134.
2. The impeller shall be enclosed, single piece cast bronze casting, completely machined on all outside surfaces and statically balanced at time of pump assembly. The impeller shall be keyed to the shaft and securely fastened with a vibration resistant lock screw and washer.
3. The mechanical shaft seal shall have carbon/ceramic mating faces for leak free operation, with stainless steel internal parts.
4. The motor shall be close-coupled type. Motor power supply is 208/230 volt 3-phase. The motor bearing shall be selected to withstand thrust loads and have a minimum life of 100,000 average B-10 hours. Motor shall meet or exceed the minimum full load efficiencies as per NEMA MG-1 Table 12-11.
5. The motor shall be heat treated carbon steel, turned and ground, protected by a bronze sleeve secured to the shaft to prevent rotation. The maximum allowable no-load shaft run-out shall be .002.

6. The impeller shall not contact the suction wear ring under any operating load condition.
7. The pump and motor shall be connected by an ASTM 48, Class 30, cast iron bracket incorporating a full isolating shield with a slinger to prevent moisture from entering.
8. Pump shall carry NSF standard 50 listing.
9. All pumps are self-priming

B. Outdoor Pool Circulating Pump
   1. Furnish and install the horizontal, frame mounted, close coupled, self-priming manufactured by Marlow Series- Prime Line Swimming Pool Pumps described for the following conditions:
      a. Lap Pool
         1) Two Pumps –alternating operation
         2) Flow: 650 GPM
         3) Horsepower: 20 hp
         4) Design Total Head 75
         5) 208/230/460 Volt 3 Phase
      b. Zero Depth Pool
         1) Two Pumps –alternating operation
         2) Flow: 385 GPM
         3) Horsepower: 10 hp
         4) Design Total Head 70
         5) 208/230/460 Volt 3 Phase
      c. Water Slide Flume
         1) Single Pump
         2) Flow: 100 GPM
         3) Horsepower: 5hp
         4) Design Total Head 70
         5) 208/230/460 Volt 3 Phase
      d. Water Feature Pump
         1) Single Pump
         2) Flow: 100 GPM
         3) Horsepower: 5hp
         4) Design Total Head 70
         5) 208/230/460 Volt 3 Phase
   2. Provide Neptune Benson Green Drive VFD with 4 inch B&W Schedule 80 Pipe Digital Flowmeter

2.16 FIBERGLASS OR COMPOSITE HAIR AND LINT STRAINER

A. Provide composite or fiberglass hair and lint strainers at each pump meeting the following requirements:
   1. Unit shall be a single molded unit equal to
      a. Neptune Benson Model: NBBSK08EP with strainer basket 150NBFG85ER1
   2. Have opposing flanged connections for piping
   3. Strainer lid shall be 1" thick transparent acrylic machined to eliminate sharp edges and house securing assemblies. Lid shall be grooved to house rubber gasket. Lid shall be seated with a 1/8", thick full face 40 durometer neoprene rubber gasket. (0-ring gaskets will not be permitted)

4. Provide one (1) stainless steel basket and one (1) spare per each Basket Type Strainer provided. Basket shall be constructed of heavy gage T304 stainless steel frame and mesh with 5/32 INCH perforations and not less than 62% open area. The strainer housing shall be equipped with a valved bottom drain for winterization purposes.
5. Strainer basket shall have a welded intermediate curved baffle to reinforce the basket and capture extra debris to reduce cleaning frequency.
6. Unit shall include a minimum of four (4) securing assemblies to permit easy opening and closure of strainer lid without the use of tools.

2.17 GAGES AND CONTROLS

A. Backwash sight glass: Furnish a full pipe type sight glass for installation on the pipeline carrying backwash water to waste. Such sight glass shall be constructed of corrosion proof materials and capable of withstanding pipeline water pressure without leakage.

B. Gages: Provide 3 ½ inch gauges mounted to identify pump vacuum, pump pressure, filter influent and filter effluent pressure for each pump.

C. Provide flowmeters in filtered water return lines to pools. Meters shall be direct reading analog type calibrated to read in gallons per minute. Flowmeters shall be equal to Signet analog type.

2.18 OPTION 1: WATER CHEMISTRY MONITORING AND CONTROL SYSTEMS

A. Provide an integrated microprocessor- based electronic water treatment control system for each body of water for continuous control of pH, chlorine residual, flocculant feed and monitoring of ORP & temperature. Installation of the system shall be specified by the manufacture and no exceptions shall be allowed. Requests for substitutions for the specified make and model will not be considered unless equal to the specified system in every respect and must be submitted to the specifying agent not less than 10 calendar days prior to bid date.

B. The specified controller is a Blu-Sentinel Pro as manufactured by Evoqua Water Technologies.

C. Controller
1. For operator safety, the controller shall be able to operate from a 24V DC power source.
2. Mains power, 100 – 240 V AC, 50 – 60 Hz can alternatively be used.
3. The controller shall have a 7” graphic color display with backlit LED and resistive touchscreen. The resolution of the display shall be 800 x 480 pixels.
4. The controller shall display all measured values and their four assigned limits on a single home screen.
5. Each measured value shall have the capability of having two minimum and two maximum limits assigned.
6. The controller shall display a trend line diagram for all measurement parameters for up to 60 days.
7. The controller shall display on the main screen if the controller is set in manual, automatic, stop or adaptation.
8. The controller shall be capable of self adjusting the free chlorine residual control point to ensure the ORP will be maintained as specified by the operator. Systems that only monitor

free chlorine residual and do not adjust to a free chlorine residual control point while controlling to an ORP setpoint shall not be considered equal.

9. The controller shall be supplied with a fully integrated flow cell design for precise sample flow regulation past the probes. The flow cell shall be equipped with temperature probe, flow switch, water ground and sample valve.
10. The flow cell assembly shall have continuous hydro-mechanical cleaning of the free available chlorine sensor.
11. The flow cell shall be equipped with an LED light stick capable of changing colors to indicate normal operation, pre-alarm condition and alarm condition.
12. The controller shall have 8 integral relay outputs that shall allow assignment of each alarm output depending on customer preference and needs as well as assignment to feed devices.
13. The relays that are assigned alarm functionality shall be able to be configured as normally open or normally closed, latch or unlatched contact with a fully adjustable delay from 0 to 10 hours.
14. The controller shall have actuator feedback integrated into the main circuit board, which will recognize automatically the manual or automatic position of a V10k actuator.
15. The controller shall be furnished with three standard digital inputs that are open to be assigned to sample water, controller stop, controller constant, mA constant, switch mode, CL2 parameter economy/reduced Flocculation.
16. The connection from the flow cell to the controller shall be a single bus cable connection.
17. An Economic mode shall be integral part of the controller. If for energy conservation the facility wishes to reduce its turnover/flowrate the controller must incorporate the ability to self adjust the pH, ORP and Chlorine setpoints for reduced flow. It shall also reduce the flocculant feed rate when in economic mode.
18. The controller shall have the ability to feed a flocculant as a filtration aid. The flocculant feed shall be bracketed with pH values that will disallow flocculant feed when the pH is operating out of the specified range for such feed.
19. The controller shall have incorporated control algorithms for the metering equipment. This adaptation program shall analyze pool hydraulics, feed equipment capability and automatically set up feed proportioning accordingly. The adaptation feature is an integral part of this system, therefore controllers that do not utilize the adaptation program shall not be considered.
20. The controller shall include a programmable contact that is based on measured water chemistry parameters within an operating range which can be used to activate energy saving modes for the circulation pump and HVAC system if so equipped.
21. The Free Chlorine probe shall be potentiostatic 3-electrode amperometric system with a measuring range 0 to 20 mg/l with a fully selectable scale. Resolution up to 10 mg/l shall be 0.01 mg/l. Resolution up to 20 mg/l shall be 0.1 mg/l with temperature compensation from 0-122 degrees Fahrenheit.
22. The pH and ORP sensors shall be the proprietary Strantrol pH and Strantrol HRR sensors respectively.
23. The controller shall be capable of having on site software updates via connecting an USB stick to an externally mounted USB socket.
24. The controller shall be capable of downloading operational data in an Excel spreadsheet usable format via connecting an USB stick to an externally mounted USB socket.
25. The controller shall include an Ethernet interface to allow visualization of the 7” color display on PC’s, tablet and smart phone via VNC viewer software downloadable in the internet free of charge.

26. The system shall be provided with an illustrated installation, operating and maintenance manual. Drawing and detailed written description of features and operating phases of the control system shall be a part of the operating and maintenance manual.
27. The controller shall carry an eighteen (18) month limited warranty against defects in material and workmanship for all components including electronics and flow cell assembly.

2.19 OPTION 2: DCM 500- ProMINENT FLUID CONTROLS Pittsburgh PA 412-788-7900

A. The controller shall automatically activate the appropriate chemical feeders in order to maintain the sanitizer level within +/ 0.1 parts per million (PPM) or +/ 10 mV (millivolts) of Oxidation Reduction Potential (ORP) and the pH within +/ 0.1 pH unit of the setpoints selected by the operator. All setpoint and calibration levels shall be adjustable with a numeric keypad mounted on the front panel of the unit.

B. The controller shall be capable of actuating all outputs in the following operator selectable modes: off, manual, automatic, proportional and PID control. The controller must be able to interface pulse output chemical feed pumps for true PID control to ensure chemical conservation. The controller shall have ORP, pH, temperature, and free and total chlorine probe for indoor applications. The controller must be capable of controlling a UV systems based on a combined chlorine alarm.

C. The controller must utilize both ORP and PPM control. Controllers that do not have the ability to control simultaneously to ORP and PPM control points shall not be considered. For indoor applications units MUST incorporate probes for real time combined chlorine readings and control of supplemental UV equipment.

D. The controller shall have the capability to operate a UV system via combined chlorine real time readings. Controller shall be programmable to turn UV on and off or ramp power up and down based on combined chlorine reading and programmable alarm settings. Controllers that utilize DPD testing or do not control based on real time combined chlorine levels shall not be considered equal.

E. The controller shall include a temperature sensor and automatic control of the heater

F. The controller shall include standard a flow switch incorporated into the sample line for chemical probes to ensure shut down of chemical feed should there be a no flow conditions top in the recirculation lines. The system must also display via remote communication the status of flow witch and its run time for a 24-hour period.

G. The controller shall continuously calculate and display the Langelier Saturation Index and Ryznar Index using either sensor data and/or manual input for TDS, total alkalinity and calcium hardness.

H. The controller shall be contained in a NEMA Type 4X (rain and splash proof) lockable injection molded cabinet with an lockable enclosure.

I. The controller shall include programmable high and low alarm levels for all sensor inputs and control functions with operator-selectable feed lockout and alarm buzzer. A Remote Alarm relay shall be included in parallel with alarm buzzer for operator-selectable voltage or dry contact

output. The controller shall be standard with e-mail out alerts on alarm activation. The controller shall also email out a user-defined notification if any automatic control feature is deactivate or changed at the site by an operator. Controllers without email notifications shall not be considered equal.

J. The controller shall have standard real-time monitor and control via a smartphone, iPad or tablet device using a 10-base t Ethernet jack, or Wi-Fi router. The HTML server shall be an integral part of the controller. Controllers not having an integral HTML server or interface shall not be considered. The controller shall also be capable of utilizing 3G internet access with optional EVDO provided interface. All communication functions shall function with standard internet browsers. Controllers needing additional software installed shall not be considered.

K. The controller shall have real time monitoring of the heat exchanger corrosion rates and alarm out should corrosion rates exceed standard mil/year erosion rates when supplied with optional LogR package.

L. The controller shall come standard with no less than 7 fully configurable digital inputs

M. The controller shall have 10 configurable analog inputs.

N. The controller shall have a minimum of 5 fully assignable relays. Controllers with less than 5 assignable relays shall not be considered an equal.

O. The controller shall have a minimum of 4 fully assignable digital outputs.

P. The controller shall be supplied at factory on Acrylic backboard.

Q. The controller shall include an optional conductivity sensor.

R. The controller shall include recirculation flow rate via paddle wheel flow sensor. Flow-sensor to be supplied by chemical controller manufacture.

S. The control shall have flashing LED status indication with flashing light notification when in alarm status.

T. The flow cell shall incorporate both a flow switch and flow meter to indicate flow through cell. Controllers not having flow indication shall not be considered.

U. The controller shall come standard with remote monitoring software for both auto polling no less that following:
   1) Routine checking of alarms with e-mail out on alarm detection
   2) Periodic auto downloading of stored data in controller

V. Warranty
   1. The controller shall be covered by a standard manufacturer warranty of five (5) years. Special extensions of more limited warranties shall not be considered acceptable. pH and ORP probes shall be covered by a 2 year warranty all other sensors will be covered by a standard one (1) year warranty. All other ancillary parts and consumables supplied shall be covered by their own manufacturer's warranty or one year whichever is greater. The

controller shall not require a service technician for annual calibration, seasonal start up, or whenever chemicals supplier or type are changed.

2. The manufacturer shall supply a complete instruction, operating and maintenance manual. Check-out of installation, start up, and instruction of operating personnel shall be performed by an authorized and properly trained manufacturer representative.

2.20 SURGE ACCESSORIES

A. Valves Submerged:
   1. Butterfly valves shall be Dominion valves with Rilsan coated body and disc. Valves shall be furnished for main drain shut-off, tank suction shut-off and gutter line shut-off.
   2. Valves shall be suitable for freshwater, saltwater and submerged applications.

B. Valve Extensions:
   1. Valves shall be furnished with stainless steel extension rods to deck surface. Stainless steel deck access sockets with drop-in covers shall be provided for each valve extension. Sockets shall be furnished to deck work contractor for installation in concrete stab over surge tank.
   2. Stainless steel T-Handle operator shall be provided.

C. Stainless Steel YMCA Style Ball Float Valve:
   1. Float operated modulating valve shall be constructed entirely of stainless steel and designed for submerged service.
   2. The housing body shall be fabricated using Schedule 10 T304L stainless steel with ¼" thick standard flanged ANSI 150# bolt pattern vanstone style back up rings. The body shall include a 45° integral diversion elbow. The internal wafer shall be 12 gauge T304L material and positioned with ¼" (±1/16") opening around the perimeter. The body shall also incorporate exterior stop pins constructed of T304L stainless steel to define the allowable range of arm motion. All hardware shall be stainless steel. Close fitting bushings shall be included on the shaft penetrations of the body to provide a seal against water loss and air entrance.
   3. The valves shaft shall be T304L material 1" diameter of appropriate length to house either one or two float arms. Float arms shall securely fasten to shaft using T304L sliding collars to provide adjustability. Arms shall be T304L ½" thick with length as required. The valve shaft shall have welded stop pins to secure to proper positioning of valve wafer.
   4. Ball floats shall be constructed of T304L stainless steel and be 7" in diameter with internal weighting. Floats shall also be adjustable using sliding collars as previously described.

D. Anti-Vortex Plate
   1. Manufactured by Neptune-Benson. Stainless steel PVC plate for installation on pump suction line within the surge tank.
   2. The plate shall be supported off the floor of the surge tank with 3/4" stainless steel bolts allowing for a minimum 3" gap between the plate and the floor. Hardware shall be included.

2.21 UV SANITATION SYSTEM FOR FAMILY POOL

A. Ultraviolet Disinfection Equipment: Shall operate within the UVC electromagnetic spectrum emitting wavelengths in the range of 200nm to 400nm. This required wavelength will provide constant disinfection/inactivation of bacteria, algae, molds, viruses and destruction of Mono-chloramines, Trichloramines, and Dichloramines. Ultraviolet Lamp/Chamber and Spectra Touch Control Panel by ETS UV by Neptune Benson (Telephone 920-885-4628, Fax 920-885-4386) or Architect/Engineer approved equal..

B. The UV System shall have an MET or equivalent (ETL, CSA, or UL) listing, be NSF-50 2016 certified including Section 14.18 (crypto inactivation) and 3rd party **validated** to the USEPA UVDGM 2006 Guidelines.
   1. Equipment General Description
      a. The Ultraviolet System shall be provided in a complete package to include: 316L Schedule 10 Stainless Steel Chamber, Spectra Touch Control System located in a NEMA 12 (IP52) rated panel, Medium Pressure Bulb(s) designed to emit wavelengths within the UVC electromagnetic spectrum, UV EZ Clean strainer, automatic wiper system, and Project Commissioning by a Certified ETS Ultraviolet Technician.

2.22 UNIT TYPES

A. ECF Units: Ultraviolet manufacturer to offer unit capability of a horizontal OR vertical installation application using state of art design and direct flow through characteristics. Direct flow will be required in order to reduce total head loss through the system. Unit shall be a Multiple Lamp medium pressure system with a bulb range of (2) 1.0 kW – (4) 3.0 kW power range. Multiple lamp system is required in order to maintain quality disinfection in the event of a single bulb failure. ANSI or PN (as specified) flange range of 4”/100MM – 12”/300MM and flow pattern of 350 to 3700 GPM (79 m3/hr to 840 m3/hr) (Pool Flow Rate is 2.900 GP). @ 94% UVT. Any systems validated or designed for flows based on 98 % UVT are not acceptable. Chamber and Control Cabinet shall be as indicated on the drawings. Electrical requirements to include 480 volt 3-phase 50/60 HZ (as specified) with a 40 amp external breaker recommended by ETS based on the appropriate supply voltage. The electrical contractor is to take into account plus/minus 3% for external breaker. All required electrical work to be performed by licensed electrician. Unit is ECF-430-12 NEMA 12.

2.23 ULTRAVIOLET CHAMBER

A. Pressure rated for 100 psi/8 Bar (tested to 150 psi/11 Bar), and pressure drop across the unit will be minimal. The unit shall be constructed of 316L stainless steel, schedule 10 pipe, passivated to prevent corrosion within the harsh pool environment. The Ultraviolet chamber shall come complete with the following equipment:

B. Ultraviolet intensity monitor factory calibrated to provide intensity in mw/cm2, monitors providing percentage of lamp output not acceptable. It must include a built-in alarm system to notify operator when output level drops below required level of 60 mj/cm2 for indoor pools or 40mj/cm2 for outdoor pools (or operator set dosing levels).

C. Ultraviolet temperature control system shall be provided to maintain system integrity in the event of flow interruptions to the chamber.

D. Ultraviolet chamber shall come complete with annealed quartz sleeve with "O" ring seals for water tightness.

E. Chambers shall be complete with ANSI or DN flanges (as specified) and all ports or vents shall be threaded NPT. The Ultraviolet chamber must be capable of installation in the system so that it remains full under all conditions.

F. The ultraviolet unit must be complete with integrated brackets or feet for ease of installation in either vertical or horizontal mounting.

G. The Chamber shall have a sacrificial anode attached to the chamber, extending inside the chamber and be bonded to the installation bond loop

2.24 ULTRAVIOLET LAMP

A. Ultraviolet lamp shall be medium pressure high intensity. Lamp shall be designed to emit continuous Ultraviolet wavelengths in the range of 200nm to 400nm. This will provide optimal disinfection benefits and destruction of the Monochloramine, Dichloramine, and Trichloramine compounds. Lamp must remain unaffected by temperature variance of 0 degrees F (-17 C) to 200 degrees Fahrenheit (93 degrees Celsius).

B. The lamp system must provide a constant dose of not less than 60 mj/cm2 until the end of the lamp life for indoor applications and not less than 40 mj/cm2 for outdoor disinfection and this must be based on constantly monitoring the full recirculating flow rate, not on a side stream treatment. The system must be equipped with variable power control to control the intensity & dose of the lamp in 1% increments. Power stepping not acceptable.

C. The lamp(s) must be powered by chokes. Electronic ballasts are not acceptable since they limit the distance between the chamber and the power supply to 13 feet (4M) to operate effectively and must be replaced every two –three years.

2.25 AUTOMATIC WIPER SYSTEM

A. An automatic cleaning system shall be provided for cleaning of quartz sleeve and Ultraviolet monitor probe. The system shall travel the entire length of the quartz sleeve twice per desired cleaning cycle. Precision molded wiper rings shall be provided to ensure thorough quartz tube cleaning and quartz tube protection. Wiper cycle shall be user selectable and adjustable within a range of 5 minutes to 24 hours depending on anticipated application and deposit build-up. At a minimum the Automatic Wiper system shall have the following characteristics:
   1. System shall utilize direct Belt Drive with square machined pulleys and acme threaded shaft to prevent slippage and pin shearing. Systems utilizing shear pins or complicated gear boxes will be unacceptable.
   2. Wiper power supply shall be 24 volt DC for improved safety. Higher voltage not acceptable.
   3. System shall incorporate Direct Shaft Encoding for positional location. Systems relying on external limit switches or internally located magnets will be unacceptable.
   4. Wiper interval shall be operator selectable with optional override switch.
   5. Wiper faults are to be indicated on the control system display.

6. Wiper System to utilize “Intelligent Operation” for automatic start-up commissioning.
   a. Records wiper position at chamber ends. Position must be fixed and not dependent on a timed interval or component striking end of chamber.
   b. Establish a travel run without setting limit adjustments to ensure system integrity and longevity.

2.26 UV STRAINER

A. The UV system must be provided with a downstream strainer to protect against the remote possibility of lamp /quartz breakage traveling downstream.

B. The strainer must be cleanable without removal from the piping system.

C. The strainer must be operable either manually, electrically or pneumatically to clean it.

D. The electrical or pneumatic operation must be able to be integrated with the filtration control system and/or the UV control system

2.27 ULTRAVIOLET CONTROL SYSTEM

A. Control cabinet shall be an ETS SPECTRA Touch control unit and or pre-approved equal. The cabinet shall be an epoxy coated NEMA 12 / IP52 rated cabinet. If mounted outdoors it must be a NEMA4X /IP56 rated cabinet with an integral A/C unit to protect the components from the environment. The power must be controllable to provide full power, half power and infinite variable power based on real time interface with changes in UVT, Flow Rate or Combined Chloramines. The power panel must house the chokes required to ignite the lamps. Three levels of operation shall be provided to meet the needs of the operator and pool environment: Simple Control (start, stop and reset), Full Parameter Display, and Customized Operator Configuration. Modes of operation shall be password protected to secure system critical setup functions. Touch Control system shall have clearly identifiable start, stop, and reset icons (suitable for gloved operation) with Running and Fault LCD indicators.
   1. The main Touch screen shall display the following: Ultraviolet calculated dose (derived from flow and intensity inputs), Ultraviolet intensity (as a % and mw/cm2), Lamp Current, Flow rate (accepts signal from optional flow meter – displayed as gallons per minute or m3/hour), Chamber temperature (displayed as deg. F or deg. C), Operation hour meter, and fault indicators to include Lamp fault, low Ultraviolet & temperature alarm, Ground fault trip, Wiper fault. All alarm functions shall have simple text message display to assist in fault finding.
   2. Touch Control system shall have a minimum of the following system interface control: Remote operation, Process interrupt features (from valves, flow meters), Low UV dose (configurable to shutdown or alarm only), Flow meter input, Auto-Restrike, Half to full power Ultraviolet setting with 24 hour/7 day settable timer. Variable power/Dose pacing interface.
   3. Touch Control system shall have built in data-logging capabilities to record the following information: Ultraviolet intensity required, Ultraviolet intensity measured, Lamp current, Chamber temperature, Flow rate (if flow meter is connected), Time and date stamp, All alarms generated.

4. Touch Control system must be able to be interfaced with a Chemistry Controller that ca measure Total or Combined Chloramines in order to maintain the proper dosage required during the life of the lamp.
5. Touch Control System must be able to interface with the Defender filtration controller.
6. Touch Control System must be capable of operating through Ethernet or Wi Fi.
7. Touch Control System must be capable of interfacing with a SCADA system including both Profibus and Modbus.

2.28 CHLORINATOR EQUIPMENT FOR POOL

A. The system shall be designed to feed low concentrations of calcium hypochlorite in solution intermittently or continuously as required. The system shall be a single pre-assembled, package unit with a welded aluminum frame consisting of chlorinator, electrical box, centrifugal pump, and balance tank for ease of installation and operation. The basis of the specification for this product is the PowerBase by PPG Industries, Inc. The size of the system shall be as determined by the swimming pool design build contractor for both pools.

