

City of Lynchburg
Procurement Division
900 Church Street
Lynchburg, Virginia 24504
Telephone No.: 434-455-3970

Addendum for Bid
Miller Park Pool Renovations
26-090

Date: July 16, 2026

From: Stephanie Suter, CPPO, CPPB

RE: Addendum No. 3

This Addendum becomes a part of the contract documents and modifies the bid document as noted below. Acknowledge receipt of this addendum in the space provided on the Terms and Signature Sheet. Failure to do so may subject bidder to disqualification.

Questions and Answers:

1. Is it the intent that the Type ST1, ST2, ST3 and ST4 fixtures be mounted directly to the concrete around the pool area or should a pole base be provided? If a pole base needs to be provided can you please provide a pole base detail?

The Contractor shall coordinate with the lighting manufacturer and submit all applicable pole base details along with the shop drawings for review.

2. In review of the plans, there is no construction joint or saw cut control joint layout plan provided in the drawings. Also, there is no construction joint detail in the drawings. Should allowances for these items be included in the bid?

For bidding purposes, contractors shall base their pricing on contraction joints with a maximum spacing of 8'-0" for 4-inch concrete slabs and panel dimensions generally maintained within a 1:1 to 1:1.5 aspect ratio. Joint layout shall be coordinated by the Contractor with the proposed pour sequence, including construction joints, and submitted for review after award. Maximum spacing of expansion joints shall be 125ft. No additional allowance will be provided for joint layout or joint spacing coordination, and bidders shall include all associated costs in their base bid.

3. Pool qualifications for pool deck installer are very limiting with regard to available local concrete subcontractors in the area as a limited number of cantilevered deck over perimeter gutters are built. We are pouring to the back of the pool gutter, not a true cantilever. Additionally, the requirement of 5 pools with 6000sf area for local subcontractor seem steep for the available pool construction in our area. Are these requirements to be waived/modified to allow local contractors to competitively bid?

New specifications with revised requirements are attached.

4. A2.1 detail 2 references "Belgian Block acquire materials from City of Lynchburg stockpile". Do you have dimensions of this product? Is this palletized? Will this be brought to the site?

Belgian Block dimensions vary. Approximate dimensions are 10" W x 5" D x 6" H. Product is not palletized. GC is responsible for getting product to construction site.

5. GS1.2 and GS1.3 indicate a floor ceiling assembly UL 556. The only reference to this is on sheet A10.3 which appears to be a ceiling/roof assembly. AD1.2 doesn't indicate demolition of the existing ceiling. What is the intent/requirement?

DELETE existing plywood ceiling in Chemical Storage PH-103. Existing Park Maintenance PH-101 does not currently have a ceiling. Install (3) layers of 5/8" gypsum board, resilient channels and (1) additional layer of 5/8" gypsum board as required by UL L556 design for new ceilings in both Park Maintenance PH-101 and Chemical Storage PH-103. Any penetrations into new 2-hour fire rated ceiling will need to be fire caulked.

6. A3.1 detail 2 indicates truss bearing at 9'-7" with drywall at the bottom cord, A3.2 detail 2 indicates the same with a 1x4 covering the 2x8 plates. S5.01 indicates TOW at 10'-0" with the ceiling being lower than bottom of truss. What is required?

Truss Bearing is to remain at 9'-7" with drywall attached to the bottom chord as the finished ceiling material. The 1x4 is to be provided to cover the 2x8 plates. Both the drywall ceiling and 1x4 are to be primed and painted with (2) finish coats.

7. Sheet ED101 – General Notes, Item 4 References Sheet EP101, this sheet is not included in the Bid set. Please advise.

Reference to sheet EP101 has been removed.

8. Sheet C1.00 Shows an U/G Power running East to West along the South side of the old pool location, it appears based on the details that this will be in the area of the steps for the new pool and that the construction of the new pool wall may interfere with the existing route. Please advise if this is to be relocated.

Detailed underground power line should be feeding a demolished one-story block building fed from a demolished circuit. Existing Pool demolition and demolition of that building has already been conducted. Need to confirm that the underground power line and the corresponding circuit breaker have also been demolished prior to build-out. It appears this underground power is still in place.

9. In preparation for bidding the site scope of work for this project I noticed that several of the drain basins may be undersized based on the size requirements of the corresponding pipe sizes noted on the plans. Structures to Clarify: #202, #204, #208, #210, #214, #228. In addition, Structure #212 is not included on the structure table or defined in any manner.

The structure table on Sheet C5.00 has been updated to reflect appropriate sizes for the drainage basins. Structure 212 has been added to the table.

10. S3.00 indicates 6" of #57 stone under slab, A6.1 indicates 4" of gravel fill. Which is correct?

6" depth of #57 stone under the slab will work fine. Use 6" in lieu of the 4" gravel fill indicated on A6.1.

Changes to Specifications:

1. SECTION 000110 – TABLE OF CONTENTS - ADD Section 012200 – Unit Prices.
2. SECTION 012200 – UNIT PRICES - ADD Section 012200 – Unit Prices.

3. SECTION 087100 - DOOR HARDWARE - ADD Set 5.0 and 6.0.
4. SECTION 131100 - SP General Requirements - REVISED and updated qualification requirements.
5. SECTION 131103 - SP Shotcrete - REVISED to paragraph 1.3 – Qualifications.