B. A maximum chlorine solution level of 0.05% (500 ppm) shall be maintained to prevent calcification in system components

C. Delivery shall be by erosion feed technology to control accurate and consistent concentration limits in the chlorine treatment solution

D. The chlorinator shall automatically and continuously feed a limited quantity of chlorine in solution as needed; when the system is not running, no more chlorine than that amount which can be fed in one minute or less shall be left in the tank to prevent dilution. Batch systems preparing excess quantities of solution for delivery over an extended period shall not be acceptable

2.29 ACID FEED SYSTEM

A. Provide a self-contained acid tablet feed system. System based on Acid-Rite 2500 pH Balancing System by Axiall Treatment Products. https://www.acidrite.com/#MiddleRedArea

B. System shall be mounted on frame and contain tablet holding container, mixing tank, pump, controller and all interconnected piping and controls.
1. Unit shall be NSF Standard 50 Certified
2. Flow rate: 0-10 gpm
3. Power: 110V, plug in.

C. Tablets shall be 99.97% sodium bisulfate, contrasting color, shipped in plastic buckets (roughly 5 gallon/45 lbs.

2.30 PIT ACCESS LADDERS FOR SURGE TANK

A. Access Ladder

1. Access ladder shall be a Neptune-Benson stainless steel ladder and shall be mounted inside the pump pit. Ladder shall be 18" wide with 2½" x 1/4" side rails. Length per plan.
2. Ladder rungs shall be 2 ½ inch , stainless steel plate at 12" centers. 2½" x 1/4", stainless steel, angle clips shall be provided for mounting ladder to pump pit wall.
3. Secure ladder in backwash holding tank back to tank wall. Extend ladder rails to top of tank.

2.31 AUTOMATIC MAKE-UP WATER LEVEL CONTROLLER--WLC-100- CHAMBER

A. Pool water level shall be maintained by an automatic make-up level controller Model WLC-100.

B. Controller package shall consist of a PVC chamber to house stainless steel probes. The electronics are housed in the Command Center.

C. Water level shall be controlled by the use of a three-probe electrode system, one for high level, one for low level and one ground. Electrodes shall be T316 stainless steel connected to a UL approved probe holder. A mechanical linkage or float operated system will not be acceptable.

D. Probes and holders shall be housed in a PVC chamber consisting of an 8", schedule 80 PVC pipe. Chamber shall be sized to accommodate desired range of water level variation and shall be complete with removable cover and adjustable collar suitable for deck level installation. A 1½", equalizing line shall be connected from the bottom of the chamber to the pool wall.

E. Probes shall be mounted on a readily removable Lexan disk within the chamber. Probe connectors shall be protected with 90° molded plastic holders.

F. Wiring from the probes shall be connected to a UL approved relay mounted within the Control Panel.

2.32 MAIN DRAIN SUMPS - FIBERGLASS

A. Main drain sumps two (Shall conform to the entrapment protection standards of the ASME/ANSI A112.19.8 performance standard, or any successor standard regulating such swimming pool or drain cover. Contractor shall provide the Owner with manufacture’s certificate of compliance with current Federal and State regulations. Main drain sumps shall be all fiberglass body as manufactured by Neptune-Benson, Inc.. Main drains are to be sized as shown on the drawings.

B. Main drain body shall include a 3" stainless steel waterstop flange and 2" threaded hydrostatic relief valve fitting. Hydrostatic relief valves and collector tubes shall be provided with the drains.

C. Flanged connections shall be provided for pipe sizes required to accommodate design flow rate ad applicable codes.

D. Main drains shall be provided with under drain collector assemblies and hydrostatic relief valves.

2.33 GUTTER

A. Basis- of- Design: Documents are based on Neptune Benson, Inc.
   1. Lap Pool: VCRS , 6 inch gutter with an 8 inch by 12 inch profile and is used for informational purposes to describe a standard of required function, dimension, appearance and quality.
      a. Provide fully recessed VCRS at end walls of racing lanes.
   2. Family: VCRS , deck level gutter, with a custom 13 inch by 11 inch profile and is used for informational purposes to describe a standard of required function, dimension, appearance and quality.

B. The system shall consist of an overflow channel filtered water supply channel, finished edge, drain converter, supply converter and other accessories as listed.

C. It is the intent of the specifications that the swimming pool perimeter gutter system channel flow and surface cleaning be maintained under all conditions of operation and that no water be discharged to waste except when backwashing the filters or emptying the pool.

D. The gutter system shall be sized to accommodate a flow capacity equal to 100% of the pool system recirculation rate.

E. The system shall include a handhold at the overflow lip and required anchors for racing and/or safety lines.

F. The bottom front edge of the gutter shall incorporate a flange extending 1" below the bottom of the gutter channel and form a second “V” notch. It shall be flush with the face of the gutter and pool wall finish as shown on the drawings.

G. The exposed surface of all stainless steel shall be fabricated of type 304L, with a number 3 polished finish. The anchor angles and stiffeners shall be type 304 stainless steel. All components of the system shall be no less than 12 gauge in thickness.

H. The VCRS gutter channel shall be fabricated according to the dimensions detailed on the drawings. The face of the gutter shall incorporate a “V” notch. The upper portion of the filtered water supply tube shall be welded to the inside of the “V”. There shall not be any horizontal welding distortion noticeable on the face of the gutter.

I. The filtered water supply shall be TIG welded stainless steel, with inlet nozzles spaced not more than 42" on center around the perimeter of the pool. The quantity of inlets shall be determined to deliver the required flowrate. The inlets shall be spaced so as to not interfere with wall areas, electronic touch pads or competitive racing lanes.

J. Surface skimming shall be continuous around the entire pool perimeter. The water level of the pool shall be maintained at ±1/16" above the overflow lip of the gutter. Dynamic surge action shall be quelled by the gutter channel to reduce repelling back onto the swimming surface.

K. The gutter channel shall be covered with a pultruded glass fiber composite grating. The grating shall be white, non-skid and UV coated. The style shall be T bars at 2" centers with cross rods at 12" centers. The grating shall be fastened to the support angles with non-corrosive hardware.
   1. The grating support angles shall be T304L stainless steel and shall be spaced not more than 36" on center around the entire pool perimeter.

L. Gutter drain and supply/return converters shall be sized according to the system requirements and installed in the system where indicated on the drawings.
   1. The drain converter shall be fabricated of T304L stainless steel no less than 12 ga in thickness. The supply (pressure) converter shall be fabricated of T304L stainless steel no less than 10 ga thickness. A 1" x 1" x 1/8" angle shall be welded around the converter to increase rigidity.
   2. All converters shall be fitted with slotted flanged connections. Other means of connection to perimeter piping shall not be acceptable.

M. The horizontal surfaces of the gutter are to have a skid resistant surface.

N. The entire gutter channel shall be anchored to the pool walls with non-corrosive anchors drilled into the pool beam at no less than 48" on center around the pool perimeter.
   1. The anchors shall be zinc plated expansion type with stainless steel threaded rods. 1.5" x 1.5" 10 gauge stainless steel slotted angles shall be secured to the threaded rods with fasteners to provide accurate leveling.
   2. The rear top gutter edge shall be aligned and secured to the pool beam with 12 gauge stainless steel support angles. The angles shall be welded to anchor pins installed in the pool beam at no less than 8" on center around the entire pool perimeter.

O. Depth Markers: Provide self-adhesive black vinyl depth markers as detailed on the plans and the contractor shall apply these after all concrete work is complete.

P. Jet Wash Fittings: The channel shall be fitted with jet wash spray nozzles as detailed on the plans to provide a constant flow of filtered water to the gutter system.

Q. Recessed Anchors: All racing lane and safety line anchors shall be included as detailed on the drawings. Anchors shall be integral to the gutter system and recessed not to protrude above any finish face of the gutter

R. Surface Agitator at Diving Board: A surface agitator shall be installed at each diving board location and shall include a spray nozzle valve and connecting tube. The assembly shall be installed to allow easy access from the deck immediately adjacent to the diving board.

S. Step and Ramp Covers: A stainless steel step and ramp cover shall be installed at each step and ramp location as detailed in the drawings

2.34 PIPING:

A. Filer Connection Piping: The piping which connects the filter to the filter pump and to the recirculation piping, backwash piping and other drain piping shall be of polyvinyl chloride (PVC) piping, class 200, schedule 80, and galvanized steel for vent piping, as required with matching fittings. PIPE FITTINGS: All PVC pipe fittings shall be heavy weight class 200, of the same manufacturer as PVC piping used by the Pool Contractor. Provide hangers and stands where required.

B. Pool Drain Piping: The main drain piping for the pool shall be AWWA Class 22 cement lined mechanical joint cast iron pipe with similar fittings or NSF approved Schedule 80 PVC.

C. Filter Connection Piping: The piping which connects the filter to the filter pump and to the recirculation piping, backwash piping and other drain piping shall be of polyvinyl chloride (PVC) piping, Class 200, Schedule 80 and galvanized steel as required with matching fittings.

D. Chlorine Solution Lines: Shall be of plastic and of a type recommended by the chlorinator manufacturer. Chlorine lines which are run underground shall be carried in PVC conduit.

E. Pipe Fittings: Wherever plastic pipe is used, all fitting shall be heavy weight Class 200 , of the same manufacturer as PVC pipe used by the Pool Contractor. Provide hangers or stands where required.

2.35 VALVES

A. Small Valves: Valves up to and including two (2) inches in size shall be Gate Valves, all brass with treaded ends for ferrous pipe. They shall be 125 lb. non-rising stem type.

B. Large Valves: Valves three (3) inches and larger shall be iron-body bronze mounted, and shall conform to AWWA Standard C-500. Valves shall have a flanged or mechanical joints ends as required for the piping in which they are installed. Valves shall be designed for a minimum water working pressure of 125 lb. per square inch.

C. Wafer Valves: As shown on the plans shall be butterfly-wafer valves equal to Centerline Series A, bronze disc, meehanite iron body stainless steel stem, Buna N seat gear or lever operated as shown.

D. Throttling Valves: Provide gear operated butterfly valves.

E. All below grade, below slab, and all valves within surge pit shall be provided with extension rods to the deck surface. Steel deck access sockets with drop-in covers shall be provided for each extension.

2.36 VALVES - GENERAL - DOMINION

A. All valves 3" and larger shall be constructed with cast aluminum ASTM S12A housing and fully coated with Rilsan on all interior and exterior surfaces. Internal components include EPDM resilient lining, Rilsan coated ductile iron disc and T304 stainless steel shaft. Valves shall be rated for 150 psi bubble tight shutoff.

B. Valves shall be Dominion butterfly valves and shall be provided for strainer isolation, filter bypass, backwash throttling, filtered water return and balance tank connections.

C. Valves shall be suitable for chlorinated water, freshwater and submerged applications

2.37 VALVES GENERAL VICEROY

A. All valves 2 ½" and larger shall have a body & disc constructed of PVC resin per 12454 ASTM·D 1784. Internal components shall include EPDM resilient lining, PTFE anti-friction rings and

stainless steel shaft. Valves up to 10" shall be rated for 150 psi bubble tight shutoff. 12" valves shall be rated for 115 psi bubble tight shutoff.

B. Valves shall be Viceroy™ valves and shall be provided for strainer isolation, filter bypass, backwash throttling, filtered water return and balance tank connections.

C. Valves shall be suitable for chlorinated water, freshwater and submerged applications.

2.38 TEST KIT

A. Provide and use a DPD test kit for measuring the concentration of chlorine and an appropriate test kit for measuring pH, alkalinity, and cyanuric acid levels at each swimming pool. Provide one (1) Taylor No. 1765 tester for measuring FAC chlorine residuals and pH. Include sufficient reagents for one year's testing. Furnish in carrying case with separate slides for pH and chlorine. Also provide WB test with extra reagents and a Dalite slide mount for viewing.

2.39 SPECIALTY START-UP CHEMICALS

A. The contractor is responsible to supply and dose the pool with all necessary chemicals to balance the water to the following levels:
1. pH 7.2 - 7.8
2. Alkalinity 50 - 150 (ppm)(mg/l)
3. Residual Chlorine: 1.0-3.0 Free, 0.0 to 0.2 combined

B. All chemicals shall be USP listed and mineral free.

C. Initial shock treatment shall be performed with a non-chlorine oxidant and shall be administered prior to balancing.

D. Chemicals necessary to prevent staining and discoloration (sequestering agents) shall be introduced prior to shock treatment.

E. All chemical tests must meet Owner satisfaction and filter manufacturer's standards. Contractor shall obtain owner approval prior to any chemical dosage.

F. Cost of providing all chemicals for start-up, testing and training shall be provided by the Contractor.

2.40 MISCELLANEOUS MATERIALS

A. Valve Tags: Round, 2 inch diameter, stamped .025 stainless steel tag, with No. 16, solid brass jack chain connection to valve. Available from Seton Identification Products, Branford, CT., (800) 243-6624, or equal.
1. Tag: Seton M4540, Black filled numbers.
2. Chain: Seton Style No. 16182

B. Piping Labels: Pressure sensitive vinyl markers complying with OSHA and ANSI specifications for background and colors. Provide one label at 6 feet O.C. for length of exposed pipe. Provide Seton Opti-Code Pipe Markers, or approved equal. Provide labels in size required for piping. Color code label types using white letters on green, red, yellow, and blue fields. Text with directional arrows may include:
   1. Chlorine
   2. ACID injection
   3. UV feed/return
   4. Water to heat exchange/ heated water
   5. Cold Water
   6. Discharge
   7. Drain
   8. Filtered Water
   9. Return
   10. Suction
   11. Supply
   12. Waste

C. Equipment Labels: Custom Facility Labels. 4 mil pressure-sensitive labels. Background color shall be white, print color shall be blue. Labels available from Seton Identification Products. Provide 1 label for each piece of pool equipment, including, but not limited to:
   1. Pumps
   2. VFD's
   3. Filters
   4. Chlorinators and chlorinator pumps.
   5. Acid and acid feeder pumps
   6. UV equipment
   7. Control equipment
   8. Sensors
   9. Probes
   10. Sample stream assemblies.
   11. Other component that requires easy identification in the pool filtration room.

D. Plywood Backing Material and Miscellaneous Shelving:
   1. Backing Boards: 3/4 inch thick, exterior grade plywood, A/C facing. Sand smooth all exposed edges. Plywood shall be sealed with three (3) coats of water-based polyurethane prior to installation.
   2. Shelving: Cellular PVC Boards: Extruded, expanded PVC with a small-cell microstructure, recommended by manufacturer for exterior use, made from UV- and heat-stabilized, rigid material.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) AZEK Building Products, Inc.
         2) CertainTeed Corporation.
         3) Fypon Ltd.
         4) Kleer Lumber, LLC.
         5) Ply-Trim, Inc.

E. Diagrams: The pool filtration diagrams shall be on a permanent media that is not subject to fading or deterioration.

PART 3 - EXECUTION

3.1 INSPECTION

A. The Contractor shall examine all work prepared by others which is to receive the work of this Section and shall report any noted defects affecting the work of this Section to the Owner in Writing.

B. All contractors, subcontractors, and sub-subcontractors are cautioned to clearly understand the limits of responsibility of each other. Prior to a work start by those trades effecting the work of this Section, a meeting will be held at the jobsite among all contractors, subcontractors, sub-subcontractors and the Engineer to coordinate these Specifications and establish work limits, job schedules and liaison between the trades to insure a coordinated construction process.

3.2 INSTALLATION

A. The Pool Sub-contractor shall assemble and install all filtration system and pool equipment, piping and accessories in accordance with the intent of these specifications and as indicated on the project drawings, as indicated on the approved shop drawings and as recommended by the Pool Manufacturer."

3.3 GUTTER INSTALLATION

A. All components of the system including anchor plates, gutter channel, supply tube, converters, grating and line anchors; shall be installed by personnel approved by the manufacturer.

B. Welding shall be performed by a welder with at least five (5) years' experience in the welding of stainless steel gutters.

C. Expansion anchors shall be installed by the gutter installer and shall be spaced no more than 48" on center and at the elevation shown on the drawings.

D. The fabricated gutter components shall be delivered to the jobsite, unloaded by the pool construction contractor and stored in the shallow end of the pool.

E. All other installation work and required installation materials, including scaffold brackets and scaffolding, shall be provided and performed by the gutter manufacturers installation crew. All scaffolding shall conform to OSHA requirements where applicable.

F. Gutter shall be bonded per Specification Section 260000 Swimming Pool Electrical Bonding in accordance with the latest edition of the National Electrical Code

G. Gutter Welds:

1. All seams shall be welded by the TIG process and shall result in a uniform appearance. Welds shall not be ground. All welds shall be brushed after cooling to approximately 300 degrees. Filler metal shall be added to present a flush appearance to finished seams.
2. All horizontal welds shall be fully accessible for inspection.

H. Gutter Survey
1. The gutter system shall be installed level within a tolerance of ±1/16". Provide a stamped survey of the gutter installation upon completion certifying installation of accepted tolerances. Survey shall be performed after grouting. Provide 72 hours' notice to Architect and Owner from time survey work is scheduled.
2. Provide a stamped survey of the gutter installation upon completion certifying installation of accepted tolerances. Survey shall be performed after grouting. Provide 72 hours' notice to Architect and Owner from time survey work is scheduled. Survey shall be performed before grouting by a licensed Surveyor in the Commonwealth of Massachusetts. The spacing of survey points shall be a minimum of 4'-)" on center at the gutter lip (pool water elevation). Provide 72 hours' notice to the Town and Architect from time survey work is scheduled

I. Gutter Testing:
1. After the gutter system has been fully welded, anchored and secured, the supply tube shall be air pressure tested at 12 psi for 2 hours.
2. After the test has been satisfactorily completed, the inlets shall be drilled.
3. Factory drilled inlets or factory tested supply tubes shall not be acceptable.
4. Provide laboratory report with results from air pressure test to the Town.

J. Gutter Grouting:
1. After the gutter system has been installed, the pool construction contractor shall place a non-metallic, non-shrink grout underneath and behind the gutter to completely encase the channel.
2. The grout material shall include Sika Interplast-N as manufactured by Sika Corp. Mixing proportions shall be in accordance with Sika Corp. guidelines.

K. Gutter Cleaning:
1. The stainless steel components shall be cleaned as required to present a uniform appearance.
2. Blending of the surface shall be done with a 3M pad #7447, or 100 grit abrasive.
3. The strength of the welds shall not be reduced by grinding.
4. Provide manufacturer's recommended cleaning supplies to the Town, one bottle of polish, 3M pad #7447 and clothes for maintaining rust free finish at welds
5. At the completion of the gutter manufacturer system installation and before grand opening in the Spring 2012, the gutter installer shall provide a crew to clean the pool and gutter components with a nitric acid solution and polish for a like new appearance clean of dirt, mold and debris prior to filling the pool with clean water for startup operations

3.4 PIPING AND VALVES

A. The Contractor shall furnish and install new piping and fittings as shown on the Project Drawings and contractor shop drawings.

B. The Contractor shall furnish all other material and parts necessary to complete the installation.

C. All pipes and fittings for pool filtration system shall be Schedule 80 PVC, with the exception of potable fresh water feeds and backflow preventer, copper piping for the eye wash station and hot water heater connections which work shall be performed by a licensed plumber. The plumber shall make final connections to waste which shall be ductile iron in accordance with State Plumbing Code. Connections between copper and PVC shall be flanged.

D. Piping arrangement shall be in accordance with approved shop drawings.

E. The Contractor shall provide all the concrete bases under the pumps and elsewhere as indicated on the drawings.

F. All chemical feed equipment, tubing, piping and chemical control sample streams shall be installed in strict accordance with the manufacturer's installation instructions.

3.5 INSTALLATION OF PIPING

A. Pipe openings shall be closed with caps or plugs during installation. Equipment and pool fittings shall be tightly covered and protected against dirt, water and chemicals or mechanical injury. At the completion of the work, the fittings, materials and equipment shall be thoroughly cleaned and adjusted for proper operation.

B. Handling: Pipe and accessories shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition.

C. Cutting of Pipe: Shall be done in a neat and workmanlike manner without damage to the pipe. Cutting shall be done by means of a mechanical cutter.

D. Placing and Laying: Before installation, pipe shall be inspected for defects. The interior of the pipe shall be thoroughly cleaned of foreign matter and shall be kept clean during layout operation. Pipe shall not be laid in water or when trench or weather conditions are not suitable for the work. Water shall be kept out of the trench until the pipe is installed. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth or other substance will enter the pipes or fittings.

E. Threaded Joints: After cutting and before threading pipe shall be reamed and shall have burrs removed. Screw joints shall be made with graphite inert filler and oil or with an approved graphite compound applied to male threads only. Threads shall be full-cut and not more than three threads on the pipe remain exposed. Caulking of threaded joints to stop or prevent leaks will not be permitted. Unions will be permitted where access is provided.

F. Solvent Welded Joints: Shall be made in accordance with the manufacturer's recommendations. However, the following directions are considered when applying cement. The outer surface area of pipe and inner wall of fitting shall be clean and dry. Thinner is to be applied to the outer surface of the pipe and to the inner surface of the fitting.
   1. Cement is to be applied to the outer surface of the pipe, or on the male sections of the fittings only. When the outside surface are of the pipe is satisfactorily covered with cement, allow ten seconds open time to elapse before inserting pipe end into fitting. After full insertion of pipe into fitting, turn fitting about the pipe end approximately 1/8 to 1/4 turn. Wipe off excess cement at the joint in a cove bead. Use only approved cement and thinners for making joints.
   2. All joints shall remain completely undisturbed for a minimum of ten minutes from the time of joining the pipe and fitting. If necessary to apply pressure to newly made joints, limit to 10% of rated pipe pressure, four hours after joining. Do not exceed this level for the first 24 hours after the joint has been made.
   3. Carefully handle all pipe and move as little as possible for 24 hours after joining.
   4. Protect plastic pipe from exposure to aromatic hydrocarbons, halogenated hydrocarbons, esters and ketones that attack the material. Protect pipe from mechanical damage and long exposure to sunlight during storage.

G. Testing: After piping is laid, the joints completed and the trench partially backfilled, leaving joints exposed for examination, the newly laid line shall be subjected to a hydrostatic pressure for a period of two hours.
   1. A water test shall be applied to a gravity drain piping systems, either in their entirety or in sections. All openings shall be tightly plugged, and each system filled with water and tested with at least a 10 foot head of water. The water shall be kept in the system, or in the portion under test for at least 15 minutes before the inspection starts. The system shall then be proved tight at all joints.

3.6 SYSTEM OPERATION INSTRUCTION AND ENGINEERING SERVICES

A. An authorized representative of the “EQUIPMENT SUPPLIER” shall provide the supervisory services of an installation engineer for at least one day to fully instruct designated personnel in the operation, care and maintenance of the entire purifying, sterilizing and recirculating system.

B. All system components shall be operational prior to scheduling operator training.

3.7 ELECTRICAL WORK

A. The pool sub-contractor is required to review and become familiar with the scope of work of Division 26 Electrical indicated in the drawings that relates to the pool equipment. It shall be the work of the swimming pool sub-contractor to provide all necessary wiring that is not indicated but required for the operation of the swimming pool contractor’s filtration, recirculation and chemical treatment systems. This includes but is not limited to wiring between the motor control center and the pool controls systems and includes low voltage and line voltage wiring.

3.8 POOL FILLING

A. Contractor shall provide independent laboratory analysis of existing water supply. Based on the results, the pool Subcontractor shall recommend start-up chemical use and dosage. Take multiple water samples at periodic times in order to establish a range.

B. All chemical tests must meet Owner satisfaction and filter manufacturer's standards. Contractor shall obtain Owner approval prior to any chemical dosage.

3.9 INSTALLING EQUIPMENT

A. For equipment specified in this Section, install in strict accordance with the manufacturer's recommendations, anchoring firmly into position. Make all required hookups prior to start of equipment operation and put all items through at least five complete cycles of operation.

B. Verify that each item is properly installed and properly operating. Make required adjustments to achieve optimum operation.

3.10 INITIAL WATER BALANCE

A. Upon completion of the installation, chlorinate, acidulate, and properly balance the pH content of the water. Initial water balance shall be as follows:

1.	pH	7.5 - 7.16
2.	alkalinity	80 - 120 PPM
3.	calcium hardness	200 - 350 PPM
4.	chlorine	1.0 PPM

3.11 MISCELLANEOUS FILTER AREA EQUIPMENT

A. Install stainless steel valve tags and piping labels according to manufacturer's recommendations.

B. Mount the following between plywood and Plexiglas on the filtration room wall.
1. Diagram of filter and backwash operation. Diagram shall be cross-referenced to electrical controls, pump equipment, valve tag numbers and piping labels. Diagrams shall be color coded to match decals.
2. Pool piping diagrams of entire system.

C. Install plywood shelving to support pool equipment and accessories. Shelving brackets shall be fastened to wood framing members. Prior to installation, apply three coats of polyurethane to the shelving.

3.12 STARTUP AND ENGINEERING SERVICES

A. Refer to Section 131100.

3.13 CLOSEOUT

A. Refer to Section 131100.

END OF SECTION 131100

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SECTION 13 11 13- SWIMMING POOL CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. Reinforced pneumatically applied concrete pool structures, including but not limited to:
   1. Final hand trimming of crushed stone and gravel fill
   2. Rigid insulation at shallow pool areas shown
   3. Delegated Design of pool structures
   4. Formwork
   5. Reinforcing Steel
   6. Dry mix Shotcrete structure.
   7. Pre cast Surge tank structures or formed integrally with pool tanks at contractor's option
   8. Finish of Shotcrete to accommodate plaster and tile finishes
   9. Standard white and colored aggregate finish plaster
   10. Tile surfaces at pool stair nosings, racing line and end wall targets, and other areas indicated
   11. In pool and deck level tile depth and warning graphics.
   12. Lane Line and Rope Float Anchors not integral with gutter
   13. Installation of anchorage for deck equipment within the pool tank.
   14. Warranties.

1.3 DEFINITIONS

A. Shotcrete: Mortar or Concrete pneumatically projected onto a surface at high velocity.

B. Dry-Mix Shotcrete (Gunite): Shotcrete with most of the water added at the nozzle during placement.

C. Flash Coat: Thin shotcrete coat applied from a distance greater than normal for use as final coat or for finishing.

D. Ground Wire: Small-gage, high-strength steel wire used to establish line and grade for shotcrete work. Also known as alignment wire, screed wire, or shooting wire.

E. Gun Finish: Undisturbed final layer of shotcrete as applied from nozzle without hand finishing.

F. Nozzelman: Worker on shotcrete crew who manipulates the nozzle, controls consistency with the dry process, and controls final disposition of the material.

G. Rebound: Shotcrete material leaner than the original mixture which ricochets off the receiving surface and falls to the ground.

1.4 REFERENCES

A. ACI Standards (American Concrete Institute)
1. ACI-301-10 Specifications for Structural Concrete
2. ACI 305R-10 Hot Weather Concreting.
3. ACI 306.1-90 Cold Weather Concreting.
4. ACI 318-92 Building Code Requirements for Reinforced Concrete.
5. ACI 506R-95 Guide to Shotcrete
6. ACI 506.2-90 Specifications for Materials, Proportioning, and Application of Shotcrete

B. ANSI – American National Standards Institute
1. ANSI A108.1B - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
2. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
3. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework.
4. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar.
5. ANSI A118.6 - American National Standard Specifications for Ceramic Tile Grouts.

C. ASTM C 242 - Standard Terminology of Ceramic Whitewares and Related Products.

D. ASTM Standards (American Society for Testing Materials)
1. A-615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
2. A-36/A /A36M Standard for Carbon Structural Steel
3. A 307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod
4. C33-94 Standard Specifications for Concrete Aggregates.
5. C42-13 Standard Method of Obtaining and Testing Drilled Cores or Sawed Beams of Concrete.
6. C94-14 Standard Specifications for Ready-Mixed Concrete.
7. C143-12 Standard Test Method for Slump of Portland Cement Concrete.
8. C150-07 Standard Specification for Portland Cement.
9. C260-06 Standard Specification for Air Entraining Admixtures for Concrete.
10. C494-05 Standard Specification for Chemical Admixtures for Concrete.

E. TCA (HB) – Tile Council of America
1. Handbook For Ceramic Tile Installation; Tile Council of America.

1.5 SYSTEM DESCRIPTION

A. Pool Contractor shall be responsible for preparation of swimming pool delegated design shop drawings, engineering reports and applications and submitting this data as necessary to obtain

approval and permits from appropriate authorities having jurisdiction prior to start of construction.

B. Pool tank shall be designed as a single monolithic unit.

1.6 SUBMITTALS

A. Shop Drawings: Shop drawings for the swimming pool system and all its components, including typical details of pool shell, equipment anchors, and floor and wall markings drawn at large scale. Include the following:
   1. Details of fabricating, bending, and placing reinforcement.
   2. Support and anchor details
   3. Number and location of splices
   4. Special reinforcement required for openings, transitions in pool floor, gutter assembly
   5. Smaller scale drawings of the overall plan and sections. Include:
      a. Piping and wiring diagrams for recirculation, filtration and chemical treatment systems. Assemble shop drawings into one (1) coordinated submittal.
   6. Drawings shall be stamped by a structural engineer licensed in the Commonwealth of Massachusetts

B. Design mixes: For each shotcrete mix.

C. Material Test Reports: For each Shotcrete ingredient

D. Material Certificates: For material item, signed by manufacturer

E. Field quality test reports

F. Qualification Data: For Installer and nozzlemen

G. Maintenance Manuals: Submit three (3) copies of bound maintenance manual for swimming pool structure and finish, dewatering instructions and parameters.

1.7 QUALITY ASSURANCE

A. Pool Subcontractors Qualifications:
   1. Qualifications of the swimming pool subcontractor are specified in Section 131500 – GENERAL PROVISIONS FOR SWIMMING POOL

B. Nozzlemen shall have a minimum of 5 years' experience in the application of pneumatically applied concrete for swimming pools and be certified under ACI 506.
   1. Nozzlemen shall attain mean core grades of 2.5, according to ACI preconstruction testing

C. All pool tile work shall be performed by mechanics skilled in these trades, with 3 years minimum experience.

1.8 CONSTRUCTION TESTING

A. Owner will engage the services of an independent testing agency to perform reinforcing steel inspection and test field samples of pneumatically applied concrete.

B. Tolerances:
   1. Cover of reinforcement: ACI 506.2, Paragraph 3.6.2.
   2. See also 3.5 Construction Tolerances.

C. Construction testing
   1. Produce a material test panel for each mix and each work day or every 50 cubic yards placed, whichever is less. Test panel shall be kept moist and at 70 F ± 10 F until moved to test laboratory. Obtain test specimens either from job site material test panel or from in-place shotcrete. Test specimens from test panels in compliance with ASTM C 1140.
   2. Test specimens from in-place shotcrete in compliance with ASTM C 42.
   3. Grade cores that include reinforcement in accordance with Section 1.9.F - Shotcrete core grades.
   4. The mean compressive strength of a set of three cores shall equal or exceed 0.85fc′ with no individual core less than 0.75fc′. The mean of a set of three cubes shall equal or exceed fc′ with no individual cube less than 0.88fc′.

D. Shotcrete core grade: A mean grade of 2.5 or less is acceptable. Determination of mean grade shall be by computing the mean of a minimum of three test specimens. Individual shotcrete cores with a grade greater than 3 are unacceptable.
   1. Grade 1: Shotcrete specimens are solid; there are no laminations, sandy areas or voids. Small air voids with a maximum diameter of 1/8 in. and maximum length of 1/4 in. are normal and acceptable. Sand pockets, or voids behind continuous reinforcing steel are unacceptable. The surface against the form or bond plane shall be sound, without a sandy texture or voids.
   2. Grade 2: Shotcrete specimens shall have no more than two laminations or sandy areas with dimensions not to exceed 1/8 in. thick by 1 in. long. The height, width and depth of voids shall not exceed 3/8 in. Porous areas behind reinforcing steel shall not exceed 1/2 in. in any direction except along the length of the reinforcing steel. The surface against the form or bond plane shall be sound, without a sandy texture or voids.
   3. Grade 3: Shotcrete specimens shall have no more than two laminations or sandy areas with dimensions exceeding 3/16 in. thick by 1-1/4 in. long, or one major void, sand pocket, or lamination containing loosely bonded sand not to exceed 5/8 in. thick and 1-1/4 in. in width. The surface against the form or bond plane may be sandy with voids containing overspray to a depth of 1/16 in.
   4. Grade 4: The core shall meet in general the requirements of Grade 3 cores, but may have two major flaws such as described for Grade 3 or may have one flaw with a maximum dimension of 1 in. (25 mm) perpendicular to the face of the core with a maximum width of 1-1/2 in. The end of the core that was shot against the form may be sandy and with voids containing overspray to a depth of 1/8 in.
   5. Grade 5: A core that does not meet the criteria of core grades 1 through 4, by being of poorer quality, shall be classified as Grade 5.

E. The above core grades are based on cores with a surface area of 50 in.2 For cores with greater or lesser area than 50 in.2, adjust allowable flaws relative to 50 in.2

F. Evaluation of in-place shotcrete: Remove and replace shotcrete that is delaminated, exhibits laminations, voids, or sand pockets exceeding the limits for the specified grade of shotcrete. Remove and replace shotcrete that does not comply with the specified material properties

G. Repair core holes in accordance with Chapter 9 of ACI 301. Do not fill core holes by shooting.

H. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in the Commonwealth of Massachusetts.

1.9 PROJECT CONDITIONS

A. Cold Weather Shotcreting: Protect Shotcrete work from physical damage or reduced strength caused by frost, freezing, or low temperatures according ACI 306.1.
   1. Materials used must be able to keep Shotcrete in a 40 degree F and rising state until in place Shotcrete can be protected. Hot water may be required.
   2. Do not use frozen materials or materials containing ice and snow
   3. Do not place Shotcrete on frozen surfaces or surfaces containing frozen materials.
   4. Do not use calcium chloride, salt, or other materials containing antifreeze agents

B. Hot Weather Shotcreting: Mix, Place, and protect Shotcrete according to ACI 205R when hot-weather conditions and high temperatures would seriously impair quality and strength of Shotcrete.
   1. Cool ingredients before mixing to maintain Shotcrete temperature at time of placement below 100 degrees F for dry mix and 90 degrees F for wet mix.
   2. Reduce temperature of reinforcing steel receiving surfaces below 100 degrees F before shotcreting.

1.10 WARRANTIES

A. Pool Shell: Pool Contractor shall guarantee the dry mix shotcrete pool shell and piping under pool to be free from defects which causes leaks for a minimum period of five (5) year after beneficial occupancy. If such defects occur, contractor shall repair such in thirty (30) days after notification in writing by the Owner.

PART 2 - PRODUCTS

2.1 POOL STRUCTURES- GENERAL

A. General: The pool structures shall consist of a reinforced pneumatically applied concrete ready to receive a painted finish and tile markings. Pneumatically applied concrete shall be wet-mix or dry-mix Shotcrete at Contractor’s option.

2.2 FORM MATERIALS

A. Formwork: Wood or fabric/paper backed reinforcing mesh, adequately braced to prevent excessive vibration or deflection during shotcrete placement.

1. Must be designed for the escape of compressed air and rebound during shotcreting.
2. Form release agent for wood forms: If wood forms are used, provide form release agent to inhibit the bond between shotcrete and form and to prevent absorption of moisture.

2.3 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615A. Grade 60, deformed.

B. Supports: Bolsters, chairs, spacers, ties and other devices for spacing, supporting, and fastening reinforcing steel in place according to CRSI's "Manual of Standard Practice".

C. Reinforcing Anchors: ASTM A 36/A, unheaded rods or ASTM A 307, Grade A (AST< F568M, Property Class 4.6), hex-head bolts, carbon steel; and carbon-steel nuts. Finish shall be plain, uncoated.

D. Steel Reinforcement shall be tied at every other intersection of steel. There should not be in any location 2 spots in a row without a reinforcement tie. Splices should be tied at least three times.

2.4 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board, Type VII, Drainage Panels: ASTM C 578, Type VII, 60-psi (414-kPa) minimum compressive strength.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Dow Chemical Company (The).
      b. DuPont de Nemours, Inc.
      c. Owens Corning.
   2. Minimum thickness; 4 inches.

2.5 SHOTCRETE MATERIAL

A. Portland Cement: ASTM C150, Type I/II, gray. Cement may be supplemented with the following:
   1. Fly ash: ASTM C 618, Class F or C.

B. Normal-weight Aggregates: ASTM C33, from a single source, and as follows:

C. Aggregate: ASTM C33, and UACE EM 1110-2 (Gradation Table 3-1), as defined in Table 2.

TABLE 2 -- GRADATION LIMIT FOR AGGREGATES

Sieve Size, U.S. standard square mesh	Percent by Weight Passing Individual Sieves		
	Gradation No. 1	Gradation No. 2	Gradation No. 3
20 mm 3/4 inch	---	---	100
13 mm 1/2 inch	---	100	80-95
10 mm 3/8 inch	100	90-100	70-90
No. 4	95-100	70-85	50-70
No. 8	80-100	50-70	35-55
No. 16	50-85	35-55	20-40
No. 30	25-60	20-35	10-30
No. 50	10-30	8-20	5-17
No. 100	2-10	2-10	2-10

D. Water: Potable, complying with ASTM C94, free from deleterious materials that may affect color stability, setting, or strength of Shotcrete.

E. Guide Wire: High-strength steel wire, 0.8 to 1mm in diameter.

2.6 CHEMICAL ADMIXTURES

A. General: ASTM C 1141, Class A or B, but limited to the following admixture materials. Provide admixtures for Shotcrete that contains not more than 0.1 percent chloride ions. Certify compatibility of admixtures with each other and with other cementitious materials.
   1. Air Entraining Admixture: ASTM C260
   2. Water-Reducing Admixture: ASTM C494, Type A
   3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D
   4. Water-Reducing and Accelerating Admixture: ASTM C494, Type E
   5. High Range, Water Reducing Admixture: ASTM C494, Type F
   6. Accelerating Admixture: ASTM C 494 , Type C

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighting approximately 9 oz. /square yard dry.

B. Moisture-Retaining Cover: AST C 171, polyethylene film or white burlap-polyethylene sheet.

C. Potable Water

D. Clear, Waterborne, Membrane-forming Curing Compound:
1. Aquron Curing Products, http://www.aquron.com/our-products/concrete-protection-and-waterproofing/
2. or approved equal.

2.8 SHOTCRETE MIXTURES GNENERAL

A. Prepare design mixes for each type and strength of Shotcrete

B. Limit water-soluble chloride ions to maximum percentage by weight of cement or cementitious materials permitted by ACI 301.

C. Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
1. Fly-ash ; 25 percent

D. Admixtures: When included in Shotcrete design mixes, use admixtures and retarding admixtures according to manufacturer's written instructions.

E. Design-Mix Adjustments: Subject to compliance with requirements, shotcete design-mix adjustments may be proposed when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.9 SHOTCRETE MIXTURES

A. Shotcrete: The shotcrete used shall consist of a mixture of Portland cement, sand, aggregate, and water so proportioned and mixed to be pumped. Mixture shall be proportioned to provide a minimum compressive strength of 4500 psi at 28 days.

B. Mix Design: Testing Laboratory, retained by Contractor, shall design a mix to produce concrete as specified and perform tests as required. Certified test reports (duplicate) shall be submitted. Reports shall include proportions of design mix.

C. Maintain water-cement ratio between 0.35 to 0.50 by weight.

D. Concrete-mix design adjustments may be considered if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant. Resubmit and obtain approval from the Architect of proposed changes to concrete-mix design.

E. Improper Mix: Immediately notify the Concrete Testing Laboratory if at any time during construction the accepted mix design proves to be unsatisfactory for any reason. The Contractor's Concrete Mix Designer shall modify the design, subject to the review of the Architect, until a satisfactory mix is obtained.

F. Mixing Processes:
1. Mixing, General:

a. At Contractor's option, use either the dry or wet mix process. Discharge entire batch before recharging. Clean mixer at least once every 8-hour shift or portion thereof. Reject material mixed and standing for 45 minutes; remixing or tempering not permitted.

2. Dry Mix Process: Conform to ACI 506R, Paragraph 1.5.1.
3. Wet Mix Process: Conform to ACI 506R, Paragraph 1.5.2.

2.10 SHOTCRETE EQUIPMENT

A. Mixing Equipment: Capable of thoroughly mixing Shotcrete materials in sufficient quantities to maintain continuous placement.

B. Equipment shall be commercial grade selected by the Contractor to suit the size of the project, character of the work, job site conditions, the availability and quality of local materials and labor, and schedule.

C. Dry-Mix Delivery Equipment: Capable of discharging aggregate-cement mixture into delivery hose under close control and maintaining continuous stream of uniformly mixed materials at required velocity to discharge nozzle. Equip discharge nozzle with manually operated water injection system for directing even distribution of water to aggregate-cement mixture. Air pressure used for conveying dry mix material must be capable of delivering at least 600 DFM. Should any other pneumatic devices be operated in conjunction with the conveying of material then, a larger CFM compressor or second compressor must be used.

1. Provide uniform, steady supply of lean, compressed air to maintain constant nozzle velocity while simultaneously operating blow pipe for cleaning away rebound.
2. Provide water supply with uniform pressure at discharge nozzle to ensure uniform mixing with aggregate-cement mix. Provide water pump to system if line water pressure is inadequate.

2.11 BATCHING AND MIXING

A. Dry-Mix process: Measure mix proportions by weight batching according to ASTM C 94 or by volume batching complying with ASTM C 685 requirements.

1. In volume batching, adjust fine-aggregate volume for bulking. Test fin-aggregate moisture content at least once daily to determine extent of bulking.
2. Prepackaged Shotcrete materials may be used at Contractor’s option. Pre-dampen prepackaged Shotcrete materials and mix before use.
3. When ready mix trucks are used plant must be within a 25 minute drive of jobsite to allow for sufficient offload time.
4. Volumetric batching based on ACI 304.6R-09 is an acceptable and preferred alternative to ready mix.

B. Wet-Mix process: Measure, batch, mix and deliver Shotcrete according to ASTM< C94 and furnish batch ticket for information and record.

1. Comply with ASTM C685 when Shotcrete ingredients are delivered dry and proportioned and mixed on-site.
2. When ready mix trucks are used plant must be within a 25 minute drive of the job site to allow for sufficient offload time.

3. Volumetric batching on ACI 304. 6R-09 is an acceptable and preferred alternative to ready mix.

2.12 SHOTCRETE FINISH

A. It is the intent of the work to provide a plaster and tile pool finish. The shotcrete will require a steel trowel or magnesium float finish acceptable to the painting subcontractor.

B. Finish within surge tanks should be tooled to create a smooth non-porous surface that will not trap debris, grime or other particulates carried in the water.

C. Pool Plaster: The pool finish shall consist of two coats of plaster finish. The two coats of pool plaster shall together equal three-eighths (3/8) to one-half (1/2) inch thickness and shall be applied by hand troweling method to a smooth, dense, impervious surface.

D. Plaster mix shall be submitted to the Architect for approval prior to application. Plaster shall be graded gray aggregate and cement. Contractor must provide adequate curing time for plaster prior to painting.

2.13 PRECAST SURGE TANK

A. Basis of Design Manufacture is Shea Concrete, Amesbury, MA https://sheaconcrete.com/

B. Provide tanks as indicated on drawings. Both tanks are 9 feet wide by length indicated. Main pool is a single tank. Wading pool is divided to create a balance tank/reservoir for the water features separated from the surge tank.

C. Materials:
1. 4,000 PSI concrete
2. Reinforcement per ASTM C1227
3. Tongue and groove construction with butyl resin.
4. Factory applied waterproof coating.
5. Provide HS-20 loading

2.14 WATERPROOFING OF SURGE TANKS

A. Provide cementitious crystalline waterproofing to interior of shotcrete surge tanks and within the formed gutter below the grate.

B. Cementitious Crystalline Waterproofing: Blend of Portland cement, fine treated silica sand and active proprietary chemicals. When mixed with water and applied as a cementitious coating, the active chemicals cause a catalytic reaction which generates on-soluble crystalline formation of dendritic fibers within the pores and capillary tracts of concrete. This process causes concrete to become permanently sealed against the penetration of liquids from any direction.

C. Basis of Specification Product; Xypex Chemical Corporation 13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9 , Tel: 800 961.4477 or 604 273.5265 Fax: 604 270.0451
1. Xypex Concentrate

2. Xypex Modified
3. Xypex Patch'n Plug

D. General: Mix waterproofing material by volume with clean water which is free from salt and deleterious materials. Mix waterproofing material in quantities that can be applied within 20 to 30 minutes from time of mixing. As mixture thickens, stir frequently, but do not add additional water. Do not mix bonding agents or admixtures with crystalline waterproofing materials.
1. **Brush Application Mix:** Measure dry powder and place in mixing container. Measure water and mix into the dry powder with a paddle on a slow speed electric drill (250 RPM) or other type mixer which is acceptable to manufacturer.
2. **Spray Application Mix:** Mixing shall be same as specified for brush application except that mixture shall be thinner. Adjust proportions to match type of spray equipment and pressures used.

2.15 POOL PLASTER FINISH TYPE 2

A. Pool Plaster: The pool finish shall consist of two coats of plaster finish. The two coats of pool plaster shall together equal three-eigths (3/8) to one-half (1/2) inch thickness and shall be applied by hand troweling method to a smooth, dense, impervious surface.

B. Plaster mix shall be submitted to the Architect for approval prior to application. Plaster shall be graded white aggregate and white cement.

2.16 QUARTZ AGGREGATE POOL FINISH PLASTER TYPE 1 (Multiple Colors)

A. General: A blend of quartz aggregates and fortified white Portland Cement specially formulated for swimming pools.

B. Basis of Design: Provide "Marquis" Pool Finish System by Premix Marbletite,or approved equal.

C. Color and Texture: Color to be determined by Architect.

D. Mix pool finish in strict compliance with manufacturer's written recommendations.

E. Calcium Chloride shall not be used in the mix.

2.17 QUARTZ AGGREGATE POOL FINISH PLASTER TYPE 3 AT ZERO DEPTH ENTRY AND RAMP (Multiple Colors)

A. General: A blend of tumbled small pebbles and fortified white Portland Cement specially formulated for swimming pools.

B. Basis of Design: Provide "Freestone" Pool Finish System by Premix Marbletite,or approved equal.

C. Color and Texture: Color to be determined by Architect.

D. Mix pool finish in strict compliance with manufacturer's written recommendations.

E. Calcium Chloride shall not be used in the mix.

2.18 POOL TILE MARKINGS

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials".

C. All tiles shall be 2x2 inch ceramic tile. Tile shall be certified for use in pools. .Provide products from:
1. American Olean Tile Company
2. Dal Tile
3. United States Ceramic Tile
4. Lone Star Ceramics
5. or approved equal.

D. Mortar and Grout Materials: Provide products from one of the following manufacturers:
1. American Olean Tile Company.
2. Boiardi Products Corporation.
3. Bonsal: W.R. Bonsal Company.
4. Laticrete International, Inc.
5. Mapei Corporation.
6. Southern Grouts & Mortars, Inc.

E. Tile size and color shall be based on the following American Olean products:
1. Unglazed porcelain Ceramic Mosaics; 2 x 2 inch with abrasive finish.
2. Tile Colors: Colors to be selected by Architect from "A" price Group (American Olean) or premium price group (3) (Daltile).
   a. Type 1: Pool Scum Line Gutter tiles f: Glazed ceramic mosaic tile; 2x2 inch. Color: TBD
   b. Type 2: Stair treads, risers, lane markings wall targets and below water bench: Unglazed porcelain Ceramic Mosaics; 2 x 2 inch with abrasive finish. Color: TBD
   c. Type 2R Pool break line at 5' depth: Unglazed porcelain Ceramic Mosaics; 2 x 2 inch with abrasive finish. Color: Red D017.

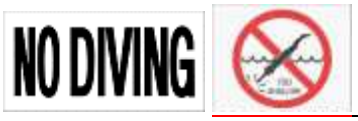
F. Mortar Bond Coat: Dry-set mortar or latex Portland cement mortar on a cured bed to conform with ANSI A108.5

G. Grout: Non sanded latex-Portland cement grout conforming with ANSI A118.6

2.19 TILE SAFETY MARKINGS AND GRAPHICS

A. Tiles with Marking at Graphics: Provide tiles manufactured by Tile Specialties, Spring Hill, Florida 904-686-8670 or approved equal. www.tilespecialties.com

B. Deck Level No Diving Tiles: 6” x 12”, flat, skid resistant tile. 6” black letters “NO DIVING” on white tile with international graphic for “no diving”. Provide 26 tiles to be located in the field. .

1. 

Type 1

C. Deck Level Depth Marking Tiles: 6” x 6”, flat, skid resistant tile. 4” black letters “x ft, x in” on white tile. At locations indicated on drawings. Provide “At Drain” tiles at sides and end of each pool. Provide at all even foot and ½ foot depths. Around both pools.

1. 

Type 2

2. 

Type 2D

2.20 RACING LINE AND ROPE FLOAT ANCHORS

A. Basis of Design: Standard Bronze Company Model 5454, 4 inch square Rope Anchor with 3/8 inch stainless steel BAR CPB.

2.21 CEMENT GROUT

A. Cement Grout: Portland Cement and fine aggregates; Non-metallic, non-shrink: Grout shall be Sika Grout 212 as manufactured by Sika Corporation or equal. Mixing shall be done in accordance with manufacturers guidelines.