CHANGES TO DRAWINGS:

1. Sheet AD1.2 - DELETE existing plywood ceiling in Chemical Storage PH-103.
2. Sheet A9.1 - ADD Hardware 5.0 to PH-103 in the door schedule. ADD G-101, G1-2, and G-103 for the gates with hardware 6.0.
3. Sheet A10.3 - CHANGE note for clarification to say: "Install UL L556 as ceiling to provide 2-hour fire rating".

Attachments:

1. **Revised Section 000110 – Table of Contents;**
2. **Section 012200 – Unit Prices;**
3. **Revised Section 087100 – Door Hardware;**
4. **Revised Section 13 11 00 – SP General Requirements;**
5. **Revised Section 13 11 013 - SP Shotcrete Revised;**
6. **Pool Base Survey dated July 15, 2026 in PDF format; and**
7. **Updated Drawings dated July 16, 2026 have been posted to the City's website.**

READ TERMS AND CONDITIONS AND SIGN

In compliance with the above BID, and subject to all the conditions hereof, the undersigned offers and agrees to comply with any or all of the terms and conditions contained herein, or as mutually agreed upon by subsequent negotiations. This form shall become part of the final file.

Company Name: _____ *Address:* _____ *Date:* _____

Authorized Signature: _____ *Title:* _____

Print Name: _____ *Telephone No.:* _____

DOCUMENT 000110

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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. General Conditions for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

- A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

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

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

- A. Unit Price 1: Removal of mass rock, disposal off site and backfill with stone compacted per specifications.

1. Unit of Measurement: Cubic yard of material.

END OF SECTION 012200

SECTION 087100 - 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. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding doors.
 - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 01 Section "General Conditions".
 - 2. Division 06 Section "Rough Carpentry".
 - 3. Division 06 Section "Finish Carpentry".
 - 4. Division 08 Section "Operations and Maintenance".
 - 5. Division 08 Section "Hollow Metal Doors and Frames".
 - 6. Division 08 Section "Flush Wood Doors".
 - 7. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
 - 8. Division 26 Section "Electrical"
- D. Codes and References: Comply with the version adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.5 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.

4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.2 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
- a. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.
 2. Manufacturers:.
 - a. Pemko (PE).

2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Manufacturers:
 - a. Rockwood (RO).
- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:
 - a. Rockwood (RO).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Manufacturer's Standard.
- C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.
 1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
 2. Manufacturers:
 - a. Corbin Russwin (RU) - Access 3 AP.
 - b. Sargent (SA) - Degree DG1.

- c. No Substitution.
 - E. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
 - F. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
 - G. Construction Keying: Provide construction master keyed cylinders.
 - H. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.
- 2.6 KEY CONTROL
- A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
 - 1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).
- 2.7 CYLINDRICAL LOCKS AND LATCHING DEVICES
- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.
 - 1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - CLX3300 Series.
 - b. Sargent Manufacturing (SA) - 10X Line.

2.8 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 4. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. Exit devices shall have a five-year warranty.
 2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide exit devices with functions and features as follows:
 - a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
 - b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
 - c. No catch points: addition of applied deflectors or other added components are not allowed.
 - d. No visible plastic.
 - e. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes.
 - f. Constructed of all stainless steel.
 - g. Stainless steel pullman type latch with deadlock feature.
 - h. Narrow or wide style exterior trim as specified in the hardware sets.
 - i. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.
 - j. Ten-year limited warranty for mechanical features.
2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - PED4000 / PED5000 Series.
 - b. Sargent Manufacturing (SA) - PE80 Series.

2.10 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.

Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
 - b. Corbin Russwin Hardware (RU) - DC6000 Series.
 - c. Norton Rixson (NO) - 7500 Series.
 - d. Sargent Manufacturing (SA) - 351 Series.

2.11 OVERHEAD CONCEALED DOOR CLOSERS

- A. Door Closers, Overhead Concealed (Narrow Profile): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed overhead concealed door closers designed for narrow profile frames and doors. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide overhead concealed doors closers with functions and features as follows:
 - a. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies and A117.1 Accessibility Code.
 - b. Single acting, offset hung with a cast iron body.
 - c. Fully concealed body in the frame head and track assembly in the door.
 - d. Separate and independent valves for closing speed and backcheck adjustments.
 - e. Five-year limited warranty.
2. Manufacturers:
 - a. Norton Rixson (NO) - 91DCP Series.

2.12 ARCHITECTURAL TRIM AND ACCESSORIES

- A. Door, Frame and Wall Protective Trim: ANSI/BHMA A156.6, protective products as specified in the hardware sets. Door protection plates shall be not more than 2" less than door width on

stop side and 1" less door width on the pull side or on stop side of pairs of doors. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide protective trim with functions and features as follows:
 - a. Meets ADA requirements for smooth bottom door surfaces.
 - b. UL Classified options for use on fire-rated doors up to 3 hours.
 - c. Fabricated from stainless steel, brass, bronze, aluminum, or high-impact plastic.
 - d. Available in a variety of sizes, finishes, and profiles to suit aesthetic and functional requirements.
 - e. Designed to protect doors, frames, and adjacent walls from damage due to impact, abrasion, or traffic.
 - f. Fasteners included; adhesive-backed options available for select models.
 - g. Ten-year limited warranty.
2. Manufacturers:
 - a. Rockwood (RO).

2.13 DOOR STOPS AND HOLDERS

- A. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Rockwood (RO).

2.14 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 1. Pemko (PE).

2.15 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Paint prime coated mullions to match frames.
- C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- E. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- G. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. MC - Medeco
6. NO - Norton Rixson
7. OT - Other

Hardware Sets

Set: 1.0

Doors: 101A

Description: EXT - AL - PANIC - CLASS

1 Continuous Hinge - [Modular]	CFMXXHD1-M		PE
1 Rim Exit Device, Classroom	60 PE8513 NEL	US32D	SA
1 Interchangeable Core	LFIC X4 as required	26	MC
1 Concealed Closer	91N	626	NO
1 Door Stop	463-RKW	US32D	RO
1 Gasketing	by door / frame mfg		
1 Sweep	3452APK TKSP		PE
1 Threshold	2005AT MSES25SS		PE

Set: 2.0

Doors: 100

Description: EXT - PR - STOR

6 Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
2 Flush Bolt	555	US26D	RO
1 Storeroom/Closet Lock	60 10XG04 LL	US26D	SA
1 Interchangeable Core	LFIC X4 as required	26	MC
2 Surface Closer / Stop	351 OTB / POTB [As Req]	EN	SA
2 Kick Plate	K1050 10" X 1.5" LDW CSK TEK	US32D	RO
2 Door Stop	463-RKW	US32D	RO
1 Astragal	357SP TKSP X S88BL		PE
1 Gasketing	S88BL		PE
1 Rain Guard	346C x LAR		PE
2 Sweep	3452APK TKSP		PE
1 Threshold	2005AT MSES25SS		PE

Set: 3.0

Doors: 101B

Description: STOR - CLOSER

3 Hinge, Full Mortise	TA2714-MCK 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	60 10XG04 LL	US26D	SA
1 Interchangeable Core	LFIC X4 as required	26	MC
1 Surface Closer	351 [Reg/PA as req]	EN	SA
1 Kick Plate	K1050 10" X 1.5" LDW CSK TEK	US32D	RO
3 Silencer	608		RO

Set: 4.0

Doors: 102

Description: TOILET

3 Hinge	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1 Privacy Lock	10XU65 LL	US26D	SA
1 Surface Closer	351 [Reg/PA as req]	EN	SA
1 Mop Plate	K1050 4" x 1" LDW CSK TEK	US32D	RO
1 Kick Plate	K1050 10" X 1.5" LDW CSK TEK	US32D	RO
1 Door Stop	409 / 446 [as required]	US26D	RO
1 Gasketing	S88BL		PE

Set: 5.0

Doors: PH-103

Description: STOR - CLOSER - RATED

3 Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1 Storeroom/Closet Lock	60 10XG04 LL	US26D	SA
1 Interchangeable Core	LFIC X4 as required	26	MC
1 Surface Closer	351 [Reg/PA as req]	EN	SA
1 Kick Plate	K1050 10" X 1.5" LDW CSK TEK	US32D	RO
1 Gasketing	S88BL		PE

Set: 6.0

Doors: GATE

Description: GATE

1 Rim Exit Device, Storeroom	60 PE8804 WEL	US32D	SA
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1 Interchangeable Core	LFIC X4 as required	26	MC
1 Gate Hardware	By Door Manufacturer		OT

END OF SECTION 087100

SECTION 131100

SWIMMING POOL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The scope of the work included under this Section of the Specifications shall include multipurpose swimming pool(s) as illustrated on the Drawings and specified herein.
- B. The Swimming Pool Subcontractor shall furnish and install the swimming pool structures, finishes, cantilever deck forming, gutter forming, swimming pool mechanical and electrical systems, and all accessories necessary for a complete, functional swimming pool system, as herein described. Work shall include initial start-up of all pool systems, a minimum 14-day pool maintenance period or until Owner takes occupancy of project, instruction of Owner's personnel on all pool systems, As-Built drawings and warranties as required.
- C. The General and Supplementary Conditions of the Specifications shall form a part and be included under this Section of the Specifications. The Swimming Pool Subcontractor shall provide all supervision, labor, material, equipment, machinery, plant and any and all other items necessary to complete the work.

1.2 DEFINITIONS

- A. It is the intention of these specifications and Drawings to call for finished work, tested and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."
- B. References to "swimming pool systems" shall include all types of pools, equipment, and accessories.
- C. References to "written date of acceptance" shall be equivalent to Temporary Certificate of Occupancy (TCO).
- D. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the work, the same as if herein specified or shown.