PART 3 - EXECUTION

3.1 COORDINATION OF EXCAVATION

A. Prior to the start of the pool construction, the site shall be properly prepared to an elevation of that is equal to the floor finish less the thickness of the pool bottom.

B. Swimming pool sub-contractor shall be responsible for hand shaping of the pool shell.

C. The General Contractor shall control rough grading beyond the pool contract limits so that ground is pitched to prevent water running into the excavated area of the pool.

3.2 POOL TANK LAYOUT

A. Swimming pool subcontractor shall mark off grades and elevations and stake out finished pool shape and elevation prior to start of excavation.

B. Placement Guides:
   1. Provide an adequate header form to assure proper placement and installation of the gutter system.
   2. At all straight sections including the pool bottom, walls, and ramps, install ground wires for accurate cutting of the interior face of the pneumatically applied concrete.

3.3 POOL FORMWORK

A. General: Design, erect, support, brace and maintain forms, according to ACI 301, to support Shotcrete and construction loads and to facilitate shotcreting. Construct forms so Shotcrete members and structures are secured to prevent excessive vibration or deflection during shotcreting.
   1. Fabricate forms to be readily removable without impact, shock or damage to shotcete surfaces and adjacent materials.
   2. Construct forms to required sizes, shapes, lines, and dimensions using guide wires to obtain accurate alignment, location, and grades in finish pool structures. Construct forms to prevent mortar leakage while allowing air to escape and rebound during shotcreting. Provide openings, offsets, blocking, screeds, anchorages, inserts, and other features required for the Work.

B. Form openings, chases, recesses, bulkheads, keyways, and screeds in formwork. Determine sizes and locations for trades providing such items. Accurately place a securely support items built into the forms.

3.4 POOL REINFORCING AND PLACMENT OF EQUIPMENT

A. General: Comply with CRSI's "Manual of Standard Practice: for fabricating, placing and supporting reinforcement.

B. Reinforcing Steel:
   1. All reinforcing steel shall be in place before pneumatically applied concrete work is placed and positioned and of the sizes indicated on the approved shop drawings.
   2. Reinforcing steel shall be free from rust, dirt, oil, paint, or mill scale, earth, ice and other materials that weaken shotcrete bonding.
   3. Reinforcing steel shall be supported with metal chairs, runners, bolsters, spacers and hangers to prevent displacement before or during placement of shotcrete.
   4. Accurately position, support, and rigidly secure reinforcement against displacement by formwork, construction, or shotcreting.
   5. Place reinforcement to obtain minimum coverage for shotcrete protection. Arrange, space, and securely tie bar supports to hold reinforcement in position during shotcreting. Set wire ties with ends directed into shotcrete, not toward exposed shotcrete surfaces.
   6. Reinforcement should be tied at every other intersection to bars or more. Rows of bars shall be adequately tied to prevent vibration during shotcrete application.
   7. Wall and slab steel shall be securely wired together at all points where bars cross, and shall not lap less than 40 bar diameters.

C. Placing Fittings: Place, before commencing shotcrete work, all necessary pool fittings and anchors that are to be embedded and be responsible for their positioning.

D. Bonding: All reinforcing steel and metallic fittings and equipment within the pool tank shall be properly bonded according to National Electrical Code. Coordinate with Section 260000 – Electrical.

3.5 JOINTS

A. Construction Joints: Locate and install construction joints tapered to a 1:1 slope where joint is needed. Continue reinforcement through construction joints, unless otherwise indicated on the approved shop drawings.

B. Thoroughly clean join immediately after creating it to remove any material rebound. In the wet mix process power wash the joint before commencing with the next shotcrete application.

3.6 WATERSTOPS

A. Waterstops: Provide in joint between wall and floor. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions. Prevent displacement during shotcrete application.

3.7 ALIGNMENT CONTROL

A. Guide Wires: Install ground wires to establish thickness and planes of shotcrete surfaces. Install ground wires at corners and offsets not established by forms. Pull ground wires taut and position adjustment devices to permit additional tightening.

B. Provide adequate markings by tape of marking paint to identify wire and prevent accidental damage or lost position by construction personnel.

3.8 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by shotcrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.9 APPLICATION

A. Only experienced foremen, gunmen, and nozzlemen meeting the minimum experience standards specified in Part 1 of these Specifications shall be employed.

B. Apply temporary protective coverings and protect adjacent surfaces against deposit of rebound and overspray or impact form nozzle stream.

C. Moisten wood forms immediately before placing shotcrete where form coatings are not used.

D. Apply shotcrete according to ACI 506.2

E. Apply dry-mix shotcrete materials within 25 minutes after pre-dampening and wet-mix shotcrete materials within 90 minutes after batching.

F. Deposit shotcrete continuously in multiple passes, to required thickness, without cold joints and delaminations developing. Place shotcrete with nozzle held perpendicular to receiving surface. Begin shotcreting in corners and recesses.
   1. Remove and dispose of rebound and overspray materials during shotcreting to maintain clean surfaces and to prevent rebound entrapment.
   2. Rebound and overspray shall not be used for any application.

G. Maintain reinforcement in position during shotcreting. Place shotcrete to completely encase reinforcement and other embedded items. Maintain steel reinforcement free of overspray and prevent build-up against front face during shotcreting.

H. Do not place subsequent lifts until previous lift of shotcrete is capable of supporting new shotcrete.

I. Do not permit shotcrete to sag, slough, or dislodge.

J. Remove hardened overspray, rebound, and laitance from shotcrete surfaces to receive additional layers of shotcrete; dampen surfaces before shotcreting.

K. Do not disturb shotcrete surfaces before beginning finishing operations.

L. Remove ground wires or other alignment control devices after shotcrete placement.

M. Shotcrete Core Grade: Apply shotcrete to achieve mean core grades specified in Part 1 of these specifications.

N. Installation Tolerances: Place shotcrete without exceeding installation tolerances permitted by ACI 117R, increased by a factor of 2.

3.10 SURFACE FINISHES

A. General: Finish shotcete according to descriptions in ACI 506R and Part 2 Article above.

B. Finish: A gun finish is acceptable at areas to receive tile.

3.11 CURING AND PROTECTION OF DRY MIX SHOTCRETE

A. General: Protect freshly placed shotcrete from premature drying and excessive cold or hot temperatures.

B. Start Initial curing as soon as free water has disappeared from shotcrete surface after placing and finishing.

C. Curing Exposed Surfaces: Cure shotcrete by one of the following methods:

1. Moisture Curing: Keep surface continuously moist for at least seven days with water, continuous water-fog spray, water-saturated absorptive covers, or moisture retaining covers. Lap and seal sides and ends of covers.
2. Chemical Curing: Provide application of curing compound in strict accordance with manufacturer's written recommendation. Basis of Specification Product:
   a. Kurez Wvox by Euclid Chemical Company
      1) Water based wax emulsion curing compound
      2) White opaque liquid that dries clear
      3) Percent Solids: 15%
      4) Zero VOC
      5) ASTM C 309, Type 1, Class A
      6) AASHTO M 148, Type 1, Class A & B
      7) USDA compliant
   b. Or equal.

D. Shotcrete surface shall be protected against frost and rapid drying, and kept moist for at least seven days after placing. During this period, concrete shall be maintained above forty (40) degrees Fahrenheit for a least five (5) days and shall conform to ACI 305R and ACI 306R. Protect from rapid drying in warm weather in accordance with ACI 205R.

3.12 FORM REMOVAL

A. Forms not supporting weight of shotcrete may be removed after curing at no less than 50 degrees F for 24 consecutive hours after gunning provided the shotcrete is hard enough to avoid damage by form removal operations and provided curing and protection operations are maintained.
   1. Leave forms supporting weight of shotcrete in place until shotcrete has attained design compressive strength. Determine compressive strength of in-place shotcrete by testing representative field-cured specimens of shotcrete.

3.13 CEMENT GROUT

A. Shall be composed of one volume of Portland cement to two volumes of fine aggregates.

B. The material shall be mixed dry and water added just sufficient to make the mixture flow under its own weight.

C. For dry tamp cement grout, a minimum of water shall be added to the mix so that when wet sample is squeezed hard in the hand, surface moisture but no free water shall appear on the sample.

D. All ceramic tiles shall be set in full beds of cement grout prior to plastering.

3.14 TILE INSTALLATION

A. Tiles shall be installed using TCA Method P601TB-11, thin-set swimming pool installation.
   1. Cementitious Bond Coat: ANSI- A118.4 or better.
   2. High performance epoxy grout, non-sag formula.

3. Grout shall be installed according to ANSI- A118.3.
4. Basis of Specification Grout: SPECTRALOCK® PRO Premium Grout
   a. LATICRETE International, Inc., http://www.laticrete.com.
   b. Color shall be white.
   c. Or approved equal.

3.15 POOL PLASTER FINISH

A. Interior surfaces of the Pool shall be thoroughly cleaned of dust, oil, or other loose material before application of any succeeding plaster coats, using diluted muriatic acid.

B. Interior surfaces of the pool shall receive a finish coat of graded white aggregates and white cement. This coat shall be approximately 1/2 inch in thickness, applied in two successive coats, shall be floated to a uniform plane and trawled to a smooth, dense, impervious surface, exercising extreme care to avoid stains.

3.16 AGGREGATE QUARTZ FINISH

A. Do not commence finish work until after tile markings have been set and grouted.

B. Mixing: Mix finish in strict accordance with manufacturer's written requirements.

C. Substrate should be cool and damp but not dripping wet. Mist the shell with cool clean water but do not leave standing water.

D. Discard unmixed material (lumps).

E. Apply a scratch coat to the bowl first. The bowl will set up last and it will be necessary to walk on the bowl during the exposure process.

F. Apply a finish coat to the entire pool surface working to 3/8 – ½ inch thickness. Install finish using the "Slick Trowel ling" technique:

1. Bring the cement paste to the surface during toweling and remove with the trowel.
2. A "slick" surface is provided that will minimize the exposure.
3. The aggregate can be seen through a thin film of cement paste after trowel ling is complete.
4. Fill all shoe spike holes with aggregate.

G. Exposure: The final finish of the quartz aggregate finish requires an "exposure" process.

1. Adequate Workmen: Provide one workman for every 300 square feet of surface to ensure proper exposure.
2. Start exposure process in strict accordance with manufacturer's written recommendations.
3. Water Washing with Brushes:

a. Starting by washing away cement paste with water and brushes. Use a bucket first then progress to a soft flow of water from a garden hose as the material begins to harden. Begin using stiff bristle brushes as the set progresses.
b. Examine the plaster for hot spots that may set quickly. Mist these areas with water to allow longer exposure time. Over-cured cement paste will not remove easily and may require stiff bristle brushes to remove.
c. Maintain a sump pump in the main drains at all times to discharge the wash solution. Dispose of wash in an approved manner.
d. Do not leave hoses, buckets or other items on the finish during exposure process.
e. Final finish shall be a surface with uniformly removed cement paste.

4. If required to correct water washing exposure, acidwash the surface with a solution of 25% muriatic acid. Provide proper safety equipment while using acid. Neutralize and discard the wash solution in an approved manner.

3.17 EQUIPMENT INSTALLATION

A. Coordinate the pool construction with pool gutter, piping and equipment specified in Section 131110.

B. Coordinate the pool construction with pool deck equipment specified in Section 131146.

C. Coordinate the pool construction with water features specified in Section 131413.

3.18 ELECTRICAL

A. All equipment within the pool structure and the pool structure itself shall be properly bonded according to the NEC, Applicable Massachusetts Codes; latest edition. Coordinate with Section 260000-ELECTRICAL.

3.19 FIELD QUALITY CONTROL

A. Testing and Inspecting; Owner shall engage a qualified independent testing agency to sample materials, visually grade cores, perform tests, monitor all shotcrete operations and submit reports during construction.

B. Air Content: ASTM C173, volumetric method or ASTM C231, pressure method; one (1) test for each compressive strength test for each mix of air-entrained, wet mix shotcete measured before pumping.

C. Shotcrete Temperature: ASTM C1064; One (1) test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and 1 test for each set of compressive strength specimens.

D. Test Panels: Test panels shall be taken every day or every 50 yards of material whichever is less. Test panels should be cored from the test panel yielding cores not less than 3 ½ inches in diameter. Three test samples shall be cored from each panel for test breaks at 7, 14, and 28 days.

1. Dry mix panels shall be shot on the ground with no box needed: nozzlemen should build-up a 24 by 24 inch test panel at least 8 inches thick.

2. Wet mix test panels should be an 8 inch deep box 24 by 24 inches square built on site.

E. In-Place Shotcrete: If samples indicate unsatisfactory shotcrete, and only if directed by the Owner, OPM and Architect, non-destructive testing shall be performed on the structure followed by coring if still deemed necessary.
1. Take a set of 3 unreinforced cores for each mix for each workday or for every 50 cubic yards of shotcrete placed; whichever is less. Test cores for compressive strength according to ACI 506.2 and ASTM C42. Do not cut steel reinforcement.

F. Strength of Shotcrete will be considered satisfactory when mean compressive strength of each set of 3 unreinforced cores equals or exceeds 85 percent of specified compressive strength, with no individual core less than 75 percent of compressive strength.
1. Mean compressive strength of each set of three (3) unreinforced cubes shall equal or exceed design compressive strength with no individual cube less than 88 percent of specified compressive strength.

3.20 REPAIRS

A. Remove and replace shotcrete that is delaminated or exhibits laminations, voids, or sand/rock pockets exceeding limits for specified core grade of shotcrete.
1. Remove unsound or loose materials and contaminants that may inhibit bond of shotcrete repairs. Chip or scarify areas to be repaired to extend necessary to provide sound substrate. Cut edges square and ½ inch deep at perimeter of work, tapering remaining shoulder at 1:1 slope in cavity to eliminate square shoulders. Apply concrete patch by one of the following methods:
a. Dampen surfaces and apply new shotcrete
b. Apply bonding agent per manufacturer's recommendations. Use concrete patching mortar t repair defect.

B. Repair core holes from in-place testing according to repair provisions in ACI 301 and match adjacent finish, texture and color. Apply bonding agent per manufacturer's recommendations. Use concrete patching mortar to repair defect matching the strength of the shotcrete.

3.21 APPLICATION OF WATERPROOFING IN SURGE TANK

A. Repair of Defects: Surface defects shall be repaired in accordance with manufacturer's instructions as follows:
1. Form Tie Holes, Construction Joints, Cracks: Chip out defective areas in a "U" shaped slot one inch (25 mm) wide and a minimum of one inch (25 mm) deep. Clean slot of debris and dust. Soak area with water and remove excess surface water. Apply a slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m2) to the slot. Allow slurry to reach an initial set, then fill cavity with Dry-Pac. Compress tightly into cavity using pneumatic packer or block and hammer.
2. Rock Pockets, Honeycombing or Other Defective Shotcrete: Rout out defective areas to sound concrete. Remove loose materials and saturate with water. Remove excess surface water and apply a slurry coat of Xypex Concentrate to area. After slurry has set, but while still "green", fill cavity to surface level with non-shrink grout.

B. Wetting Shotcrete: Prior to application of waterproofing treatment, thoroughly saturate concrete surfaces with clean water as required to ensure migration of crystalline chemicals into voids and capillary tracts of the concrete. Remove free surface water before application.

C. Construction Joints: Apply Xypex Concentrate in slurry form at a rate of 2.0 lb./sq. yd. (1.08 kg/m2) to joint surfaces between concrete pours. Moisten surfaces prior to slurry application. Where joint surfaces are not accessible prior to pouring new shotecrete, consult manufacturer for application procedure.

D. Sealing Strips and Coves: Prepare concrete surfaces that will come into contact with sealing strips and coves by applying one coat of Xypex Concentrate in slurry form at a rate of 1.5 lb./sq. yd. (0.8 kg/m2). Then apply Xypex Concentrate in Dry-Pac form (sealing strip) or Xypex Modified in mortar consistency (cove) after slurry coat has reached an initial set but is still "green".
   1. Sealing Strips: Where indicated on drawings, fill preformed grooves, one inch (25 mm) wide and minimum of 1.5 inch (37 mm) deep, located at construction joints with Xypex Concentrate in Dry-Pac form. Compact Dry-Pac tightly into groove using a pneumatic packer or hammer and block.
   2. Coves: Where indicated on drawings, trowel apply and pack Xypex Modified mortar into a cove shape.

E. Surface Application: After repairs, surface preparation, treatment of construction joints and sealing strip placement have been completed in accordance with manufacturer's product data and as specified herein, apply Xypex treatment uniformly to concrete surfaces with semi-stiff bristle brush or broom, or suitable spray equipment. Application rates and locations shall be as indicated in the drawings and in accordance with manufacturer's product data. When brushing, work slurry well into surface of the concrete, filling surface pores and hairline cracks. When spraying, hold nozzle close enough to ensure that slurry is forced into pores and hairline cracks.
   1. First Coat (of one or two coat application): Apply Xypex Concentrate slurry coat to locations indicated on drawings in accordance with manufacturer's product data.
   2. Second Coat (of two coat application): Where indicated on drawings or as required by manufacturer's product data, apply Xypex Modified slurry coat while first coat of Xypex Concentrate is still "green" but after it has reached an initial set. Use light prewatering between coats when rapid drying conditions exist.

3.22 CURING

A. A. General: Begin curing as soon as Xypex coating has hardened sufficiently so as not to be damaged by a fine spray. Cure Xypex treatment with a mist fog spray of clean water three times a day for 2 to 3 days, or cover treated surfaces with damp burlap for the prescribed period. In warm climates, more than three sprayings per day may be necessary to prevent excessive drying of coating.

B. Air Circulation: Do not lay plastic sheeting directly on the waterproofing coating as air contact is required for proper curing. If poor circulation exists in treated areas, it may be necessary to provide fans or blown air to aid in curing of waterproofing treatment.

C. C. Holding Structures: For concrete holding structures such as swimming pools, reservoirs, water treatment tanks and wet wells, cure Xypex treatment for three days and then allow treatment to set (air cure) for 12 days before filling structure with liquid. For structures holding

hot or corrosive liquids, cure waterproofing treatment for three days and allow to set for 18 days before filling.

D. Protection: During the curing period, protect treated surfaces from damage by wind, sun, rain and temperatures below 36oF (2oC). If plastic sheeting is used for protect- ion, it must be raised off of waterproofing coating to allow sufficient air circulation.

E. Curing Agent: If moist curing is not possible, use a chemical curing agent that is specifically designed for or compatible with the approved crystalline waterproofing treatment. Curing agent shall have at least two years of successful field use and shall be approved by waterproofing manufacturer in writing.

3.23 POOL FILLING

A. After plaster and quartz finish is exposed, let it air dry for as long as conditions will allow. Delaying the fill water a few hours or until the next morning to reduce the occurrence of shade variations (mottling).

B. Dose water with recommended additives during filling and according to finish manufacturer's written recommendations.

C. Dissolve all chemicals in water first and allow sufficient time for each chemical to be fully dispersed before adding additional chemicals. Do not add chlorine or calcium chloride.

D. Start the circulation system as soon as possible using the main drain line. Circulate the water continuously for the first 3 days.

E. On the first day test, adjust and record chemistry as follows:
1. ph : 7.2 – 7.4
2. total alkalinity 100 ppm

F. Brush the entire surface twice each day for the first 3 days.

G. On the second day, repeat chemical adjustments and brushing.

H. On third day, adjust all the chemistry to the following levels:
1. ph : 7.4
2. free chlorine: 1.0-3.0 ppm
3. total alkalinity 120 ppm
4. Calcium Hardness 200 ppm
5. Stabilizer 30-90 ppm

I. Coordinating dosing with Section 131510

3.24 WATER SAMPLING AND TESTING

A. Scope: Take and deliver samples to a MA State Certified Laboratory in accordance with 105 CMR 435.28 (435.280)

B. All samples shall be collected, dechlorinated, and examined in accordance with the procedure outlined in the latest edition of the American Public Health Association Standard Methods for the Examination of Water and Waste Water (. The bacteriological quality of the water from the pool shall meet the following standards: No sample shall:
   1. (A) Have a heterotrophic plate count (HPC) of 200 bacteria or more per milliliter of water; or,
   2. (B) contain coliform organisms in any of the five 10-milliliter portions of a sample or more than 1.0 coliform organism per 50 milliliters when the membrane filter test is used; or
   3. (C) Contain Pseudomonas aeruginosa organisms in any of the five 10 milliliter portions of a sample or more than 1.0. Pseudomonas aeruginosa organisms per 100 milliliters when the membrane filter test is used.; or
   4. (D) contain total staphylococci or Staphylococcus aureus of 50 bacteria per 100 milliliters of water.

C. Acceptance of the pool by the Board of Health is subject to satisfactory test results.

END OF SECTION 131113

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SECTION 131146 - SWIMMING POOL DECK EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Contractor shall provide all labor, materials and equipment to install the pool deck equipment outlined below complete and in place around the proposed pool perimeters, within the pool deck surfacing as shown on the plans or listed within the specifications.

B. Work includes, but is not limited to:
1. Starting Platforms and Sockets.
2. Back Stroke Stanchions
3. Pool Ladders
4. Assist rails at steps and ramps.
5. Permanent lifeguard chairs
6. 1 Meter Diving Board Assembly
7. Safety Ropes and Floats
8. Pool Racing Lanes with reel storage units
9. Emergency Eye Wash Units

C. Related Sections:
1. 131100-General Provisions for Swimming Pool for general warranty and standards information.
2. 131113- Swimming Pool Construction for coordination of deck equipment within the pool structure.
3. 260526- Electrical Pool Bonding for bonding requirements of deck equipment.

1.3 SUBMITTALS

A. Samples: Provide samples of all specified materials requested by the Architect.

B. Product Data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Materials list for items proposed to be provided under this Section.
2. Manufacturer's specifications, copies of guarantees and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

C. Shop drawings in sufficient detail to show design criteria, fabrication, installation, anchorage, and the interference of the work of this Section with the work of adjacent trades.

D. Provide operation and maintenance manuals compiled in accordance with the provisions of Division 1 Specifications.

1.4 GUARANTEES

A. Attention is directed to provisions of the general documents regarding guarantees and warranties for work under this contract.

B. Manufacturers shall provide their standard guarantees for work under this section. However, such guarantees shall be in addition to and not in lieu of all other liabilities, which manufacturers and Contractor may have by law or by other provisions of the Contract Documents.

PART 2 - PRODUCTS

2.1 GENERAL

A. General: Equipment is based on a specific manufacturer's model to establish standard of quality and should not limit the use of other manufacturers' products.

B. Acceptable Manufacturers of Deck and Safety Equipment:
1. Pentair Commercial Aquatics, 1351 Route 55, LaGrangeville, NY 12540-5105; ASD. Tel: (845)-4653-7245
2. S.R. Smith Inc. , 105 Challenger Dr. Portland, Tennessee 37148, Tel: (615) 325-0770, Fax (615) 325-0775, Website: http://www.srsmith.com.
3. Spectrum Pool Products, 7100 Spectrum Lane, Missoula, MT 59808, Tel: (406) 543-5309, Fax (406) 728-7143, Website: http://www.spectrumproducts.com.
4. or approved equal.

2.2 STARTING PLATFORMS

A. Starting Platform: SR Smith Legacy Single Post Starting Block
1. Powder-coated, stainless steel frame is secured to the pool deck with a patented RockSolid® anchor to eliminate platform movement.
2. High-impact footboards with laminated cores reinforced with fiberglass in a gelcoat skin with a non-slip tread
3. The 2.5” square, 304 stainless steel tubing is powder-coated for added corrosion resistance
4. Meets FINA, NCAA, NFSHSA, USMS, USAS competition pool rules and regulations STANCHIONS
5. Numbered 1 through 8.

2.3 BACKSTROKE

A. Sockets for Stanchion Posts for Backstroke stanchions: Stanchion socket shall be cast bronze with vandal proof threaded plug, by Pentair or Spectrum

B. Stanchions for Backstroke: Provide stanchions of stainless steel tube, 1.90 by 0.109 wall thickness. Stanchions shall be equipped with top U-hook and sliding eyebolt collar. Finish height shall be 4 feet above finish pool deck for recall stanchions, 7 feet for backstroke stanchions.. Pentair or spectrum. Each stanchion is to be provided with (2) anchorages.