1.3 QUALIFICATIONS

- A. ALL OF THE WORK IN THE SECTIONS OF DIVISION 13 IS TO BE THE RESPONSIBILITY OF ONE EXPERIENCED SWIMMING POOL SUBCONTRACTOR PRIMARILY ENGAGED IN THE CONSTRUCTION OF COMMERCIAL PUBLIC-USE SWIMMING POOLS. A SWIMMING POOL

SUBCONTRACTOR SHALL BE CONSIDERED PRIMARILY ENGAGED AS REQUIRED HEREIN IF THE SUBCONTRACTOR DERIVED 50% OF ITS CONSTRUCTION-SPECIFIC ANNUAL REVENUE FROM NEWLY CONSTRUCTED PUBLIC-USE SWIMMING POOL CONSTRUCTION FOR EACH OF THE LAST FIVE YEARS. THE SUBCONTRACTOR MUST HAVE ALSO, IN THE LAST TEN YEARS CONSTRUCTED AT LEAST THREE (3) NEWLY CONSTRUCTED COMMERCIALY DESIGNED MUNICIPAL AND PUBLIC-USE SWIMMING POOLS, EACH OF WHICH SHALL HAVE INCORPORATED A MINIMUM SIZE OF 4,000 SQUARE FEET OF WATER SURFACE AREA WITH A PERIMETER OVERFLOW GUTTER AND SELF-MODULATING BALANCE TANK.

1.4 CODES, RULES, PERMITS, FEES

- A. The swimming pools shall be constructed in strict accordance with the applicable provisions set forth by authorities having jurisdiction over swimming pool construction and operation in the State of Virginia.
- B. The Swimming Pool Subcontractor shall give all necessary notices, obtain all permits, and pay all government sales taxes, fees, and other costs in connection with their work; The Contractor shall file all necessary plans, prepare all documents and obtain all necessary approvals of governmental departments having jurisdiction; obtain all required certificates of inspection for their work and deliver same to the Designated Representative before request for acceptance and final payment for the work.
- C. The Swimming Pool Subcontractor shall include in the work any labor, materials, services, apparatus, or drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on Drawings and/or specified.
- D. The Contractor shall submit all required documents and materials to all Governmental Departments having jurisdiction for any deferred approval items or substituted materials or products to obtain final approval prior to installation.
- E. Standards:
 - 1. All work and materials shall be in full accordance with the current rules and regulations of applicable codes.
 - 2. Nothing in these drawings or specifications is to be construed to permit work not conforming to those codes.
 - 3. Should the drawings or specifications call for material or methods of construction of a higher quality or standard than required by these codes, the specifications shall govern.
 - 4. Applicable Codes, Regulations shall include, but are not necessarily limited to the following:
 - a. Virginia Code of Regulations
 - b. Title 8, Industrial Relations

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- c. Title 22, Division 4, Public Swimming Pools
- d. Title 24, Building Standards
- e. American National Standards Institute
- f. American Society of Mechanical Engineers
- g. American Society for Testing and Materials
- h. Occupational Safety and Health Act
- i. National Spa and Pool Institute (NSPI), Minimum Standards for Public Pools
- j. National Sanitation Foundation (NSF)
- k. National Electric Code (NEC)
- l. Government Health and Building Codes, latest edition
- m. ADA Accessibility Guidelines for Building and Facilities
- n. American National Standards Institute (ANSI)
- o. American Society for Testing and Materials (ASTM)
- p. State and local guidelines for bulkhead(s), river current(s), waterslide(s), and/or wet play features and spray grounds.
- q. "Technical Manual," National Plasterers Council, Wauconda, Illinois – latest edition
- r. Tile Council of North America (TCNA) Handbook – latest edition

1.5 DESCRIPTION OF WORK

- A. Furnish and perform supervision, coordination, all layout, formwork, excavation, hand trim, disposing off-site of all unused material or debris to complete the swimming pool excavation to the dimensions shown on the plans.
- B. Condition the pool subgrade as required by the Project Geotechnical Report and/or the direction of the Geotechnical Engineer. Provide protection, shoring and adequate surface drainage to preclude any damage to the pool excavation during construction.
- C. Furnish and install complete; swimming pool structures, balance tank (if required per plan), reinforcing steel and cast-in-place concrete floors and pneumatically placed concrete walls and floors.
- D. Furnish and install swimming pool finishes, including tile and pool plaster or other specified waterproofing finishes.
- E. Furnish and install complete swimming pool mechanical system(s), including, but not limited to, circulation systems, filtration systems, pool water heating systems, water chemistry control systems, domestic water fill line systems, booster pump and special effects systems, and all pumps, piping, valves, and connections between system(s) and swimming pool(s).
- F. Furnish and install complete swimming pool electrical system(s) from P.O.C. in Mechanical Room, including, but not limited to, underwater lighting systems, water level control systems, timing systems, scoreboards, special effects systems, control circuitry, all interlocks between pool mechanical equipment, motor starters, time

- clocks, bonding, and all electrical controls, conduits, conductors, contactors, and switches between the system(s) and swimming pool(s).
- G. Furnish and install all swimming pool cantilever forming, gutter forming, deck equipment and required anchors and inserts for the specified equipment as required by code, shown on the Drawings and specified herein.
 - H. After the initial filling of the swimming pool system(s), should any repairs, continuing work, or other Subcontractor responsibility require drainage or partial drainage of the swimming pool systems, the Swimming Pool Subcontractor shall be responsible for any subsequent refilling and shall complete the project with the swimming pool system(s) full of water, water in chemical balance, complete in every way, and in full operation.
 - I. For Competition Pools: The Contractor shall retain an independent licensed surveyor to provide proof of compliance for required pool lengths as follows:
 - 1. 25 Yards: (Allows for touch pads at one end) 75'- 5/6" minimum, 75'-1 3/16" maximum.
 - 2. 25 Meter: (Allows for touch pads at one end) 82'-9/16" minimum, 82'-13/16" maximum.
 - 3. 50 Meter: (Allows for touch pads at both ends) 164'-1 1/8" minimum, 164'-1 11/16" maximum.
 - J. Tolerance against length shall extend in a vertical plane 0.3M (12") above and 0.8M. (2'-7 1/2") below the surface of the water at all points of both end walls typ. of all courses.
 - K. The independent licensed surveyor shall fill out, notarize and fill official certifications forms with USA Swimming.
 - L. Contractor shall retain a licensed engineer to certify the field built main drain systems as VGB Compliant.

1.6 ASSIGNED RESPONSIBILITIES AND RELATED WORK

- A. It is the intent of this section of the Specifications to clarify Work responsibilities of the trades directly and indirectly involved in construction of the pool systems. All labor, equipment, materials and supplies furnished by the Swimming Pool Subcontractor and other Subcontractors per the contractual agreement with the General Contractor and Owner and shall be as directed by the Owner through their Designated Representative.
- B. THE SWIMMING POOL SUBCONTRACTOR SHALL NOT SUBCONTRACT ANY PORTION OF THE SWIMMING POOL CONSTRUCTION OR SWIMMING POOL EQUIPMENT INSTALLATION TO ANYONE OTHER THAN A SUBCONTRACTOR THAT SATISFIES THE REQUIREMENTS OF SECTION 13 11 00

- C. The Owner will provide one complete water filling of the swimming pool(s), but will not assume any responsibility for the swimming pool system(s) until they have been proved fully operational, complete in every way and are provided written acceptance by the Designated Representative of the Owner.

1.7 RESPONSIBILITIES OF THE CONTRACTOR

- A. The Contractor is responsible for coordination of all trades to provide a fully functional pool system.
- B. The Contractor shall grade the swimming pool site(s), establish benchmarks, cut and fill as necessary to provide as level an area as possible at swimming pool deck elevation before swimming pool layout.
- C. The Contractor shall be responsible for horizontal dimensions and grade elevations accurately from established lines and benchmarks (as indicated on the Drawings) and be responsible for those grades.
- D. The Contractor shall provide adequate temporary light, electric power, heat and ventilation per Federal and State OSHA requirements to construct the swimming pool system(s).
- E. The Contractor shall not permit any heavy equipment activity over any area or within five (5) feet of any area under which swimming pool piping is buried. There shall be no exceptions to this requirement.
- F. The Contractor shall keep the swimming pool excavation(s) and swimming pool structure(s) free of construction residue and waste materials of their workmen or Subcontractors, removing said material from the swimming pools as required.
- G. Contractor shall provide all necessary dewatering equipment for discharge of groundwater including ground water discharge authorization and agency approval.
- H. The Contractor shall protect the swimming pool(s) from damage caused by their construction equipment and /or workmen and Subcontractors.
- I. The Contractor shall provide a representative at time of swimming pool start-up to coordinate all trades related to swimming pool system(s).
- J. Contractor shall test the pool fill water and provide a report identifying the fill water chemistry to ensure chemistry is suitable prior to pool plastering.
- K. Contractor shall coordinate required site visits with Aquatic Designer for the appropriate stage of construction. Contractor shall notify Aquatic Designer of required milestone site visits a minimum of 2 weeks prior to date requested. Contractor to ensure all work is ready for Aquatic Designer review at the time of requested site visit. Site visits are required at the following milestones:

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1. PRE-CONSTRUCTION: Prior to actual start of construction, meet to review job site safety procedures, submittals process, substitution process and RFI process.
2. PRE-CONCRETE /SHOTCRETE: After the pool piping, underwater lights, electrical bonding and reinforcing steel are installed, prior to pouring the pool floor and/or placing shotcrete.
3. PRE-DECK: After the concrete deck finish mock-ups have been constructed, deck drainage, anchors, inserts, reinforcing steel and forms are installed, but prior to the first concrete pour.
4. PRE-PLASTER: After the pool decks are complete, the pool tile and pool mechanical equipment has been installed, prior to pool plaster installation.
5. PUNCH LIST: After the pool is substantially complete, all pool systems are in operation and all deck and competitive equipment has been installed.
6. FINAL: After the work required by the Punch List is completed.
7. WARRANTY REVIEW: Approximately eleven (11) months after substantial completion, review of all pool systems prior to expiration of twelve-month Contractor warranty.

Date/Time of Requested Site Visit

Construction Milestone

Contractor

Date

Architect / Project Manager

Date

1.8 RESPONSIBILITIES OF THE MECHANICAL SUBCONTRACTOR

- A. The Mechanical Subcontractor shall be licensed in the State of Virginia and provide written notifications to Swimming Pool Subcontractor and contractor when necessary to excavate and backfill within the swimming pool construction site.
- B. The Mechanical Subcontractor shall not utilize any swimming pool piping trench for installation of any sanitary sewer, storm sewer, domestic water, hot water, chilled water or natural gas line.
- C. The Mechanical Subcontractor shall furnish and install all sanitary sewer piping, including vent stacks (if necessary), for backwash pits, floor drains and floor sinks as required by code, shown on Drawings, and herein specified.
- D. The Mechanical Subcontractor shall furnish and install all storm sewer piping and site drainage systems as required by code, shown on the Drawings, and herein specified.