C. Backstroke Flags: 2 sets of 7 inch nylon backstroke flags on 3/16 inch braided nylon cord with nylon zinc plated swivel hooks.
   1. Set 1:
      a. Colors: Alternating colors to be selected.
      b. Custom Printing with “NEWTON BLUDEFISH”
   2. Set 2:
      a. Colors: Alternating multi-color. Colors to be selected.

2.4 LADDERS

A. Anchorage for Ladders: Anchorage shall be cast bronze with escutcheon plate.

B. Ladders: Ladders shall be 24-inch-wide Standard Cross Brace Plus Commercial Ladder by SR Smith. The width of frames from front to back shall be 24”. 1.90-inch pipe with wall thickness of 0.109 inches.
   1. 3-Step Ladders
   2. 4-Step Ladders
   3. 5-Step Ladders

2.5 RAILS

A. Stair Assist Rails: Provide custom fabrication. Pentair 1.90 inch by 0.109 inch wall thickness rails. Anchorage shall be cast bronze with escutcheon plate. At stairs per Drawings.
   1. Provide deck return rail adjacent to stair wall to prevent bathers from walking onto peninsula.

B. Custom Fabricated Ramp/Zero Depth Handrails and Guard: Provide Custom fabrication, including anchorage, for the HCP Access Ramp Handrails as indicated. Provide Type 304 polished to Assist Rails: Provide custom fabrication. Pentair 1.90 inch by 0.109 inch wall thickness rails. Anchorage shall be cast bronze with escutcheon plate.

C. Barrier Rails at Deck: At location indicated to prevent access to peninsulas and guard the zero depth deck transition edge, provide custom railings as indicated. KDI Pentair. 28102 with escutcheon plate.

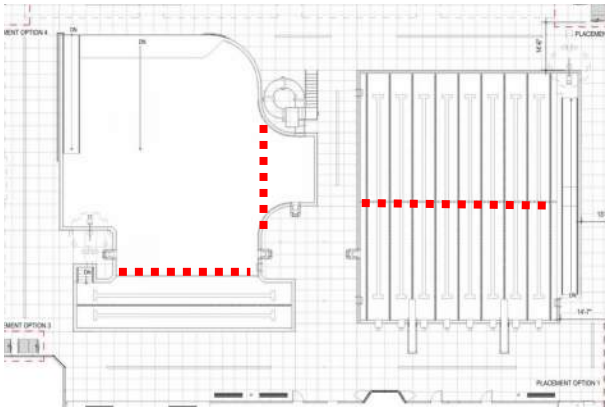
2.6 LIFE GUARD CHAIRS

A. High Platform Lifeguard Chairs: 6 foot high Paraflyte OSHA Chair by Pentair, Chairs shall include devices for holding a life ring and umbrella.

2.7 DIVING TOWER

A. 1-Meter Diving Tower: Duraflex International 1 meter Diving Stand No. 70-231-400
   1. Surface mounted stand with 16 ft Duraflex aluminum diving board
   2. Complete unit including stand, ladder assembly, fulcrum assembly and main support.
   3. Base shall be heavy duty aluminum casting with epoxy powder coating
   4. Double Stainless steel guardrails

2.8 SAFETY LINES AND FLOATS

A. Floats: Spectrum Pool Products Handi-Lock Floats: 5 by 9 inches for ½ inch diameter rope. Color to be determined. Rope for floats shall be ½ inch diameter, white, polypropylene rope. Provide hook at each end of rope Provide length to span pool and sufficiently taught to prevent slippage of hook end. Hook end for rope shall be Spectrum straight clamp rope hook model 58030.
   1. Provide as shown
   2. 
   3. Provide at edge of lap area in zero depth pool.

2.9 RACING LANE LINES

A. Provide two complete sets of the following:
   1. 4.75 inch Anti-waive Swim Racing Lanes
   2. 25 yard (75 feet)
   3. Polyethylene discs with UV resistant additives.
   4. Interspersed blow-molded floats
   5. 2,000 pound test strength, 2-, strand 1/8 inch un-coated stainless steel cable
   6. 15 ft. End Segments: Solid color to be selected
   7. Alternating body colors: 2 to be selected, color to be selected.

B. Racing Reel Carriers
   1. Large Capacity Swim Lane Line Storage Reels

2. Wheel rollers lockable in stationary position
3. Size Approximately 72 inches long, 53 inches wide, and 64 inches high.
4. Provide 2 carriers each carrying nine (9) seventy five ft) lanes
5. Provide covers for each carrier

2.10 POOL LIFT

A. Basis of Design: Spectrum Portable Motion Trek BP Deluxe, Part Number 153121-DLX
1. 350lb lifting capacity
2. Self-operable from the deck and the water
3. 90 lifts per battery charge (TI Motion)
4. All stainless-steel construction (electropolished 304L grade)
5. Coated with Spectra Shield for maximum corrosion protection
6. Stabilizer bar significantly improves lift stability during transfer
7. Rotationally and vertically powered with 360-degree continuous power rotation
8. Accommodates setback of 6” to 22” and water draft up to 12”
9. Flip-down armrests for ease of transferring
10. Adjustable padded head rest
11. Seatbelt
12. Swingout footrest

2.11 RESCUE AND SAFETY EQUIPMENT

A. Emergency Eye Wash Stations: Portable, self-contained eyewash. Wall mounted. Eye wash flow is gravity activated and delivers 15 minutes of uninterrupted flushing. A 16-gallon minimum tank constructed of high-density, polyethylene. Provide three (3) 8 oz. bottle of bacteriostatic additive to keep wash ready for use anytime. **Meets ANSI Z358.1-2009**
1. globalindustrial.com
2. grainger.com
3. eyewashdirect.com
4. or equal.

B. Provide Two (2) units to be field located by the Architect and Owner.

2.12 POOL SAFETY COVER

A. Provide complete safety cover assembly based on the following:
1. Basis of Design Manufacturer: Meyco Pool Covers, Melville, NY 800-446-3926 www.meycovers.com
2. Style: Commercial Pool Cover
3. Material: Meyco “Rugged Mesh™” 6oz per square yard
4. Grab Tensile Strength: 300 lbs. MD, ASTM D 4632 minimum
5. Shade: 99 %

B. Cover shall be cut into largest sections practical. Provide cutout sections to allow zero depth handrails to remain in place.

C. Hardware: Provide all mounting hardware for a complete installation including, but not limited to:
   1. Stainless Steel Springs, 8-inches
   2. Brass screw type deck anchors
   3. Extension straps and yoke straps
   4. D -Rings
   5. Mounting hardware and tools

2.13 WINTERIZATION TIRE INNER TUBE

A. Provide tire inner tubes to be placed in the swimming pools beneath the pool covers to provide expansion capability for ice formed on pool surface. 40-44-inch heavy duty tire innertube with integral inflation stem. Available manufacturers include but are not limited to:
   1. Just Tubes On line Store https://justubes.com
   2. Ken Jones Tires, Worcester MA ttps://justubes.com/
   3. Town Faire Tires https://www.townfairtire.com/store/tires/massachusetts/shrewsbury/
   4. Or equal

B. Tires will be tied together with ½ inch polypropylene rope

C. Main Lap Pool
   1. Provide 4 tubes total
   2. Tie into two clusters of 4 to be floated into the center of the pool
   3. Provide additional length of rope to retrieve float cluster from perimeter

D. Zero Pool
   1. Provide 6 tubes total
   2. Tie into a cluster to be floated into the center of the pool
   3. Provide additional length of rope to retrieve float cluster from perimeter

PART 3 - EXECUTION

3.1 INSPECTION

A. The Swimming Pool Contractor shall examine all work prepared by others which is to receive the work of this Section and shall report any noted defects affecting the work of this Section to the Architect.

3.2 COORDINATION

A. Coordinate the Work of this Section with:
   1. Swimming Pool Work specified in Section 131113 and 131110.
   2. Concrete paving Work specified in Division 30.

3.3 INSTALLING EQUIPMENT

A. For equipment specified in this Section, install in strict accordance with the manufacturer's recommendations, anchoring firmly into position.

B. Verify that each item is properly installed and properly operating. Make required adjustments to achieve optimum operation.

C. The electrical subcontractor specified in Section 260000 shall bond all metal components according to the National Electric Code (NEC) and the Massachusetts Electrical Code.

END OF SECTION 131146

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SECTION 13 15 40 - SPRAY PARK, POOL WATER FEATURE AND POOL SLIDE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Spray Park: The spray park scope includes the spray features, pump, piping, control, manifold with flow and solenoid valves, actuators, pump and control enclosure, automatic pump shut off, main drains and piping to drywell.

B. Water Feature in Pool: Work includes saw cutting and removal of existing pool bottom to expose water supply line and extend line to new water feature. Restore pool bottom and constructing water feature base. Installing water feature and balancing flow with existing feature.

C. Pool Slide: Installation of the slide includes coring existing pool wall to connect wall suction inlets, underslab piping between the pool, pump and slide,

D. Spray Park work requires final design and engineering of the spray park. The proposed spray deck is a recirculation type. There are two primary zones with smaller zones controlled by multiple actuators.

E. Work includes pad, recirculation system, and filtration.

F. Related Sections:
   1. Section 260000- Electrical for power and bonding.
   2. Section 321800- non-Porous Spray Deck Surfacing for coordinating features with surface installation.

1.3 GUARANTEES

A. Interactives: The filament wound fiberglass stem and/or structural tubing furnished with the components shall be unconditionally warranted against rust for five years from the date of shipment and a guarantee against all defects in workmanship and material for a period of one year from shipment, on all other components.

PART 2 - PRODUCTS

2.1 SPRAY PARK-

A. Proposed spray park design is based on features manufactured by
   1. Rain Drop Products 800-343-6063 www.rain-drop.com

B. Other manufacturers offering spray features that can meet the performance requirements include.
   1. Aquatix by Landscape Structures. 877-632-0503, www.aquatix.plylsi.com
   2. Vortex, https://www.vortex-intl.com/

C. Features include:
   1. FA: Rain Drop Leaf -001 MF OM ZCS
   2. FB: Rain Eco Rain Tree
   3. FC: Rain Drop Posie Activator
   4. FD: Rain Drop Tiny Tulip
   5. FE: Rain Drop Silly Wet Crab Tumble Bucket
   6. FF: Rain Drop Bubble Up
   7. FG: Rain Drop Slant Jets (Group of 4)
   8. FH: Rain Drop Pipe Falls Play Center Low Flow, Omni 15 GPM
   9. FI: Rain Drop Tall Tulip Spray
   10. FJ: Rain Drop Spinning Bee
   11. FK: Rain Drop Snappy The Turtle
   12. FL: Rain Drop Circle Time 12
   13. FM: Rain Drop Butterfly Arch (single arch)
   14. FN: Rain Drop Mini Spray Ring
   15. FO: Belle Jet Spray
   16. FP: Rain Drip Play Center

2.2 SPRAY PARK CONTROL

A. Provide Rain Drop Timer Control Panel for Spray Feature control.

B. Timer control shall provide control for six actuators. Provide manifold and solenoid valves connected to controller.
   1. Provide ball valves to control flow to each zone.

C. Activators A1 provide Rain Drop Bollard , Photo Sensor Activator BOL-004.

D. Activators A2, A3, and A4 provide Rain Drop Step Activator ACT-1001.

2.3 SWIMMING POOL WATER FEATURE

A. Rain Drop Pop Jets 4 Outlet Low flow PPJT-003-LF 8.6 GPM

B. Bollard actuator shall control operation of the spray features.

C. Future Water Feature: Provide block out and blank omni-pod to accommodate future water feature.

2.4 WATER SLIDE

A. The basis of design is Natural Structures Model 1663- RH00SP8-0736E12 or approved equal. Slide features:
   1. 30” inside diameter polyethylene water slide flume
   2. 270 degree turn
   3. Total run: 32 feet 4 inches.
   4. Entry Height: 8 feet 8 inches
   5. Water slide flume: color impregnated UV stabilized
   6. Platform: Aqua-Plast coated textured aluminum surface integrated with stair landing.
   7. Stairs: 7” rise, 11” tread, 36” wide; Aqua-Plast coated textured aluminum surface; closed risers.
   8. Stainless steel base plates, hardware and anchor bolts
   9. Deck top mounted
   10. 20 GPM water flow recommended; 20 to 40 GPM required
   11. Designed for a minimum water depth of 3 feet.

B. Slide Manufacturer shall provide signage and warning information for children and adults about hazards associated with slides and graphically show the potential for injury if the warnings are ignored.

C. Water Slide Pump: Specified in Section 131110

D. Check valve: As specified in Section 131110

2.5 PIPING AND FITTINGS FOR WATER FEATRUES AND SLIDE

A. As specified in Section 131110.

2.6 WATER FEATURE COLORS

A. Colors for the water features and slides shall be selected by the Architect and Cityfrom the manufacturer’s full range of available colors.

2.7 MAIN DRAINS- SPRAY DECK

A. Main drain sumps for spray deck shall be in pairs. Provide Lawson Aquatics Super Sump. Minimum 18 by 18 for circulation main drains in main lap pool and 12 by 12 for main drains in wading pool.
   1. Open grate area of 54% - allowing for a maximum flow rate
   2. Internal plumbing fittings
   3. Built-in water stops with two vertical extensions.
   4. A solid one-piece, tapered, injection-molded unit.
   5. Stainless steel screws and brass inserts •
   6. 10-year warranty
   7. Sumps and grates are white.

B. Main drains shall be provided with under drain collector assemblies and hydrostatic relief valves.

C. Grate shall be in tested and in compliance with ANSI/ASME 112.19.82007 (addendum 8a2008) per Section 1404 of the Virginia Graeme Baker Act (VGB) Pool & Spa Safety Act – December 2008.

PART 3 - EXECUTION

A. The Swimming Pool Subcontractor shall examine all work prepared by others which is to receive the work of this Section and shall report any noted defects effecting this work of this Section to the Architect.

3.2 INSTALLING EQUIPMENT

A. For equipment specified in this Section, install in strict accordance with the manufacturer's recommendations, anchoring firmly into position.

B. Mounting shall allow the component to be installed in existing or new (cured) concrete with stainless steel anchor wedges and without the need for mounting fixtures which are embedded in concrete at the time of pouring

C. Schedule installation to ensure that utility connections are achieved in an orderly and expeditious manner.

D. Verify that each item is properly installed and properly operating. Make required adjustments to achieve optimum operation.

E. Install equipment plumb, square, and straight, without distortion; securely anchor.

F. All metal components shall be bonded according to the NEC as specified in Section 260000.

3.3 ADJUSTING AND CLEANING

A. Touch up minor damaged surfaces caused by installation. Replace damaged components as directed by Architect.

3.4 FALL SHUT DOWN/SPRING START-UP

A. The spray park subcontractor shall train the Owner and perform the initial fall shut-down of the spray park.

B. Instructions covering the winterization of the spray park tank shall be posted in the Filtration Room. Upon initial completion of the Work, the Contractor shall instruct the Owner in winterizing the spray park..

C. The Contractor shall provide one (1) more days of instruction and operational check-out by a qualified representative of the Contractor during the first season of operation.

3.5 PROTECTION

A. Provide protective measures to prevent equipment and surfaces from damage by other construction activity.

END OF SECTION 131540

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SECTION 22 00 00 PLUMBING *(FILED SUB-BID REQUIRED)*

PART 1 - GENERAL

1.1 FILING OF SUB-BIDS

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in with the Awarding Authority at a time and method stipulated in the Bidding Requirements.

B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required in Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.

C. Specific information relating to sub-bidders is set forth in the Bidding and Contract Documents and the Sub-bidders are directed thereto.

D. Sub-bids filed with the Awarding Authority shall be accompanied by a Bid Bond issued by a responsible bank or trust company payable to the *City of Newton* in the amount of five percent of the Bid. A sub-bid accompanied by any other form of bid depository will be rejected.

E. Work to be done under this Section is shown on the Drawings _____

F. The listing of Contract Drawings above shall not limit the Subcontractors responsibility to determine the full extent of his work as required by all Contract Drawings.

G. Include GENERAL CONDITIONS and applicable parts of Section 011000 as part of this Section.

H. Examine all other Sections of the Specifications for requirements, which affect work under this Section whether or not such work is specifically mentioned in this Section.

I. Examine all other Sections of the Specifications for requirements which affect work under this Section whether or not such Work is specifically mentioned in this Section.

J. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to ensure the steady progress of all work under the Contract.

K. Trade Sub-Bid Requirements: None

1.2 SUMMARY.

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Selective Demolition of Existing piping and fixtures
2. Making safe existing piping supplying entry building
3. New domestic water and sanitary plumbing system.
4. New domestic, waste, and vent piping as indicated
5. New plumbing fixtures

1.3 ACTION SUBMITTALS

A. For each Type of Product Specified

PART 2 - PRODUCTS

2.1 Refer to Drawing Specifications

PART 3 - EXECUTION

3.1 Refer to Drawing Specifications

END OF SECTION 22 22 00

SECTION 26 00 00 - ELECTRICAL *(FILED SUB-BID REQUIRED)*

PART 1 - GENERAL

1.1 FILING OF SUB-BIDS

A. Sub-bids for work under this Section shall be for the complete work and shall be filed in with the Awarding Authority at a time and method stipulated in the Bidding Requirements.

B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required in Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.

C. Specific information relating to sub-bidders is set forth in the Bidding and Contract Documents and the Sub-bidders are directed thereto.

D. Sub-bids filed with the Awarding Authority shall be accompanied by a Bid Bond issued by a responsible bank or trust company payable to the *City of Newton* in the amount of five percent of the Bid. A sub-bid accompanied by any other form of bid depository will be rejected.

E. Work to be done under this Section is shown on the Drawings _____

F. The listing of Contract Drawings above shall not limit the Subcontractors responsibility to determine the full extent of his work as required by all Contract Drawings.

G. Include GENERAL CONDITIONS and applicable parts of Section 011000 as part of this Section.

H. Examine all other Sections of the Specifications for requirements, which affect work under this Section whether or not such work is specifically mentioned in this Section.

I. Examine all other Sections of the Specifications for requirements which affect work under this Section whether or not such Work is specifically mentioned in this Section.

J. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to ensure the steady progress of all work under the Contract.

K. Trade Sub-Bid Requirements: None

1.2 SUMMARY.

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Selective Demolition of Existing electrical equipment and fixtures

2. Making safe existing electrical equipment
3. New power distribution and devices
4. New light fixtures
5. New device and receptable covering
6. Power to new mechanical equipment
7. Pool Deck Power

B. Work of this Section includes
1. Section 260001- ELECTRICAL BONDING
2. Section 260002- FIRE ALARM

1.3 ACTION SUBMITTALS

A. For each Type of Product Specified

PART 2 - PRODUCTS

2.1 Refer to Drawing Specifications

PART 3 - EXECUTION

3.1 Refer to Drawing Specifications

END OF SECTION 26 00 00

SECTION 26 00 01 – ELECTRICAL POOL BONDI*NG (PART OF Filed Sub Bid Section 02 60 00)*

PART 1 - GENERAL

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish all labor, materials, and equipment necessary to complete all work as shown on sketch included at the end of this Section. This work is to include but not limited to the following:
   1. Electrical Provisions for pool work.
   2. Wiring of equipment for pool subcontractor
   3. Basic Electrical systems

B. This work is to include but not limited to providing a common pool bonding grid, wire and bonding to swimming pool and all pool equipment.

1.3 REFERENCES

A. All work shall conform to the NFPA National Electrical Code and all Federal, State and Local Codes and Utility Company Regulations as applicable.

B. NEC *Article 680 Swimming Pools, Fountains, and Similar Installations* applies to this work.

C. All products shall be UL listed.

1.4 QUALITY ASSURANCE

A. The proper installation and operation of equipment and systems shall be demonstrated to the satisfaction and requirements of the Architect.

1.5 SUBMITTALS

A. Supply catalog cuts or prints clearly describing units selected.

PART 2 - PRODUCTS

2.1 POOL BONDING

A. Aluminum conductors shall not be used.

B. Single conductors in conduits shall be copper with THWN or XHHW insulation.

C. Splices:
1. Where splices are required, provide using one of the two following methods:
2. Compression connectors of approved pattern
3. Exothermic welded connections.
4. Provide approved manufacturers water tight splice kits to insulate all splices.

PART 3 - EXECUTION

3.1 POOL BONDING

A. IMPORTANT NOTE: Coordinate for connection of all pool rebar and equipment bonds before concrete is applied.

B. Coordinate installation of pool grounding at beginning of project. Electrician must be present to perform his work before concrete is applied.

C. Provide red marking tape buried 6" to 10" below surface indicating any buried bond wires below that extend beyond the perimeter of the pool deck.

D. INSTALLATION, POOL BOND SYSTEM
1. Furnish and install any Code required ground rods.
2. Contractor to provide #8 CU bond for pool rebar, drains, water features, stanchions, metallic recessed ladder receivers, perimeter gutter drain and all other metallic components as prescribed in NEC article 680.26.
3. Provide and install 600 volt insulated bonding conductors throughout the bonding system with connection to each item of pool equipment, platform, ladder well, etc.
4. Bonding conductors shall be continuous. where possible.
5. Insulate any splices with approved insulation kit and makeup water tight to protect from corrosion and maintain the integrity of the splice.

END OF SECTION 26 00 01

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities, abandoning site utilities in place.
7. Temporary erosion and sedimentation control.

B. Related Requirements:
1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.
2. Section 024119- Selective Demolition for removal of bathhouse and pool components.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches (50 mm) in diameter; and free of weeds, roots, toxic materials, or other non-soil materials.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction.

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Rock stockpiling program.

C. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 QUALITY ASSURANCE

A. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct the park entrance or parking lot.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises Rock with Plaque adjacent to bathhouse as noted in Section 024119 Selective Demolition.

C. Utility Locator Service: Notify utility locator service Dig Safe “#811 for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

E. Do not commence site clearing operations in environmental resource areas subject to c91 permitting and the Newton Conservation Commission. Refer to Section 011400 Work Restrictions.

F. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site \.

3.4 EXISTING UTILITIES

A. The owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
1. Arrange with utility companies to shut off indicated utilities.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities: Do not interrupt utilities serving portions of Forest River Park outside the area of work, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than[five (5) days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without the Architect's written permission.

E. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches (50 mm in diameter, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to minimum depth of 6 inches (150 mm)] > in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Temporarily stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

D. Remove stockpile from site once soil classification testing is complete.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Burning tree, shrub, and other vegetation waste is permitted according to burning requirements and permitting of authorities having jurisdiction. Control such burning to produce the least smoke or air pollutants and minimum annoyance to surrounding properties. Burning of other waste and debris is prohibited.

C. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

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SECTION 312300 - EARTHMOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work of the Section consists of all earthwork and related items as indicated on the Drawings and/or as specified herein including, but is not necessarily limited to, the following:
   1. General excavation for work indicated.
   2. Trench excavation for work indicated.
   3. Providing, placing and compacting fill materials.
   4. Off-site disposal of excess or unsuitable material.
   5. Rough grading.

B. Related Requirements:
   1. Section 011401 Work Restrictions for restrictions related to Earth moving work.
   2. Section 024119- Selective Demolition for coordination with removed structures
   3. Section 13113-Swimming Pool Construction for coordination of pool tanks and earth moving requirements
   4. Section 311000- Site Clearing for coordination with removal of existing soils and removal of structures
   5. Section 312319- Temporary and Permanent Dewatering for construction dewatering

1.3 SITE CONDITIONS

A. Visit the site before bidding the work to observe the site conditions that may impact the design or implementation of the dewatering program. No changes to the bid relating to visible site conditions will be allowed if no Prebid site visit occurred.

B. Refer to the Order of Conditions issued by the City of Newton Conservation Commission.

1.4 STANDARDS

A. The following standards and definitions are applicable to the work of this Section to the extent referenced herein:
   1. ASTM: American Society for Testing and Materials.
   2. AASHTO: American Association of State Highway and Transportation Officials.
   3. Rock Excavation: Rock shall be defined as bedrock or original ledge which cannot be removed by conventional excavating equipment (Komatsu PC650LC-8 with a 4.98 cubic yard bucket or equivalent) and which requires the use of drills, explosives and/or a rock

splitter, as well as individual boulders over two cubic yards in open excavation and over one cubic yard in trenches that are removed by power excavating equipment without the use of drills or explosives.

4. Unsuitable material: is material that is not satisfactory for its intended purpose. Material such as but not limited to loam, subsoil, organic material, debris, frozen material or weak, soft, and uncompacted soil, including fill, or material containing roots or other organic matter all as determined by the Architect shall be considered unsuitable for supporting structures and pavements. Material that is rendered unsuitable through the Contractor's means and methods of construction will not be considered unsuitable for payment purposes even though the Contractor is required to remove and replace the unsuitable material.