- E. The Mechanical Subcontractor shall provide a minimum 75 psi water supply for swimming pool construction work within fifty (50) feet of the swimming pool construction site(s).
- F. The Mechanical Subcontractor shall furnish and install reduced pressure backflow protected domestic water lines to P.O.C. within swimming pool Mechanical Room as required by code, shown on the Drawings, and herein specified.
- G. The Mechanical Subcontractor shall furnish and install natural gas piping, pressure regulation and valving to P.O.C. within swimming pool Mechanical Room as required by code, shown on the drawings, and herein specified.
- H. The Mechanical Subcontractor shall furnish and install all ductwork, louvers, and all HVAC equipment within swimming pool Mechanical Room as required by code, shown on the Drawings, and herein specified.
- I. The Mechanical Subcontractor shall provide a representative at time of swimming pool start-up to coordinate work related to swimming pool system(s).

1.9 RESPONSIBILITIES OF THE ELECTRICAL SUBCONTRACTOR

- A. The Electrical Subcontractor shall be licensed in the State of Virginia and shall furnish and install electrical service to swimming pool Mechanical Room sized to accommodate all necessary swimming pool equipment as shown on the Drawings and herein specified.
- B. The Electrical Subcontractor shall furnish any temporary power needed by the Swimming Pool Subcontractor within fifty (50) feet of the swimming pool construction site(s).
- C. The Electrical Subcontractor shall furnish and install all conduits, conductors, starters/disconnects, panels, circuits, switches and equipment as required for lighting, ventilation and HVAC equipment within swimming pool Mechanical Room as required by code, shown on the Drawings, and herein specified.
- D. The Electrical Subcontractor shall furnish and install all conduits, conductors, panels, circuits, switches and equipment for area lighting as required by code, shown on the Drawings, and herein specified.
- E. All equipment, material and installation shall be as required under Division 16 of the Specifications and shall conform to NEC Article 680 (latest revision), State and Local Codes, and as may be required by all authorities having jurisdiction over swimming pool construction within the State of Virginia.
- F. The Electrical Subcontractor shall provide a representative at time of swimming pool start-up to coordinate work related to swimming pool system(s).

1.10 SCHEDULE OF VALUES

- A. Provide a Schedule of Values for all work specified in each of the technical specifications listed in the table below, regardless of whether the work is performed by the swimming pool contractor or others. Values listed shall be fully burdened, with contractor general conditions, overhead, profit and bonds included. Payments for swimming pool work completed shall not be approved until Schedule of Values has been submitted to and approved by Architect.

SWIMMING POOL SCHEDULE OF VALUES			
No.	Section #	Description	Value
1.	13 11 01	Swimming Pool Excavation – Removal and Import	
2.	13 11 02	Swimming Pool Concrete – per cubic yard	
3.	13 11 03	Swimming Pool Shotcrete – per cubic yard	
4.	13 11 04	Swimming Pool Tile – per square foot	
5.	13 11 05	Swimming Pool Plaster – per square foot	
6.	13 11 06	Swimming Pool Equipment – per item	
7.	13 11 07	Swimming Pool Mechanical – per linear foot (pipe, conduit, etc.)	
8.	13 11 08	Swimming Pool Electrical - per linear foot (pipe, conduit, etc.)	
Total			

1.11 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Subcontractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing submittals with performance construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for schedules performance of related construction activities.

- D. Processing Time: Allow enough time for submittal review, including time for re-submittals as follows. Time for review shall commence on Architect's receipt of submittal.
1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contract when a submittal being processed must be delayed for coordination.
 2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow twenty-one (21) days for initial review of each submittal.
 3. Direct Transmittal to Consultant: Where the Contract Documents indicate that submittals may be transmitted directly to Architect's consultants, provide duplicate copy of transmittal to Architect. Submittal will be returned to Architect before being returned to Subcontractor.
 4. If intermediate submittal is necessary, process it in same manner as initial submittal.
 5. Allow fifteen (15) days for processing each submittal.
 6. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- E. Identification: Place a title sheet (see template below) on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on title block.
 2. Provide a space on title block to record Subcontractor's review and approval markings and action taken by Architect.
 3. Include the following information on title block for processing and recording action taken: (See Attached Sample)
 - a. Project name.
 - b. Date.
 - c. Name and address of Subcontractor.
 - d. Name of Subcontractor.
 - e. Name of Supplier.
 - f. Name of Manufacturer.
 - g. Unique identifier, including revision number.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - j. Other necessary identification.

SUBMITTAL FOR:

SUBMITTAL TO:

SUBCONTRACTOR:

Item Number: _____

Section Number: _____

Section Description: _____

Subcontractor: _____

Supplier: _____

Manufacturer: _____

Product Code: _____

Quantity: _____

Subcontractor Certification:

Contractor's Submittal Stamp:

It is hereby certified that the equipment or material designated in this submittal is proposed to be incorporated in the above named project and is in compliance with the contract drawings and / or specifications and is submitted for approval.

Certified by: _____

Date: _____

Job Superintendent: _____

Revisions: _____

Architect's Review Stamp and Comments

- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract documents on submittal.
- G. On all catalogue or cut sheets identify which model or type is being submitted.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Product data and shop drawings shall be electronically submitted and colored samples shall be submitted by photograph (physical submittal may be required during review). Transmit each submittal using a transmittal form.
 - 1. On an attached separate sheet, prepared on Subcontractor's letterhead, record relevant information, request for data, revisions other than those requested by Architect on previous submittals and deviations from requirements of the Contract documents, including minor variations and limitations. Include the same label information as the related submittal.
 - 2. Include Subcontractor's certification stating that information submitted complies with requires of the Contract Documents.
 - 3. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of Subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Remarks.
- I. 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.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

1.12 REQUIRED SUBMITTALS

- A. Contractor is required to provide submittals for the following:
 - 1. Qualification Submittals as listed in all Division 13 Specification Sections
 - 2. Material Submittals as listed in all Division 13 Specification Sections
 - 3. Additional Informational Submittals
 - a. Anticipated List of Submittals

- b. Acknowledgement / List of required Site Visits and review by Design Team at the milestones noted in Specification Section 13 11 00 – 1.07
- c. Pre-plaster verification form per Specification Section 13 11 05 – 3.02

1.13 SUBSTITUTIONS

- A. To obtain approval to use unspecified products, bidders shall submit requests for substitution at least ten (10) days prior to bid date. Requests shall only be considered if they clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. All unspecified products and equipment will be considered on an “or equal” basis at the discretion of the Designated Representative. Requests for substitution received after the specified deadline will not be considered. Where a conflict exists between the requirements of the General Conditions / Special Conditions / Division 1 concerning substitutions and the requirements of this Article, this Article (Section 13 11 00, Article 1.10) shall govern.
- B. Where the Swimming Pool Subcontractor proposes to use an item of equipment other than that specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring, or any other part of the architectural, mechanical, or electrical layout, all such redesign and all new drawings (stamped by Virginia Licensed Engineer) and detailing required shall be prepared by the Swimming Pool Subcontractor, at their own expense, submitted for review and approval by the Designated Representative prior to bid.
- C. Where such approved deviation requires a different quantity and arrangement of piping, supports and anchors, wiring, conduit, and equipment from that specified or indicated on the Drawings, the Swimming Pool Subcontractor shall furnish and install any such piping, structural supports, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

1.14 SURVEYS AND MEASUREMENTS

- A. The pool contractor shall provide a survey of the existing pool dimensions complete with lengths, widths, and depths of the pool. The submittal shall also include pool gutter system dimensions and elevations. This shop drawing submittal shall be submitted prior to any construction work and prior to equipment submittals for review and approval
- B. The Swimming Pool Subcontractor shall base all measurements, both horizontal and vertical, from benchmarks established by the Contractor. All work shall agree with these established lines and levels. The Mechanical Drawings do not give exact details as to elevations of piping, exact locations, etc. and do not show all offsets, control lines, pilot lines and other installation details. Verify all measurements at site and check the correctness of same as related to the work.

1.15 DRAWINGS

- A. Drawings are diagrammatic and indicate the general arrangement of the systems and work included in the Subcontractor. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact dimensions. Where they are not definitely shown, this information shall be obtained from the Designated Representative.

1.16 SWIMMING POOL SUBSUBCONTRACTOR

- A. The swimming pool construction work as herein described and specified in Division 13 of the Project Manual shall be the complete responsibility of a qualified and specifically licensed (C-53 license classification within the State of Virginia) Swimming Pool Subcontractor with extensive experience in commercial public use swimming pool installations.
- B. The Contractor shall require the Swimming Pool Subcontractor to furnish to the Contractor performance and payment bonds in the amount of 100% of the Swimming Pool Subcontractor's bid written by a surety Company properly registered in the State of Virginia and listed by the U.S. Treasury. The expense of the bond(s) is to be borne by the Subcontractor. The Contractor shall clearly specify the amount and requirements of the bond(s) in the Contractor's written or published request for subbids. The Contractor's written or published request for subbids shall also specify that the bond(s) expense is to be borne by the Subcontractor.
- C. Subcontractor certifies that it meets the qualifications and experience requirements established in Swimming Pool General Requirements, Section 13 11 00, as follows:
 - 1. Subcontractor has derived 50% of its annual revenue from public-use swimming pool construction for each of the last five (5) years.
 - 2. Subcontractor has, in the last five (5) years, constructed at least five (5) commercially designed municipal and public-use swimming pools, each of which have incorporated a minimum size of 6,000 square feet of water surface area with a concrete and tile perimeter overflow gutter and self-modulating balance tank.
 - 3. The following list of projects meet the requirements of section (D) above and the contact as reference by the Contractor, the Awarding Authority of their agent or designee.
 - a. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____
 - b. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____

MILLER PARK POOL
LYNCHBURG, VIRGINIA

- Architect for Project: _____
- c. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____
- d. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____
- e. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____

D. Swimming Pool Deck Subcontractor other than the Swimming Pool Subcontractor certifies that it meets the qualifications and experience requirements established in Swimming Pool General Requirements, Section 13 11 00, as follows:

1. Subcontract has, in the last five (5) years, constructed at least five (5) commercially designed cantilevered pool decks over perimeter gutters, each of which have incorporated a minimum size of 6,000 square feet of water surface area of the swimming pool.
2. The following list of projects meet the requirements of section (b) above and the contact as reference by the Contractor, the Awarding Authority of their agent or designee.