1.5 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions **changes in the Work**.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed **1 cu. yd. (0.76 cu. m)** for bulk excavation or **3/4 cu. yd. (0.57 cu. m)** for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- (1065-mm-) maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp (103-kW) flywheel power with bucket-curling force of not less than 28,700 lbf (128 kN) and stick-crowd force of not less than 18,400 lbf (82 kN) with extra-long reach boom.
2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp (172-kW) flywheel power and developing a minimum of 47,992-lbf (213.3-kN) breakout force with a general-purpose bare bucket.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material **3/4 cu. yd. (0.57 cu. m)** or more in volume that exceed a standard penetration resistance of [**100 blows/2 inches (97 blows/50 mm)** when tested by a geotechnical testing agency, according to ASTM D1586.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.6 SITE CONDITIONS

A. The Contractor shall fully inform himself of existing conditions at the site and shall be responsible for carrying out all site work required to execute the work of the Contract fully and properly, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed.

B. Plans, surveys, measurements and dimensions under which the work is to be performed are believed to be correct to the best of the Architect's knowledge, but the Contractor shall have examined them for himself during the bidding period and formed his own conclusions as to the full requirements of the work involved.

C. Soil borings were conducted, and logs were prepared for purposes of design at the project site for unrelated projects. This information is offered to the Contractor for general information. The Contractor is advised to review this data for information that may be helpful to his understanding of subsurface conditions. No claim for extra compensation or extension of time will be allowed on account of subsurface conditions consistent with the data given, except as otherwise provided elsewhere herein. Interpretation of this data for purposes of construction is the responsibility of the Contractor. It is the Contractor's sole responsibility to make his own interpretations and draw conclusions with respect to the character of the materials to be

encountered and their impact upon his work based on his expert knowledge. Neither the Owner nor the Architect assumes responsibility for the accuracy of the data.

D. Work includes backfilling over portions of the existing pool to remain. The 1970 pool drawings have been included in the documents for reference.

1.7 PERMITS, CODES, AND SAFETY REQUIREMENTS

A. Comply with all rules, regulations, laws and ordinances of the City of Salem, the Salem Conservation Commission, the Commonwealth of Massachusetts, and all other authorities having jurisdiction over the Project Site. The Contractor shall provide all labor, materials, equipment and services necessary to make the work comply with these requirements without additional cost to the Owner.

B. Comply with the provisions of the Manual for Accident Prevention in Construction of the Associated General Contractors of America, Inc., and the requirements of the Occupational Safety and Health Administration, United States Department of Labor.

C. The Contractor shall obtain all permits and licenses required for the complete work specified herein and shown on the Drawings. Fees for permits issued by the City of Salem have been waived.

D. The Contractor shall not close or obstruct any street, sidewalk, or passageway without written permission from authorities having jurisdiction. The Contractor shall so conduct his operations as to interfere as little as possible with the use of roads, driveways, or other facilities near enough to the work to be affected by the work.

E. Any apparent conflict between the Drawings and Specifications and the applicable Codes and Regulations shall be referred to the Architect in writing, for resolution before the work is started.

F. Contact Dig-Safe at 811 prior to start of excavation work. M.G.L §40A-40E requires notification a minimum of 3 business days before start of work.

1.8 LAYOUT AND GRADES

A. The Contractor shall maintain, and existing benchmarks and survey monuments shown on the Drawings or establish new temporary benchmarks and layout points found to provide a base reference for the construction. Refer to Section 017300- Execution for construction layout requirements.

B. The words "finished grades" as used herein shall mean final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slope between points for which finished grades are indicated or between such points and existing established grades.
   1. Refer to all Documents including building, pool, and deck plans for grading.

1.9 PROTECTION OF EXISTING CONDITIONS

A. The Contractor shall observe all rules and regulations governing the respective utilities in executing work under this Section. All work shall be executed in such a manner as to prevent any damage to existing buildings, streets, curbs, paving, service utility lines, structures and adjoining property.

B. Locate and mark underground utilities to remain in service before beginning the work. Protect all existing utilities to remain in service during operations. Do not interrupt existing utilities except when authorized in writing by authorities having jurisdiction.

C. When an active utility line is exposed during construction its location and elevation shall be plotted on the Record Drawings by the Contractor and both the Architect and the Utility Owner notified in writing.

D. Inactive or abandoned utilities encountered during construction operations shall be removed, plugged, capped or filled. The location of such utilities shall be noted on Record Drawings and reported in writing to the Owner.

E. Provide barricades, fences, lights, signs, and all other safety devices required for the protection of the public.

F. In case of any damage or injury caused in the performance of work the Contractor shall, at his own expense make good such damage or injury to the satisfaction of, and without cost to, the Owner. Existing streets, sidewalks and curbs damaged during the project work shall be repaired or replaced to their condition prior to commencement of earthwork operations.

1.10 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct pre-excavation/earthmoving conference at **Project site**.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:

    a. Personnel and equipment needed to make progress and avoid delays.
    b. Coordination of Work with utility locator service.
    c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
2. Field quality control.

1.11 ACTION SUBMITTALS

A. Issue submittals in accordance with Division 1. Submittals under this Section shall include manufacturer's specifications and installation instructions

B. Product Data: For each type of the following manufactured products required:
1. Geotextiles.

1.12 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each **borrow** soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.
2. Laboratory compaction curve according to **ASTM D698**

B. Pre-excavation Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.13 SITE DEWATERING

A. Construction dewatering is specified in Section 312319. Dewatering.

1.14 TESTING

A. The Owner will retain a Testing Agency to perform on-site observation and testing during the construction operations. The Contractor shall coordinate the individual's required presence on the site with the Clerk/OPM and the construction activities. The services of the shall include the following:
1. Assessing conditions at the bottom of excavations for foundations, pool bottoms, and slab subgrade.
2. Field testing to assess degree of compaction.
3. Laboratory testing and analysis of fill materials specified, as required.

B. The Testing Agency's presence does not include supervision or direction of the actual work by the Contractor, his employees, or agents. Neither the presence of the Testing Agency nor any observations and testing performed by their representatives, nor any notice or failure to give notice, shall excuse the Contractor from defects discovered in the Work.

C. The Contractor shall provide a 50-pound sample of each fill material from each proposed source of supply. The Contractor shall include the name of the source and identify the specification item for which the material is proposed. Allow sufficient time for testing and evaluation of results before materials are needed. Once a source of supply for a specific material has been accepted for use on the project, the Contractor will bear the cost of testing for any additional materials submitted for the same use. This also includes the event where the gradation of the material within the source changes.

D. Architect will be sole and final judge of suitability of all material.

E. The Testing Agency will determine the maximum modified dry density and optimum water content of fill materials in accordance with ASTM D1557, Method D, and the in-place density in accordance with ASTM D1556 or ASTM D2167.

F. Tests of materials as delivered may be made from time to time. Materials in question shall not be used pending test results. The Contractor shall remove and legally dispose of off-site all rejected materials and replace with new, whether in stockpiles or in-place.

G. The Contractor shall bear the cost of testing materials that fail to conform to the Specifications.

1.15 SOIL CONDITION AND CHARACTERIZATION

A. Contaminated soil is not expected to be encountered on the site. Soil characterization testing will be required to confirm the soil classification.

B. Contractor requirements are expected to include soil characterization sampling for all soils removed from the site. Samples will be furnished to Owner's consultant for analysis.

C. Temporary stockpiling will be required until testing is complete.

D. The contractor shall assume within the base bid that all material may be taken and disposed of at location selected by the Contractor.
   1. Results of the analysis may require the contractor to dispose of excess material as urban fill on a regulated site. This will be addressed as a Contract Modification.

1.16 RECORD DRAWINGS

A. See SECTION 017839- Project Record Documents for provisions relative to record drawings.

1.17 CONTRACT WORK

A. All excavated material is unclassified general excavation and shall be removed and disposed of as required under this section.

B. If any part of the excavation is carried through error beyond the depth directed by the Architect and the dimensions indicated on the Drawings, or called for in the specifications, the Contractor, at his own expense shall furnish and install compacted gravel fill as directed by the Architect up to the required level and/or dimensions.

C. Excavation, removal, and/or disposal of unsuitable materials below the grades called for on the Drawings and specified herein, and additional rock as herein defined, shall be paid for in accordance with the "Contract Unit Price " or as determined by provisions of the Contract and Conditions of the Contract, after removal of such materials has been authorized by the Architect. The quantities of excavation, removal, disposal and backfilling involving an adjustment of the Contract Price shall be subject to measurement verification and approval by the OPM and Architect, prior to the removal of such materials. The Contractor shall not be compensated for removal of material lower than the depths determined by the Architect and OPM. The Contractor shall backfill unauthorized excavations with material and in a manner acceptable to the Architect.

D. Base Contract: The following lines shall be used to determine volume of materials to be excavated, removed or backfilled within the Base Contract. No additional payment shall be made for material lying within the specified limits.
   1. Footings and slabs: A vertical line twelve inches from the toe of the footings. The depth shall be measured to the 12-inches below the bottom of footings and slabs or as shown on the drawings, whichever is greater.

2. Pool Excavation: A line below the finish pool bottom established by the depth of the pool structure, sumps, piping and fittings and crushed stone drainage course below the pool.
3. Surface areas outside of structures: To the depth of the required subgrade.
4. Utility structures: Twenty-four inches outside of the walls and to the bottom of the structures.
5. Utility trenches: Width shall be the outside diameter of the pipe plus two feet. Maximum depth shall not exceed the bottom of the pipes, etc. Banks of trenches shall be measured vertically; if depth of excavation exceeds safety standards, cutback of excavation to establish a safe angle of repose or use of trench box shall be included in the Base Contract.

E. Compensation for all work required under this Section and not specifically covered elsewhere, shall be included in the Base Contract.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Fill materials shall conform to the following material descriptions. Gradation requirements shall be determined by ASTM D422 unless specified otherwise.

B. All material shall be well graded between the gradation limits shown.

C. Material termed “recycled”, “reprocessed”, or the like containing ground building debris, bituminous pavement or other similar non-soil materials or material coming from sources other than natural sand or gravel borrow pits free of hazardous residue shall not be used on this project without approval by the Architect.

D. On-site material for use in compacted fill shall meet the requirements specified herein for the intended material for use beneath lawn areas only.

E. Crushed stone shall consist of inert angular material derived from a stone quarry that is hard, durable, washed stone, free of deleterious materials. Gradation shall conform to MHD Specification Designation, M2.01.2 (1 ½ inch) , M2.01.4 (¾ inch), and the following:
1.

U.S. Sieve No.	M2.01.4 Percent Finer by Weight	M2.01.2 Percent Finer by Weight
2”		100
1.5”		95-100
1"	100	35-70
3/4"	90-100	0-25
1/2"	10-50	
3/8"	0-20	
No. 4	0-5	

F. Structural Fill: Well-graded natural sand and gravel free from clay, organic matter, surface coatings, or other deleterious materials conforming to following gradation:

1.

Opening or Sieve No.	Percent Passing by Weight
3 inches	100
1/2 inch	50-100
No. 4	35-85
No. 16	20-65
No. 50	5-40
No. 200	0-8

G. Dense graded crushed stone shall consist of angular material derived from a stone quarry that is hard, durable and free of deleterious materials. Material shall be free from clay, loam or other plastic material. Gradation shall conform to MHD Specification Designation, M2.01.7, and the following:

1.

U.S. Sieve No.	Percent Finer by Weight
2"	100
1-1/2"	70-100
3/4"	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

H. Gravel borrow shall consist of inert natural non-recycled material that is hard, durable stone, gravel and coarse sand, free from loam and clay, surface coatings, and deleterious materials. The material shall be well graded between the following limits:

U.S. Sieve No.	Percent Finer by Weight
3"	100
1/2"	50-85
No. 4	40-75
No. 10	30-60
No. 40	10-35
No. 100	5-20
No. 200	2-10
The amount passing the No. 100 sieve shall be between 40% and 70% of that amount passing the No. 40 sieve	

A. Granular fill shall consist of inert natural non-recycled material that is hard, durable stone, gravel and coarse sand, free from loam and clay, surface coatings, and deleterious materials. The material shall be well graded between the following limits:

U.S. Sieve No.	Percent Finer by Weight
2/3 loose lift thick-ness	100

10	30-95
40	10-70
200	0-15

I. Ordinary borrow shall be well graded, natural inorganic soil, meeting the following requirements:
1. It shall be free of organic or other weak or compressible materials, of frozen materials, and stones larger than six inches maximum dimension and not more than 35 percent passing the number 200 sieve.
2. It shall be of such nature and character that it can be placed in embankments and compacted to the specified density in a reasonable length of time.
3. It shall be free from highly plastic clays, from all materials subject to decay, decomposition, or dissolution and from cinders or other materials that will corrode piping or other metal.
4. It shall have a maximum dry density of not less than 110 lbs. per cubic foot.
5. Material from excavation on the site may be used as ordinary borrow if it meets the above requirements and is approved by the Architect.

I. Sand for Pipe Bedding: Material for pipe bedding shall meet the requirements specified in ASTM C144

J. Unsuitable Material: Material containing organic matter, frozen materials, debris, clay, materials subject to decomposition and silts too wet to be stabilized which, in the opinion of the Soils Engineer, do not satisfy the design requirement, shall be unsuitable material.

2.2 GEOTEXTILE FABRIC BELOW CRUSHED STONE

A. Geotextile Fabric shall consist of Mirafi 140N or approved equal.
1. A needle-punched nonwoven geotextile composed of polypropylene fibers, formed into a stable network such that the fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids. Fabric must meet AASHTO M288-06 Class 3 for Elongation > 50%.

2.3 USE OF MATERIALS

A. Fill materials listed above shall be utilized as follows and as otherwise indicated on the Drawings, specified or directed.
1. Crushed Stone:
a. 1.5”-size: Layer on top of existing pool structure
b. ¾”-size:
1) Below swimming pool structures and surge tanks
2) As a construction working pad
3) As a surface protection below footings
4) As drainage media in wall and under slab drainage systems
2. Gravel Borrow:
a. Base for concrete pavements and slab.
b. Sub-base for bituminous concrete road and parking lot pavements.
3. Dense Graded Crushed Stone:
a. Base for bituminous concrete pavement.

4. Structural Fill
   a. Common fill beneath pool deck, pools and filtration building from existing subgrade to rough grade
5. Granular Fill:
   a. All fill within the structure and as backfill adjacent to walls not specifically designated as Structural Fill, Gravel Borrow or Crushed Stone.
   b. Trench backfill for drainage and utility structures.
6. Sand for Pipe Bedding:
   a. Bedding and blanket for utility lines or as shown on the drawings.
7. Ordinary Borrow:
   a. For general site fill where other material is not specified.
8. Geotextile Fabric:
   a. Below the crushed stone layer below the pool, wrapped around crushed stone at foundation drains, or where otherwise shown on the drawings or directed.

2.4 EQUIPMENT

A. Compaction equipment shall consist of power-driven vibratory equipment and/or hand-guided mechanical tampers as approved by the Architect and capable of achieving the required degree of compaction in a reasonable length of time.

B. Provide sufficient numbers of equipment units of suitable types to spread, level, and compact fill promptly upon delivery of materials.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. The Drawings indicate, in general, alignments, grade elevations and invert elevations. Establish the lines and grades in conformity with the Drawings. The Architect, however, may make such adjustments in the field in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.

B. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slopes between points and existing established grades.

C. Establish and maintain suitable stakes over all areas to be graded as directed, specified or required. Maintain sufficient reference points at all times during construction to properly perform the contract installation.

D. Mucky, soft, loose or spongy soils or other material designated by the Architect shall be considered unsuitable for construction purposes and shall be removed from the site. Material rendered unsuitable by the Contractor's methods of construction shall not be defined as unsuitable soil for payment purposes.

E. The Contractor shall take all required measures to avoid disturbance of the subgrade particularly in consideration of the susceptibility of on-site soils to disturbance in the presence of surface water and groundwater.

F. Any excess excavation that has been carried, through error, beyond specified depths or dimensions shall be backfilled by the Contractor at his own expense with compacted gravel, with concrete, or with other material as directed by the Architect.

G. No excavation shall be deposited or stockpiled at any time so as to endanger portions of new or existing structures, either by direct pressure or indirectly by overloading banks contiguous to the operation. Material, if stockpiled, shall be stored so as not to interfere with the established sequence of the construction. If there is not sufficient area available for stockpiling within the limits of the project, the Contractor will be required to furnish his own area for stockpiling.

H. When the plans require excavation in areas in close proximity to existing buildings, roads, structures and utilities it shall be the responsibility of the Contractor at his expense to use satisfactory means and methods to protect and maintain the stability of such roads, and structures located immediately adjacent to but outside the limits of excavation.

I. Do not excavate to full depth for footings in freezing weather unless concrete or backfill can be placed immediately. Following the placement of concrete footings, soil beneath footings shall be adequately protected from frost.

J. All foundations and slab shall bear directly upon the natural undisturbed soil or rock. In the case of rock, the material shall be sound and removed to a depth of 12-inches below the bottom of the footing. Crushed stone or gravel borrow backfill shall be used between the rock and footings as directed by the Architect or shown on the Drawings

K. All soil bearing surfaces shall be carefully hand-cleaned of all loose soil. The final cut to expose foundation bearing surfaces consisting of soil shall be made utilizing a smooth-edged excavating bucket or a bucket with teeth placed horizontally to prevent disturbance of the bearing surface. Upon completion of excavation to the final footing subgrade, a 3-inch thickness of crushed stone or a lean concrete mud mat shall be placed to protect the bearing surface from disturbance. All disturbed bearing surfaces shall be repaired and recompacted to the specified density.

L. Rock bearing surfaces shall have all loose and/or displaced rock fragments removed and shall be leveled to a maximum slope of 1 vertical to 12 horizontals across the footing area. Cleaning shall be done with high pressure air jets, water jets, brooms or by any other method acceptable to the Engineer. All additional dental concrete required to replace overbreak rock shall be provided by the Contractor at no additional cost to the Owner. Rock surfaces that are steeper than 1 vertical to 12 horizontals may require pinning if directed by the Architect.

M. No excavation shall be made below the groundwater level without lowering the groundwater level. The bottom of the excavation must be free of standing water and visible.

3.2 GENERAL EXCAVATION

A. All materials required to be excavated to permit construction of the proposed building and associated site improvements shall be included in the Contract Price as stated in the Measurement and Payment Section.

B. General excavation shall consist of all excavation not included as trench excavation.

C. Work of cutting and filling shall be scheduled to efficiently use all acceptable excavated materials as directed by the Architect. If necessary, such materials shall be temporarily stockpiled between excavation and filling operations. The Architect shall approve locations for stockpiles.

D. Temporary ditches shall be made as needed to drain off surface water to avoid damage to areas of cut or fill. Such ditches shall be maintained as required for efficient operation, at no additional cost to the Owner.

E. When excavations have reached the required depths, the Architect shall be notified and will inspect the conditions. After inspection, the Contractor will receive approval to proceed if conditions meet design requirements.

F. No excavation will be permitted below a line drawn downwards at 2 horizontal to 1 vertical from the underside of the closest edge of any in-place footing or utility at a higher elevation without providing adequate sheeting and bracing as defined above to prevent all movement of the in-place footing or utility.

G. Removal of existing paving, sidewalk, and curb shall be for the full depth thereof and shall include any base courses. The Contractor shall use power saws or other suitable tools, equipment, and methods for cutting and trimming, that will remove the materials to the neat lines as shown on the Drawings, or as directed by the Architect, with a minimum damage to pavement, sidewalk, and curbs that are to remain. Damage done at these locations shall be repaired and restored by the Contractor at his expense.

H. The ground adjacent to all excavation shall be graded or shall have a bituminous concrete berm to prevent surface water from running into the excavation. Keep excavations free from water. No claims for additional cost will be allowed for pumping and draining required for excavations.

I. It is assumed that the Contractor has fully familiarized himself with subsurface conditions and that the Contract Sum has included all necessary drainage costs for the Work under this Section.

3.3 TRENCH EXCAVATION

A. Excavate as necessary for all drainage pipes, utilities and related structures and appurtenances, and for any other trenching necessary to complete the work.

B. Definitions:
1. Trench shall be defined as an excavation of any length where the width is less than twice the depth and where the shortest distance between payment lines does not exceed ten (10') feet. All other excavations shall be defined as open excavations.
2. The words "invert" or "invert elevation" as used herein shall be defined as the elevation at the inside bottom surface of the pipe or channel.
3. The words "bottom of the pipe" as used herein shall be defined as the base of the pipe at its outer surface.

C. In general, machine excavation of trenches will be permitted with the exception of preparation of pipe beds which will be hand work. Excavate by hand or machine methods to at least six (6") inches below the bottom of pipe or as shown on the Drawings. Excavation to final grade

shall be made in such a manner as to maintain the undisturbed bearing character of the soils exposed at the excavation level.

D. Utilities or piping shall not be laid directly on boulders, cobbles or other hard material. This material shall be removed to a minimum of six inches below the bottom of pipe at all points and backfilled or compacted as specified.

E. In general, the width of trenches shall be kept to a minimum and in the case of piping shall not exceed the sum of the pipe's outside diameter plus 2'0" to at least twelve (12") inches above the pipe.

F. Provide shoring, sheeting, and/or bracing at excavations, as required, to assure complete safety against collapse of earth at the side of excavations. Provide shoring of public utility lines where exposed in or near excavations in accordance with rules and regulations of the local authorities, at no additional cost to the Owner.

3.4 SHORING AND SHEETING

A. Shoring and bracing of trenches and other excavations shall be in accordance with all applicable federal, state and local requirements and regulations to provide safe working conditions and protect property. The contractor is solely responsible for jobsite safety.

B. Provide shoring of existing utility lines where exposed in new excavations in accordance with rules and regulations of the local authorities or utility owner, at no additional cost to the Owner.

C. All sheeting, shoring, and bracing involved shall be removed by the Contractor after the completion of the permanent structures, in a manner so as not to disturb or mar the structures. Sheeting may be left in place only by written permission from the Architect, subject to such conditions as the Architect may require. No payment will be made by the Owner for such sheeting and shoring and bracing left in place.

3.5 PROOF-ROLLING

A. All areas to receive fill or support footings shall be proof-rolled prior to placing fill or constructing the footings as indicated below unless otherwise directed by the Architect.

B. Proof-rolling foundation subgrade in trenches shall be accomplished by making at least 5 passes over the area using a vibratory plate compactor. In open areas, proof-rolling shall be accomplished using a suitable heavy vibratory drum compactor making at least 4 complete passes over the area.

C. Proof-rolling pavement subgrade or areas to receive fill shall be proof-rolled using a suitable heavy vibratory drum compactor making at least 4 passes of the area.

D. Proof-rolling shall be visually observed by the Testing Agency. No proof-rolling shall be accomplished without observation of the Testing Agency.

E. Soil that exhibits soft, weaving or other instability as determined by the Engineer shall be removed and replaced with compacted Gravel Borrow at no additional cost to the Owner.

3.6 FILLING, BACKFILLING AND COMPACTION

A. Provide material conforming to these specifications and referenced Standards for all additional required fill at no additional cost to the Owner if sufficient quality or quantity of suitable material is not available on site.

B. Finished grades not otherwise indicated shall be uniform levels or slopes between points where levels are given or between such points and existing finished grades.

C. All areas to be filled or backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water. Do not place fill when materials or material below it is frozen. No fill material containing ice or frozen lumps shall be used.

D. Material shall be placed in evenly distributed horizontal layers over entire area, spread and compacted as specified.
   1. Remove all debris, organic materials or otherwise unsuitable materials from areas to be backfilled or filled.
   2. Deposit fill and backfill in successive layers having a loose lift thickness not more than 6-inches for hand operated equipment and 12-inches for heavy (10-ton) vibratory rollers. Each layer shall be moistened and thoroughly compacted by roller, pneumatic tamper, or other approved method.
   3. Moisture-density determinations shall be performed on representative soil samples in accordance with ASTM D1557, Method D.
   4. Field density tests shall be taken in accordance with ASTM D1556. The following percentages of maximum dry densities shall be achieved for fill materials or prepared subgrades.
      a. Under structures, footings, paved surfaces, drainage piping, utilities and other improvements:
         1) All fills 95%
         2) Top twelve inches of subgrades in cut 95%
      b. Within lawn and planting areas:
         1) All fill within eighteen inches of finished subgrade 92%
         2)
         3) All fill below 18 inches from finished grade 90%

E. Filling shall be done only after the area to be filled has been observed by the Architect. The Contractor shall notify the Architect when excavation is ready for formal inspection. All areas to receive fill shall be proof-rolled by at least two passes of the compaction equipment to be utilized for controlled placement of compacted fill, or other approved equipment.

F. All fill is to be placed "in the dry" to which end, dewatering may be required. The Contractor shall dewater excavated areas as required to perform the work and in such a manner as to preserve the undisturbed condition of the excavated subgrade.

G. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of a day's operations. Prior to terminating the operations for the day, the final layer of fill, after compaction, shall be rolled with a steel-wheeled roller to eliminate ridges of soil left by compaction equipment.

H. Before filling against walls, the permanent structure must be completed and sufficiently aged to attain strength required to resist fill pressures without damage. Temporary bracing of the

permanent structure walls will not be permitted. Correct any damage to structure caused by filling operations at no cost to the Owner. Place no stones over 4 inches in diameter closer than 18 inches to wall surfaces.

I. In the case of lawn and planting areas, compaction requirements for subgrades and fills shall be considered minimums and maximums within the density percentages called for, and any over-compaction of subgrades or fills which would be detrimental to lawn or planting objectives shall be corrected by loosening subgrades or fills through tilling or other means and recompacting to specified compaction limits.

J. If fill is placed adjacent to a slope, then the slope shall be adequately benched to receive fill. All fill shall be placed in horizontal layers against the slope.

3.7 BACKFILLING OF TRENCHES AND STRUCTURES INCLUDING SWIMMING POOL TANKS

A. All requirements for description, placement, compaction and spreading of fill materials as specified herein shall be applicable to backfilling operations.

B. Backfill materials as specified herein shall be used as bedding and backfill around drainage pipes, around structures and for other uses as illustrated on the Drawings.

C. Do not commence backfilling operations for trenches and structures until all piping, etc., has been installed, tested and approved, and the locations of all pipe and appurtenances have been recorded. Backfill carefully by hand around pipe to depth on one foot above top of pipe using material specified herein, and tamping firmly in layers not exceeding six inches, compacting with hand rammers or mechanical tampers.

D. Backfill materials as specified shall be placed to the full width of the trench as indicated on Drawings. After a pipe is bedded, the trench shall be filled to the centerline of the pipe with fill as specified except at the joint. After the joint is inspected, that portion shall be filled in. Material under and around the pipe shall be carefully and thoroughly compacted to the densities specified herein.

E. From the centerline of the pipe to a point twelve inches above the top of the pipe the backfill shall be placed by hand and compacted with mechanical tampers to not less than 95% of maximum density at optimum moisture content of the material. Above this point, backfill may be placed by machine in layers six inches (6") deep and compacted to the densities specified herein. This backfill shall be extended as shown on the Detail Drawings. Backfill simultaneously all sides of pipe or structure.

3.8 DRAINAGE, DEWATERING AND FROST PROTECTION

A. The Contractor shall control the grading in areas under construction on the site so that the surface of the ground will properly slope to prevent accumulation of water in excavated areas and adjacent properties.

B. Should surface, rain or groundwater be encountered during the operations, the Contractor shall furnish and operate pumps and related equipment, including standby equipment, and all

necessary piping to keep all excavations clear of water at all times and shall be responsible for any damage to the subgrade, completed work or adjacent properties from such water. All piping exposed above surface for this use shall be properly covered to allow traffic to pass without obstruction. Dispose of water through temporary pipelines or ditches with outfall to natural drainage courses. Prevent erosion and siltation of surrounding areas.

C. The presence of groundwater in soil will not constitute a condition for which an increase in the Contract price may be made. Under no circumstances place concrete fill, lay piping or install appurtenances in excavations containing free water.

D. Frost Protection: Do not excavate to full indicated depth when freezing temperatures may be expected unless work can be completed to subgrade or piping can be installed and backfilled the same day. Protect the excavation from frost if placing of concrete or piping is delayed, as approved by Landscape Architect. Protect foundation soils from frost penetration after the footings have been cast.

E. The Contractor shall keep the area under this Contract clear and free of accumulation of snow, ice and frozen ground within the Limit of Contract lines as required to carry out the work at no additional cost to the Contract. The Contractor will be solely responsible for preventing frost penetration into the foundation soil below footings and slab for the duration of this Contract.

F. No work shall be installed on frozen ground.

3.9 ROUGH GRADING

A. Rough grading shall include the shaping, trimming, rolling, and refinishing of all surfaces of the subbase, shoulders, and earth slopes, and the preparation of grades as shown on the Drawings. The grading of shoulders and sloped areas may be done by machine methods. All ruts shall be eliminated. Traffic of men and equipment across soil subgrade areas shall be prohibited following excavation to the required lines and grades.

B. If, during the progress of the Work any pipe, drain or other construction is damaged due to operations under this Contract, the Contractor shall repair all damage at no additional cost to the Owner and restore damaged areas to their original conditions.

C. Do all other cutting, filling and grading to the lines and grades indicated on the Drawings. Grade evenly to within the dimensions required for grades shown on Drawings and as specified herein. No stones larger than four inches (4") in largest dimension shall be placed in upper six inches of fill. Fill shall be left in a compacted state at the end of the workday and sloped to drain.

D. The Contractor shall bring all areas to grades as shown on the Drawings and in the details. The Architect, however, may make such adjustments in grades and alignments as are found necessary to avoid special conditions encountered.

E. No rubbish of any description shall be allowed to enter fill material. Such material shall be removed from the site.

F. Wherever streets, lawns, or sidewalks or other items contained within or outside the Limit of Contract lines have been excavated in fulfilling the work required under this Contract, this

Contractor shall furnish and install all materials necessary to bring finish surfaces level with the existing adjacent surfaces. All work shall be installed to match the existing conditions in accordance with the governing authority. Notify the proper authorities prior to restoring surfaces outside the Contract Limit Lines.

G. Placed fill materials, which become disturbed, shall be regraded and recompacted. Fill materials, which become contaminated, shall be removed and replaced, as directed by the Architect.

3.10 DUST CONTROL

A. The Contractor shall employ all possible methods and/or materials to prevent the spread of dust. Chemical materials may not be used on subgrades of areas to be seeded or planted. Contractor shall provide dust control on a daily basis as required and when directed by the clerk, OPM, or Architect.

3.11 REMOVAL OF SURPLUS AND UNSUITABLE MATERIALS AND CLEANUP

A. Surplus excavated materials not required to complete site construction and unsuitable excavated materials shall, unless directed otherwise by the Architect, become the property of the Contractor who shall remove and legally dispose of such materials from the site at no additional cost to the Owner.

B. At the end of all excavation, filling and grading operations and before acceptance of the work, the Contractor shall remove all debris, rubbish, etc., from the site. He shall dispose of them in a manner satisfactory to the Architect. The premises shall be left clean, presentable, and satisfactory.

3.12 DEFICIENCY OF FILL MATERIAL

A. Provide required additional acceptable fill material from off-site borrow sources to complete the work if a sufficient quantity of suitable material is not available from the required excavation on the project site.

END OF SECTION 312300

SECTION 31 23 19- TEMPORARY AND PERMANENT DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Design, furnish, install, operate, maintain, and remove all necessary wells, well points, pumps, sumps, pipelines, and other equipment for the collection, removal, and disposal of all ground water and surface runoff as required to complete the work.

B. Work includes dewatering the existing swimming pool.

1.3 PERMANENT DEWATERING

A. In the unlikely event ground water is present at the elevations of the new swimming pools, dewatering will be provided to ensure the swimming pools can be drained without exerting hydrostatic pressure on the pool tank.

B. A minimum layer of crushed stone will be placed beneath the pool structures. A pipe is placed vertically in this stone layer, extending to a secure cover at the pool deck.

C. This assembly will allow placement of submersible pumps into the ground water and lower the level below the pool floor.

1.4 SITE CONDITIONS

A. Visit the site before bidding the work to observe the site conditions that may impact the design or implementation of the dewatering program. No changes to the bid relating to visible site conditions will be allowed if no Prebid site visit occurred.

B. Refer to the Order of Conditions issued by the City of Newton Conservation Commission.

1.5 SUBMITTALS

A. Within 10 days of contract award, submit to the Engineer a written Dewatering Plan describing the plan to control groundwater and surface runoff during excavations, including the point(s) of effluent discharge that will be used. The Dewatering Plan shall be designed and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts, and shall include the following:

1. Location, method, design, and operating plan for dewatering. Describe types and sizes of groundwater control systems to be used, including backup power and equipment. Include water containment procedures, water conveyance, means to be used for prevention of water pollution, and proposed disposal/discharge location(s).
2. Monitoring and maintenance schedule, screening and sampling program, and reporting schedule. .

PART 2 - PRODUCTS

2.1 DEWATERING AND TREATMENT SYSTEM

A. All dewatering system equipment (e.g. pumps, sumps, hoses, and piping) must be selected and furnished by the Contractor in order to meet the requirements of the Work.

B. Keep at the site, or have immediate access to, additional pumps of sufficient capacity to maintain dewatering activities during any pump breakdown, maintenance, or a high precipitation event.

C. The dewatering system must have redundant features such that damage to or failure of a principal component of the system will not result in the failure of the entire system.

D. Provide sufficient suction and discharge hose or piping for transferring pumped liquids without causing erosion, sedimentation, or other adverse consequences.

E. Provide properly sized and designed fractionation tanks to remove any sheen or separate-phase product and fine soil before discharging to surface water.

F. Provide freeze protection for all dewatering hoses, piping, and pumping equipment necessary to execute the Work during the period of performance. Winterize and protect from damage due to freezing conditions any equipment left on site in the period between work seasons. Freeze protection chemicals or solutions may not be used without prior approval of the Engineer.

G. Equipment for dewatering may be new or used but shall be suitable for the Work and maintained in good condition.

H. All dewatering equipment shall remain the property of the Contractor or Subcontractor.

2.2 PERMANENT DEWATERING ASSEMBLY

A. In order to provide monitoring points and locations to place submersible pumps in the future buy the Owner, well points are required where indicated on the drawings: Well points include:
1. 18-inch diameter HDPE piping installed vertically from top of 12-inch crushed stone drainage course to below finish grade or Portland cement pavement. Coordinate height with frame and cover specified herein.
2. Wrap bottom of pipe with geotextile fabric specified below
3. Cast a 30 by 30-inch-wide, by 18-inch-deep concrete collar around top of pipe.
4. Provide FRP Composite Access Cover equal to Fibrelite FL 180, 18-inch diameter flat composite access cover and frame.

a. Skid resistant surface
b. Color to be UV stable “concrete color” within concrete decks.

B. Geotextile Fabric shall consist of Mirafi 140N or approved equal.
1. A needle-punched nonwoven geotextile composed of polypropylene fibers, formed into a stable network such that the fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids. Fabric must meet AASHTO M288-06 Class 3 for Elongation > 50%.

PART 3 - EXECUTION

3.1 BASIC DEWATERING

A. Basic Dewatering discharge includes groundwater and surface water runoff that have entered the existing pool and excavation.

B. Do not place fill, or concrete, or install piping or any appurtenances in excavations containing standing water. Keep utility trenches free from water until pipe joint material has hardened. Protect newly made and existing concrete and masonry from damage or discoloration resulting from dewatering work.

C. Grade and ditch the site to direct surface runoff away from open excavations and subgrade surfaces.

D. Install and maintain temporary trenches, pumps, drainpipes, sumps, wells, and other equipment to keep all excavations dry. Maintain the groundwater at least 2 feet below the excavation surface. Collect and remove from excavations all groundwater seepage and surface runoff. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting of existing footings or utilities, and soil changes detrimental to stability of subgrades and foundations.

E. Install filters for all pumps to prevent silt and fine sand from being pumped with the water.

F. At the completion of work, remove all dewatering equipment and backfill recharge pits, if used, in accordance with Section 31 00 00 (Earthmoving). Seal wells with grout after dewatering operations are complete.

3.2 DISCHARGE OF DEWATERING EFFLUENT – GENERAL

A. Comply with all rules, regulations, laws, and ordinances of the Commonwealth of Massachusetts, the City of Newton and of all other authorities having jurisdiction. Provide without additional cost to the Owner all labor, materials, equipment, and services necessary to make the work comply with such requirements.

B. Perform dewatering in a manner that will not interfere with other work, or damage adjacent properties, pavements and other surfaces, buildings, structures, utilities, and the environment.

C. Do not discharge dewatering effluent, including surface runoff that has entered the excavations or temporary water barrier area (if used), into sanitary sewers or combined sewers.

END OF SECTION 010000

SECTION 32 13 13: CONCRETE PAVING

PART 1 General

1.1 RELATED DOCUMENTS

A. Contract Documents and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to furnish and install CONCRETE PAVING, as indicated on the Contract Documents and as specified herein.

1.3 SUBMITTALS

A. Description of Methods and Sequence of Placement. For each type of specially-finished concrete provide description of methods and sequence of placement.

B. Submit manufacturer's product data for the following:
1. Form release agent.
2. Prefabricated control joint.
3. Preformed joint filler.
4. Curing materials.

C. Submit samples of the following:
1. Prefabricated control joint.
2. Preformed joint filler.

D. Construct Concrete Sample Panels:

1. Construct 2 foot x 2 foot sample panels of finished concrete pavement for approval, at least 15 days prior to final concrete paving work. Samples shall not be constructed in an area of proposed finish work. Samples shall be constructed within the vicinity of the proposed finish work to facilitate comparisons during construction. The samples shall demonstrate the typical installation of concrete, including score lines, expansion joint and sealant, curing and finishing material, surface texture, color, and edge treatment. The accepted sample, upon approval, shall be maintained as the standard of minimal quality for approval of all proposed concrete pavement work required for the project. If the original sample panel is not approved, the Contractor shall provide additional sample panels, as required, at no additional cost to the Owner until an approved sample is obtained. Unacceptable sample panels shall immediately be removed from the site.

1.4 QUALITY ASSURANCE

A. Unless otherwise specified, work and materials for construction of the reinforced Portland cement concrete paving shall conform to ACI 316R, and applicable portions of the following:

B. Existing paving areas shall, if damaged or removed during course of this project, be repaired or replaced under this SECTION, CONCRETE PAVING. Workmanship and materials for such repair and replacement, except as otherwise noted, shall match as closely as possible those employed in existing work installed under this Contract.

C. Pavement, base, or subbase shall not be placed on a muddy or frozen subgrade.

1.5 TESTING AND INSPECTION

A. The Contractor shall perform slump and compressive strength tests for concrete paving. Slump tests shall be performed on every truck delivery. Compressive strength tests shall be performed every 50 cubic yards delivered. Compressive strength testing shall include three cylinder per test (one each for 7 day, 28 day and a reserve). All tests shall be paid by the Contractor.

PART 2 PRODUCTS

2.1 AGGREGATE BASE COURSE

A. Base course shall be existing aggegrate base re-graded and compacted. Existing base shall be supplemented with similar materials as requires to meet the proposed elevations.

2.2 STEEL REINFORCEMENT

A. Welded wire fabric (WWF) reinforcement shall conform to the applicable requirements of ASTM A 185. Fabric reinforcement shall be furnished in flat sheets. Fabric reinforcement in rolls will not be permitted.
   1. Provide 6 inches (150 mm) x 6 inches (150 mm) W2.9 x W2.9 WWM for 6 inch (150 mm) thick concrete pavement, 6 inches (150 mm) x 6 inches (150 mm) W3.4 x W3.4 WWM for 8 inches (200 mm) thick concrete pavement and 6 inches (150 mm) x 6 inches (150 mm) W1.4 x W1.4 WWM for 4 inches (100 mm) concrete pavement .

B. Steel reinforcing bars shall conform to ASTM A 615.
   1. Bars employed as reinforcement shall be deformed type.
   2. Unless otherwise indicated on the Contract Documents, reinforcing bars shall be Grade 60.

C. Steel expansion dowels shall be hot-rolled plain steel rounds conforming to the requirements of AASHTO M31, Grade 60 and consisting of a 1/2 inches (12.7 mm) by 24 inches (610 mm) smooth steel dowel and compatible waxed tube sleeve, by 12 inches (305 mm) in length.

   1. Dowels and sleeves shall be as furnished by A.H. Harris & Sons, Inc., by U.S. Steel Corp., by Edgecombe Steel Corp., or approved equal.

2. Dowels shall be epoxy coated.

2.3 PORTLAND CEMENT CONCRETE

A. Cast-in-place concrete shall be air-entrained concrete with minimum 28-day compressive strength of 4,000 pounds per square inch (30 MPa), conforming to the requirements and applicable provisions of MassDOT Specifications Section M02.
1. Air Entrainment: Concrete shall be air-entrained 7 percent minimum +/-1 percent, by volume.
2. Slump: Concrete shall have a slump of 2 inches (50 mm) to 4 inches (100 mm) slump.
3. Maximum Aggregate Size: Aggregate size shall be a maximum of 3/4 inches (18.8 mm).
4. Thickness of Concrete: Depths shall be as noted on the Contract Documents.

2.4 CURING MATERIALS FOR PLAIN CONCRETE

A. Curing shall be by moist curing or by use of curing compound.

B. Curing paper shall be nonstaining, fiber reinforced laminated kraft bituminous product conforming to ASTM C 171. Four mil polyethylene sheeting may be substituted for curing paper.

C. Curing compound shall be a resin-base, white pigmented compound conforming to ASTM C 309, Type 2.

2.5 EXPANSION JOINTS

A. Provide expansion joints as indicated and in accordance with the following:

1. Unless otherwise indicated on the Contract Documents, expansion joints shall be located 20 feet (6.0 m) on-center, maximum.

B. Expansion Joint Filler:

1. Closed cell polymer foam meeting requirements of ASTM D 1752, Sections 3.1 to 3.4, based on compression requirement of 10 pounds per square inch minimum and 25 pounds per square inch maximum. Recovery rate following 50 percent compression shall exceed 99 percent recovery, per ASTM D 545. Foam shall be equal to Ceramar Foam Filler, manufactured by W.R. Meadows. Inc., or an approved equal.

2. Expansion joint filler shall have a removable cap cover for the joint filler with integral permanent plastic bond breaker such as Snap-Cap from Seal Tight manufactured by W.R. Meadows, Inc., or approved equal. Cover width shall be sized to match width of joint filler.

2.6 CONTROL JOINTS

A. Control joints in concrete shall be made using a preformed contraction joint equal to the Plastic Contraction Joint distributed by A.H. Harris & Sons, Inc., Medfield, MA 02052, or approved equal.

1. Preformed contraction joint shall be specifically designed to form construction and weaken plane joints.
2. Dimension of prefabricated joint former shall be as indicated on the Contract Documents.
3. Joints shall be placed 5 feet zero inches on center.

2.7 CONSTRUCTION JOINTS

A. Transverse construction joints shall be placed whenever placing of concrete is suspended for more than 30 minutes.
1. Butt joint with dowels or thickened edge joint shall be used if construction joints occurs at location of control joint. Submit sketch to Owner's Representative for review and acceptance of proposed system.
2. Keyed joints with tiebars shall be used if the joint occurs at any other location.

PART 3 EXECUTION

3.1 PREPARATION OF SUBGRADE

A. Subgrade of areas to be paved shall be recompacted as required to bring top 8 inches (200 mm) of material immediately below aggregate base course to a compaction at optimum moisture of at least 95 percent of maximum density, as determined by ASTM D 1557. Subgrade compaction shall extend for a distance of at least 12 inches (305 mm) beyond pavement edge.

3.2 FORMWORK

A. All forms shall be joined neatly and tightly, shall be set true to line and grade, well staked and braced, and shall have uniform bearing throughout their length. Remove all forms and miscellaneous appurtenances from pavement edges and dispose of all formwork and appurtenances at the end of the construction project.
1. Forms shall not be moved for 72 hours after the concrete has been placed, or for a longer period if directed by the Owner's Representative.
2. Remove all forms. Extreme care shall be taken in removing forms in order that no damage will be done to the concrete.

3. Under no condition shall any bar, pick or other tool be used which depends upon leverage on the concrete for removal of the forms.

3.3 STEEL REINFORCEMENT

A. Before being placed in position, reinforcing for reinforced concrete shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between the concrete and reinforcing. Where there is delay in placing concrete after reinforcement is in place, bars shall be re-inspected and cleaned when necessary.

B. Welded Wire Mesh: Wire mesh used for reinforcement shall be spread flat before placing concrete. Mesh reinforcement shall be held firmly in place against vertical or transverse movement by means of satisfactory devices. Where mesh reinforcement is spliced, it shall

be lapped at least 12 inches (300 mm).

1. Unless designated otherwise on the Contract Documents, wire mesh shall be placed midway within the depth, and parallel to the finished surface of concrete pavements.
2. Do not pour concrete over top of reinforcement unless it is supported underneath.
3. Contractor shall pull reinforcement up immediately after pouring concrete to make sure that the reinforcement is in the middle of the slab and not sitting on the bottom.

C. Reinforcing Steel: After forms have been coated with form release agent, but before concrete is placed, reinforcing steel anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted.
1. Any bar showing cracks after bending shall be discarded.
2. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Owner's Representative.

D. Unless otherwise indicated on the Contract Documents, reinforcing shall extend within 2 inches (50 mm) of formwork and expansion joints.
1. Reinforcing shall continue through control joints.

E. The Owner may do core testing to make sure that reinforcement is in the proper position. If testing shows otherwise concrete will be rejected and the Contractor shall remove all rejected slabs and re-pour new slabs at no additional cost. Contractor shall repair cored holes as directed by the Owner's Representative.

3.4 EXPANSION JOINTS

A. Expansion joints shall be 1/2 inches (12.7 mm) wide and shall be as located on the Contract Documents. Expansion joint shall be formed in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full depth of the slab. Joint filler shall extend the full length of the expansion joint.
1. For concrete banding and concrete pavements and pads, depth of joint filler shall be as required to form a 3/4 -inch (19 mm) deep sealant recess below finished concrete surface.

B. Place expansion joints spaced on 20-foot (6.0 m) centers. When provided, clarification documents that show specific locations of expansion joints shall direct the Contractor where to place expansion joints. Such clarification documents may place joints closer than 20-foot (6.0 m) centers. In the absence of clarification documents the language of this SECTION, CONCRETE PAVING, shall govern.

1. Expansion joints shall be placed where pavement meets flush foundations and footings, concrete or bituminous concrete curbing or other vertical structures, including light bases, hydrants, walls, buildings, piers and walls, and at other conditions as shown on the Contract Documents.

2. Contractor shall request the presence of the Owner's Representative to review the layout of expansion joints prior to pouring the concrete.

3. Follow the manufacturer's application recommendations for joint filler and sealer.

4. Joint alignment shall be straight and true.

C. Where expansion dowels are use in the expansion joints, dowels and greased sleeves shall be set parallel with the top and bottom surfaces of the concrete slab.

3.5 PORTLAND CEMENT CONCRETE PAVING

A. Paving mix, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base and the like, shall meet the requirements of ACI 316R. Pavement shall be constructed in accordance with the Contract Documents.

B. The Owner's Representative shall be notified of concrete placement sufficiently in advance of start of operation to allow his representative to complete preliminary inspection of the work, including subgrade, forms, and reinforcing steel, if used.

1. No concrete shall be deposited until the Owner's Representative has inspected the placing of reinforcement and given permission to place concrete.

C. Normal concrete placement procedures shall be followed. Concrete shall arrive at the job site so that no additional water will be required to produce the desired slump. When conditions develop that required addition of water to produce the desired slump, permission of the Owner's Representative must be obtained. The concrete shall be transported from the mixer to its place of deposit by a method that will prevent segregation or loss of material.

1. Concrete pavement shall be placed in a series of alternate pours such that every other panel bounded by expansion joints shall be poured first.
2. The intervening panels shall then be poured as a secondary operation only after the first panels have hardened sufficiently to allow the removal of all temporary transverse forming supports.
3. Concrete shall be placed in one course, to full depth, as detailed on the Contract Documents.

D. Work shall not be performed during rainy weather or when temperature is less than 40 degrees Fahrenheit (4 degrees Centigrade). In the event that unforeseen rain occurs, cover all broom finished concrete surfaces with plastic sheet covering to prevent alteration of texture. Concrete slabs with textured concrete surfaces altered by rain shall be removed from the site as directed by the Owner's Representative.

E. Adjacent work shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original conditions.

F. Existing concrete, earth, and other water-permeable material against which new concrete is to be placed shall thoroughly damp when concrete is placed. There shall be no free water on surface.

G. Concrete which has set or partially set before placing shall not be employed. Retempering of concrete will not be permitted.

H. Concrete shall be thoroughly spaded and tamped to secure a solid and homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

I. When joining fresh concrete to concrete which has attained full set, latter shall be cleaned

of foreign matter, and mortar scum and laitance shall be removed by chipping and washing. Laitance is the accumulation of fine particles on the surface of freshly poured concrete caused by an upward movement of water through the concrete. This can be caused by too much mixing water, by excessive tamping, or by vibration of the concrete. Clean, roughened base surface shall be saturated with water, but shall have no free water on surface. A coat of 1:1 cement-sand grout, approximately 1/8 inches (3.2 mm) thick, shall be well scrubbed into thoroughly dampened concrete base. New concrete shall be placed immediately, before grout has dried or set.

3.6 FINISHING

A. Concrete flatwork surfaces shall be screeded off and hand floated and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.
   1. Finished concrete surface for subbases for unit pavement systems shall be woodfloated to a slightly rough surface. Surface shall not deviate more than 1/4 inches (6mm) in 10 feet (3.00 m).
   2. Finished concrete surface for concrete walks, pads, and concrete bands shall be wood-floated and steel troweled to a smooth surface. Surface shall not deviate more than 1/8 inches (3.2 mm) in 10 feet (3.05 m).

B. Unless otherwise indicated, horizontal surfaces of concrete pavement which will be exposed shall be given a light broomed finish, with direction of grooves in concrete surface perpendicular to length of concrete * (sidewalk) (band) (slab) (or) (pad) *. After concrete has set sufficiently to prevent coarse aggregate from being torn from surface, but before it has completely set, brooms shall be drawn across it to produce a pattern of small parallel grooves. Broomed surface shall be uniform, with no smooth, unduly rough or porous spots, or other irregularities. Coarse aggregate shall not be dislodged by brooming operation.

C. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

D. Immediately following finishing operations, arrises at edges and both sides of expansion joints shall be rounded to a 1/4 inches (6.0 mm) radius.

E. Control Joints:
   1. Control joints shall be tooled with scored joints made by scoring into slab surface with scoring tool.
   1. Control joints shall be saw cut joints as specified below.

F. All scoring, tooling and finishing of the concrete shall be subject to the review and approval of the Owner's Representative at any time during the construction project. The Contractor shall remove and replace, at no additional cost to the Owner, all concrete which is not acceptable to the Owner's Representative.

G. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

3.7 CURING

A. It is essential that concrete be kept continuously damp from time of placement until end of specified curing period. It is equally essential that water not be added to surface during floating and troweling operations, and not earlier than 24 hours after concrete placement. Between finishing operations surface shall be protected from rapid drying by a covering of waterproofing paper. Surface shall be damp when the covering is placed over it, and shall be kept damp by means of a fog spray of water, applied as often as necessary to prevent drying, but not sooner than 24 hours after placing concrete. None of the water so applied shall be troweled or floated into surface.

B. Concrete surfaces shall be cured by completely covering with curing paper or application of a curing compound.

1. Concrete cured using waterproof paper shall be completely covered with paper with seams lapped and sealed with tape. Concrete surface shall not be allowed to become moistened between 24 and 36 hours after placing concrete. During curing periodsurface shall be checked frequently, and sprayed with water as often as necessary to prevent drying, but not earlier than 24 hours after placing concrete.
2. If concrete is cured with a curing compound, compound shall be applied at a rate of 200 square feet per gallon, in two applications perpendicular to each other.
3. Curing period shall be seven days minimum.

3.8 CONTROL JOINTS

A. Unless otherwise indicated, control joints shall be tooled into the concrete slab, with 3 inches (75 mm) wide border and troweled edges, in pattern indicated on the Contract Documents, or every 5 feet (1.50 m) on center maximum. Joint shall be made after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab, but before slab has achieved its final set.

1. Scoring shall cut into slab surface at least 1 inches (25 mm), but in no case not less than 25 percent of slab depth.

3.9 COLD WEATHER CONCRETING

A. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40 degree Fahrenheit. or is excepted to fall to below 40 degree Fahrenheit within 72 hours, and the concrete after placing shall be protected by covering, heat, or both.

B. Details of handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Owner’s Representative. Procedures shall be in accordance with provisions of ACI 306R.

3.10 HOT WEATHER CONCRETING

A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. Every effort shall be made to minimize delays which will result in excessive mixing of the concrete after arrival on the job.

B. During periods of excessively hot weather (95 degree Fahrenheit., or above), ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to

maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 95 degree Fahrenheit., when ready for placement will not be acceptable, and will be rejected.

C. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, and the like.) and relative humidity. Records shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

3.11 PROTECTION OF CONCRETE SURFACES

A. Concrete surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary 1/2 inches (12.5 mm), thick plywood sheets shall be used to protect the exposed surface.

B. The Contractor shall provide adequate surveillance for all poured-in-place concrete pavements until concrete has set firmly, to prevent unwarranted markings of the concrete surface. Any unauthorized marking or graffiti in the finished surfaces shall be a cause for rejection by the Owner's Representative and replacement by the Contractor.

3.12 ACCEPTANCE STANDARDS

A. The following acceptance standards shall be applied to this Contract. These standards are considered superior to typical industry standards. Any portion of the concrete paving that does not come up to these required acceptance standards shall be removed at the direction of the Owner’s Representative. Saw cut pavement at nearest adjacent tooled joint, remove concrete pavement and discard off site in a legal manner and replace with new concrete pavement meeting the requirements of this SECTION, CONCRETE PAVING.

1. Pavement surfaces shall be free of all cracking.
2. Pavement surfaces shall not pond water.
3. Pavement surfaces shall be free of visible high and low spots.
4. Steel mesh reinforcing shall not penetrate the surfaces or sides of the concrete slab.
5. Tooled joints and all expansion joints shall be straight, true, uniform in width and free from twists, bends, kinks and misalignments.
6. Saw cut joints shall be free of chips and spauling at joint edges.
7. Tooled edges and the associated edging patterns shall be consistent, true, crisp and complete.
8. Broom finish shall not be too coarse in the opinion of the Owner’s Representative.
9. Broom finish shall be constant and complete between joints without bare spots, lifts or disconnections in broom pattern.
10. Pavement shall show no graffiti. Pavement shall show no rubbed surfaces indicative of attempts to erase graffiti.
11. Expansion joints and score joints shall be placed as required by the Contract Documents.
12. Concrete surfaces shall be free of all stains, including those created during the course of the construction by the Contractor, caused by natural events, or caused by vandalism.
13. All tooled joints and expansion joints shall be flush.
14. Stains from construction or from natural causes

15. Pours different in color as determined by the Owner's Representative.
16. Pours without expansion joints cast into them.
17. Pours not conforming to the Contract Documents.
18. All forms shall be removed from the site.

END OF SECTION 32 13 13

SECTION 32 18 00- NON-POROUS SPRAY DECK SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Work of this Section includes non-porous, trowel applied, cushioned surface at the water spray deck.

1.3 SYSTEM DESCRIPTION

A. Non-Porous troweled applied surface over concrete. Surface shall bond to the concrete to form a non-porous, cushioned surface designed to hold up to weather and chlorine.

1.4 SUBMITTALS

A. Manufacturer's Product Literature and Specification Data.
   1. ASTM C 1028-07 Skid Resistance Test.
   2. Manufacturer's written instructions for recommended maintenance practices.

B. Color samples for customer verification.

C. Written statement on Manufacturer's letterhead certifying that the top surface will be light stable for a period of three (3) years from date of installation.

D. Written manufacturer's warranty for water play.

1.5 PROJECT CONDITIONS

A. The installation of the surface shall be completed by the manufacturer's certified installers. Manufacturer's detailed installation procedures shall be submitted to the architect and made part of the bid specifications.

B. Temperature must remain above 50-degrees Fahrenheit throughout the installation and curing process. Weather and surface must be dry, and there should be no rain in the immediate forecast.

C. Site must be made secure against vandalism during installation and curing period.

1.6 WARRANTY

A. 3-year limited warranty on manufacturing defects. This warranty does not cover areas that are submerged (including zero entries that are below the water line).

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN MANUFACTURER

A. AquaFlex Non-Porous Surfacing System, by Surface America
https://www.surfaceamerica.com/product/aquaflex

B. Other manufacturers offering acceptable surfacing systems include:
1. Softline Solutions Pour and Play surfacing.
https://www.softlinesolutions.net/products/pour-in-place-surfacing
2. Adventure TURF pool deck surfacing https://adventureturf.com/poured-in-place/pool-decks/
3. Or approved equal

2.2 SYSTEM DESCRIPTION

A. Materials: AquaFlex HC, 100% solids, two-component aliphatic polyurethane Binder/Primer; a combination of 50% AquaFlex aliphatic thermoplastic large pebbles and 50% small pebbles.

B. Impact Layer: The impact layer is to be made of a composite of foam and SBR rubber or SBR rubber alone. The foam material shall be 100% recycled cross-linked, closed-cell polyethylene foam that is heat-sealed together. The SBR rubber is to be a 50/50 blend of short strand and granular. The binder to be used is AquaFlex single component aromatic polyurethane Binder/Primer.

C. Finish Texture: Rough grain non-skid finish.

D. Color: Selected from Manufacturer’s color chart by Architect. Minimum of two colors.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Concrete: New concrete must be at least 28 days old. All concrete must be acid etched. Add acid slowly to water in clean polyethylene buckets at a ratio of eight parts water to one part acid. Care should be taken to prevent splashing on workers. Protective clothes such as safety glasses, rubber gloves and boots should be used. The acid solution should be applied on the surface at a rate of 100 square feet per 5 gallons of acid solution. Using a stiff broom, scrub acid solution onto the surface where the solution was poured and continue the process to other areas. Never let the surface dry with acid on it. After 5 minutes, rinse the surface with large amounts of clean water to remove all the acid solution, and then allow the surface to dry.

B. Drains, Ground Pop Jets, Doorways/Entryways: *Cut a 3/8" x 1" keyway groove into the* concrete surrounding the object. Groove shall be swept clean and be free of all residual residue. If the drains are raised flush with the cushion layer, weep holes must be added where the drain meets the concrete.

3.2 INSTALLATION

A. *Forming:* Following the shape of the area to be surfaced, form out the area with 1″ x 4″ wood strips or for curved concrete use plywood cut into 4″ strips. Stabilize the wood with spikes or stakes and thoroughly wax the wood surfaces with carnauba wax.

B. The manufacturer's minimum will be installed at 3/8" thickness directly over concrete.

C. Sealing: Premix AquaFlex HC aliphatic two-component Binder/Primer in a plastic pail with a paddle mixer and add 2 times the volume of primer of calcium carbonate to thicken the liquid to a paste consistency. Pour the entire mixture onto surface in a tight line. Using a hand float rubber squeegee pull the material over the surface making sure to cover the entire surface filling all voids, or use rubber hand squeegee to cover the surface filling all voids. Let cure until tack free.

D. AquaFlex Mixing and Finishing Dry: Mix a ratio of 50 pounds large pebbles to 50 pounds of small pebbles creating 100 pounds of AquaFlex pebbles in a mortar mixer. Pre-mix 2.14 gallons of AquaFlex HC aliphatic two-component binder in an appropriate plastic container with a paddle mixer. Add the premixed 2.14 gallons of binder to the pebbles in the mortar mixer. Mix thoroughly so that all pebbles are covered evenly. Dump the mix onto the area and spread it with a cam rake or screed box at a thickness of 7/16″. Fresno the area keeping the surface as level as possible. Hand or power-trowel the surface using a solution of AquaFlex Trowel Slick to lubricate the surface of the trowel. This will allow easier manipulation of the trowel. Do not use water on the surface as a troweling aid. The compounded mixture will compress to approximately 3/8″. Let the surface set for 72 hours

3.3 CLEANING

A. The contractor should clean the job site of excess materials.

B. 6.2 The contractor shall instruct the owner's personnel on proper maintenance and repair of the AquaFlex surface.

END OF SECTION 321800

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SECTION 32 31 00 - CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. PVC-coated chain link fencing, gates and accessories. Work includes PVC coated posts sleeved over existing posts, PVC-coated chain link fence fabric, PVC-coated line, gate, and terminal posts, automatic closers on all gates. All components shall be PVC coated posts.

B. Work also includes specialized panic hardware with security plates and alarms.

C. Related Sections
1. Section 033000 – Cast-in-Place Concrete for concrete footing mix design and placement of posts in concrete paving.
2. Section 087100 - Door Hardware for panic device cores and padlocks
3. Section 322100- Bases, Ballasts, and Paving for coordination with site walks and pool decks.

1.3 SUBMITTALS

A. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

B. Product data: Manufacturer’s catalog cuts indicating material compliance and specified options.

C. Samples: Color selection for PVC finishes. If requested, samples of materials (e.g., fabric, wires, and accessories). COLOR SHALL BE BLACK.

1.4 PROJECT CONDITIONS

A. Existing and New Utilities: Coordinate installation of fencing with existing and new underground utilities. If required to confirm locations of existing utilities contact Dig-Safe at 811 or 888-DIG-SAFE (344-7234) prior to start of fencing work.

B. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Products from qualified manufacturers having a minimum of five years experience manufacturing thermally fused chain link fencing will be acceptable by the architect as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size gauge of metal parts and fabrication.

B. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

C. Specifications are based on a single manufacturer. This shall not limit the use of other manufacturers meeting the requirements of the specifcation.
1. Basis of design Manufacturer:
   a. Anchor Fence/Master Halco, Baltimore, MD Phone (410) 633-6500 Fax (410) 633-6506
   b. Hoover Fence Company, Newton Falls, Ohio, Phone (330) 358-2335, Fax (330) 358-2624
   c. MasterHalco, Orange, California 92868-3510, Phone (714) 385-0091 Fax (714) 385-0107
   d. Or approved equal.

2.2 PVC CHAIN LINK FENCE FABRIC

A. PVC or polyolefin elastomer coating, 7 mil (0.18mm) thickness, thermally fused to zinc-coated steel core wire: Per ASTM F668 Class 2b.

B. Size: Helically wound and woven to height indicated on drawings with 1 ¼- inch diamond mesh, with a core wire size of 9 gage . Color is ASTM F 934 Black.

C. Selvage of fabric knuckled at top and bottom.

2.3 PVC STEEL FENCE FRAMING

A. Steel pipe - Type I: ASTM F 1083, standard weight schedule 40; minimum yield strength of 25,000 psi (170 MPa); sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz/ft² (550 g/m²) of coated surface area.

B. PVC-Coated finish: In accordance with ASTM F1043, apply supplemental color coating of 10 to 15 mils (0.254 - 0.38 mm) of thermally fused PVC in black color to match fabric.

C. End and Corner Post: Minimum 2.375 inch O.D. and 3.65 lbs/ft.

D. Line (intermediate) Post: Minimum 1.90 O.D. and 2.72 lbs/ft.

E. Rail and Braces: Minimum 1.660 O.D. and 2.27 lb/ft.

2.4 GATES

A. Gate frames: Fabricate chain link swing gates in accordance with ASTM F 900 using galvanized steel tubular members, 2" (50 mm) square, weighing 2.60 lb/ft (3.87 kg/m). Weld connections forming rigid one-piece unit. Vinyl coated frames thermally fused with 10 to 15 mils (0.254 mm to 0.38 mm) of PVC per ASTM 1043.

B. Chain link fence fabric: Install fabric with hook bolts and tension bars at all 4 sides. Attach to gate frame at not more than 15" (381 mm) on center.

C. Hardware materials: Hot dipped galvanized steel or malleable iron shapes to suit gate size. Field coat moveable parts (e.g. hinges, latch, keeper, and drop bar) with PVC touch up paint, provided by manufacturer, to match adjacent finishes.

D. Hinges: Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° (3.14 rad) inward or 180° (3.14 rad) outward depending on orientation.
1. Provide minimum of 1 self-closing spring hinge sized to close gate. Hinge shall be equal to Tru-Close heavy duty round post hinges or equal.

E. Latch: Forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate.

F. Keeper: Provide keeper for each gate leaf over 5 feet wide. Gate Keeper shall consist of mechanical device for securing free end of gate when in full open position.

G. Double Gates: Provide drop rod to hold active leaf. Provide gate stop pipe to engage center drop rod. Provide locking device and padlock eyes as an integral part of latch, requiring one padlock for locking both gate leaves.

H. Gate Posts: Steel Pipe, ASTM F1083 standard weight schedule 40, minimum yield strength of 25,000 psi. Hot-dipped galvanized with minimum average 1.8 oz/ft² (550 g/m²) of coated surface area.
1. PVC-Coated finish to match fence: In accordance with ASTM F1043, apply supplemental color coating of 10 to 15 mils (0.254 - 0.38 mm) of thermally fused PVC in black color to match fabric.
2. Single Leafs 6 feet or less: 2.875 in diameter and 5.79 lb/ft.
3. Single Leafs 6 feet to 12 feet: 4.00 in diameter and 9.11 lb/ft.
4. Refer to manufacturer's recommendations for leafs larger than indicated.

2.5 EGRESS HARDWARE GATES G1, G2, G4, G5

A. Basis of Design Emergency Exit Gate Bar Kit by Hoover, Fence Co. providing panic bar egress hardware with integral alarm and mounting plate. Model Superior Exit Bar Kit for Gates-Plate, D6006 Bar with Alarm and Lock Box. https://www.hooverfence.com/dac-industries-superior-exit-bar-kit-d-6006-bar-lock-box
1. This kit allows for free exit/egress with keyed access from the outside of the gate and includes the following:
a. Detex D-6006 (36") or D-6008 (48") surface mount exit bar with alarm.(#D-6006)
b. Mounting plate, Adjusts for 32" to 54" gate frame. 24" High (#D-6700)

c. Adjustable Receiver bracket for 3" O.D. (outside diameter) post (2-7/8" actual). (#D-6020)
d. Lock box for external access. (#D-6025)
e. Keyed cylinder with two keys. (#D-6014)
f. Pre-drilled holes for exit bar.
g. Stainless Steel tek-screws and fasteners.
h. All components shall be black.

B. Basis of Design Emergency Exit Gate Bar Kit by Hoover, Fence Co. providing panic bar egress hardware and mounting plate. Model Premium Panic Bar Kit for Gates-with Lock Box. https://www.hooverfence.com/dac-industries-premium-panic-bar-kit-detex-advantex-stainless-steel-bar
1. This kit allows for free exit/egress with keyed access from the outside of the gate and includes the following:
2. All Stainless Steel Detex Advantex 40xW Weatherized Panic Bar in 36" Wide (Part # D-10003) or 48" Wide (Part # D-10004)
3. Mounting Plate which Adjusts for 29" to 54" wide - 12" High (Part # D-6900) or 24" High (Part # D-6700)
4. Adjustable Receiver Bracket Designed for 3" O.D. (Outside Diameter) post (2-7/8" actual) - (Part # D-6020)
5. Lock Box for External Access - (Part # D-6025)
6. Keyed Cylinder With Two Keys - (Part # D-6014)
7. Stainless Steel Tek-Screws and Fasteners Included
8. Kit Allows for Free Exit with Controlled Entry
9. Plate is Pre-Drilled for Bar and Lock Box

C. Provide removal core in exit bars; core compatible with building hardware will be furnished under Section 087100.

2.6 CHAIN FOR OFF SEASON SECURITY

A. During the off season, all gates shall be secured lock by the egress device as well as a chain and padlock.

B. Provide an 18-inch length of ¼ inch wire size, 1.25 inch inside length, .38 inch inside width, type 304 stainless steel chain.

C. Padlocks provided under Section 087100.

2.7 HARDWARE SCHEDULE

A. Single Egress Gates Only Gate G1
1. Hinges: Self closing equal. 2 per leaf.
2. Superior Exit Bar Kit integral alarm and mounting plate.
3. Chain and Padlock; Padlock specified in Section 087100

B. Single Egress Gate with hold open Gate G2
1. Hinges: Self closing equal. 2 per leaf.
2. Superior Exit Bar Kit integral alarm and mounting plate.

3. Cane Bolt to Secure Gate Open

C. Double Gates without Egress: Gate G3
   1. Inactive leaf:
      a. Hold Open
   2. Hinges Self closing equal. 2 per leaf.
      a. Securable cane-bolt in lieu of center drop post.
   3. Active leaf
      a. Hold Open
      b. Hinges: Self closing unit. 2 per leaf.
      c. Latch: Child safety auto-latch. Top of latch plunger shall be set at 48 inches above the deck.
      d. Padlock provided by Section 0871000.

D. Double Gates with Egress: Gate G4 and G5
   1. Inactive leaf:
      a. Hold Open
      b. Hinges as
      c. Securable cane-bolt in lieu of center drop post.
   2. Active leaf
      a. Hinges: Self closing equal. 2 per leaf.
      b. Superior Exit Bar Kit integral alarm and mounting plate.
      c. Cane Bolt to Secure Gate Open
   3. Chain and Padlock; Padlock specified in Section 087100

E. Double Gates to Storage: Gate G6
   1. Inactive leaf:
      a. Hold Open
   2. Hinges Self 2 per leaf.
      a. Securable cane-bolt in lieu of center drop post.
   3. Active leaf
      a. Hold Open
      b. Hinges: Self closing unit. 2 per leaf.
      c. Locking Hardware to receive padlock
      d. Padlock provided by Section 0871000.

2.8 ACCESSORIES

A. Chain link fence accessories: ASTM F 626, Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing.

B. Post caps: Formed steel, cast malleable iron, or aluminum alloy weather-tight closure cap for posts. Provide one cap for each post. At line posts, provide tops to permit passage of top rail.

C. Top rail and brace rail ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.

D. Top rail sleeves: 7” (178 mm) expansion sleeve with spring, allowing for expansion and contraction of top rail.

E. Wire ties: 9 gauge 0.148" (3.76 mm) galvanized steel wire for attachment of fabric to line posts. Double wrap 13 gauge [0.092" (2.324 mm)] for rails and braces.

F. Tension (stretcher) bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" (4.76 mm x 19 mm) or equivalent fiber glass rod. Provide tension (stretcher) bars where chain link fabric meets terminal posts.

G. Truss rods & tightener: Steel rods with minimum diameter of 5/16" (7.9 mm). Capable of withstanding a tension of minimum 2,000 lbs.

H. Nuts and bolts are galvanized but not vinyl coated. Cans of PVC touch up paint are available to color coat nuts and bolts if desired.

2.9 CAST-IN-PLACE CONCRETE

A. General: Comply with ACI 301 for cast-in-place concrete and Division 3 Section "Cast-In-Place Concrete"
   1. Concrete Mixes: Normal-weight concrete with not less than 3000-psi (20.7- MPa) compressive strength (28 days), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum size aggregate.

2.10 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.

B. Verify survey of property lines and legal boundaries.

C. Verify areas to receive fencing are completed to final grades and elevations.

D. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAIN LINK FENCE FRAMING INSTALLATION

A. Install chain link fence in accordance with ASTM F 567 and manufacturer's instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Space line posts uniformly at 8' (2438 mm) maximum on center.

D. Concrete set terminal and gate posts: Drill holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6"(152 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft

and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts.

E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

F. Bracing: Install horizontal pipe brace at mid-height for fences 6' (1829 mm) and over, on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Adjust truss rod, ensuring posts remain plumb.

G. Tension wire: Provide tension wire at bottom of fabric. Install tension wire before stretching fabric and attach to each post with ties. Secure tension wire to fabric with 12-1/2 gauge 0.0985" (2.502 mm) hog rings 24" (610 mm) oc.

H. Top rail: Install lengths, 21' (6400 mm). Connect joints with sleeves for rigid connections for expansion/contraction.

3.3 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side and attach so that fabric remains in tension after pulling force is released. Leave approximately 2" (50 mm) between finish grade and bottom selvage. Attach fabric with wire ties to line posts at 15" (381 mm) on center and to rails, braces, and tension wire at 24" (600 mm) on center.

B. Tension (stretcher) bars: Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands or clips spaced maximum of 15" (381 mm) on center.

3.4 GATE INSTALLATION

A. Install gates plumb, level, and secure for full opening without interference.

B. Attach hardware by means which will prevent unauthorized removal.

C. Adjust hardware for smooth operation.

D. Touch up hardware with PVC touch-up paint.

E. Coordinate installation of key cores with Section 087100.

3.5 ACCESSORIES

A. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.

B. Fasteners: Install nuts on side of fence opposite fabric side for added security.

3.6 ADJUSTING

A. Gate: Adjust gate to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

C. Loop length of chain link fence and padlock furnished by Section 087100 around fence rail adjacent to gate at Substantial Completion.

END OF SECTION 32 31 00

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