SWIMMING POOL DECK SUBCONTRACTOR

- a. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____
- b. Owner: _____
Scope of Project: _____
Contact Person: _____
Phone Number: _____
Architect for Project: _____
- c. Owner: _____
Scope of Project: _____
Contact Person: _____

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LYNCHBURG, VIRGINIA

	Phone Number:	_____
	Architect for Project:	_____
d.	Owner:	_____
	Scope of Project:	_____
	Contact Person:	_____
	Phone Number:	_____
	Architect for Project:	_____
e.	Owner:	_____
	Scope of Project:	_____
	Contact Person:	_____
	Phone Number:	_____
	Architect for Project:	_____

1.17 OPERATING INSTRUCTIONS

- A. The Swimming Pool Subcontractor shall determine from actual samples of pool water supplied by the Owner, the proper water management program necessary for maximum operating efficiency and comfort. The Swimming Pool Subcontractor shall provide the services of experienced personnel familiar with this type of pool system operation, in conformance with Section 13 11 05 of the Specifications.

1.18 MAINTENANCE MANUALS

- A. The Swimming Pool Subcontractor shall provide a pdf of the operation and maintenance manual for delivery to the Designated Representative of instructions for operating and maintaining all systems and equipment included in this Contract. Manufacturer's advertising literature or catalog pictures will not be acceptable for operating and maintenance instructions.
- B. The manuals shall contain all parts lists, periodic maintenance instructions and troubleshooting guidelines for all pool equipment, including but not limited to filters, pumps, controllers, water chemistry control equipment, etc.

1.19 SECURE FROM THE OWNER

- A. A complete Owner-furnished filling of the swimming pools.
- B. The Owner's assistance, as specified herein, from the time of start-up until final written acceptance of the swimming pool system(s).
- C. Chemicals as required for swimming pool operation after Swimming Pool Subcontractor completes initial water chemistry balance and water treatment during the maintenance period described in Section 13 11 05 of the Specifications.

1.20 WARRANTY

- A. The Swimming Pool Subcontractor shall warrant all swimming pool structures, finishes and systems against defects in material and workmanship for a period of one year after the date of acceptance by the Owner. Any repair or replacement required due to defective material or workmanship will be promptly corrected by the Swimming Pool Subcontractor.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 131103

SWIMMING POOL SHOTCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials and equipment as required to install structural wet mix or dry mix shotcrete for swimming pool structures as indicated on the Drawings and herein specified.

1.2 QUALITY ASSURANCE

- A. Qualifications of Workers:
 - 1. The entity performing the work of this Section shall have been successfully engaged in the respective trade for at least five (5) years immediately prior to commencement of the Work.
 - 2. For actual construction operations, use only trained and experienced workers with a minimum of three (3) years experience with the materials and methods specified.
 - 3. Provide at least one person who shall be present at all times during execution of the work of this Section, with a minimum of five (5) years experience with the type of materials being installed, the referenced standards, and who shall direct all Work performed under this Section.
- B. Standards: Except as otherwise indicated, provide shotcrete per American Concrete Institute Standard ACI 506R, ACI 506.2, ACI 506R-16, ACI 318-19, and the International Building Code (latest edition).
- C. Mix Design: The Contractor shall submit a mix design stamped and signed by a licensed engineer for review by the Owner's Representative prior to any placement of shotcrete. Mix design shall indicate source of aggregate and brands of cement and admixtures used. All mix designs shall take character of locally available aggregate into consideration and make adjustments as necessary to conform with specified design criteria. Mix design shall meet minimum compressive strength as listed on drawings and in structural calculation package.
- D. Testing and Inspection: A preconstruction test panel, including compressive strength testing, is required and shall be shot, cured, cored or sawn by a ACI certified nozzleman, examined, and tested (representing the most congested and difficult project scenario) prior to commencement of the project in accordance with ACI 506R-16 section 1.5 and ASTM C1140. A certified shotcrete operator shall place all wet-mix or dry-mix shotcrete in accordance with ACI 318-19. Nozzle operators shall become certified through testing and training programs that include written and

performance examinations. Each shotcrete nozzle operator shall be certified in accordance with the applicable ACI certification program for dry-mix or wet-mix shotcrete (both are covered by ACI CPP 660.1-15). All project conditions and personnel shall be represented in the test panel. Additionally, one test panel shall be provided for each 50 yards (or portion thereof) of shotcrete placed for each day or each nozzleman, whichever is greater. The size of the strength test panel shall be per the direction of the Special Shotcrete Inspector. At least three (3) cores shall be taken from each test panel. (At least three (3) cores shall be taken from the completed work for each day of shotcrete operation.) Testing shall be performed by the Owner's designated Testing Lab and comply with Section ACI 318-19 and CBC 2022, 1705A.3.9. Continuous inspection of the shotcrete operation by a deputy inspector provided by the Owner shall be required. Compressive test strength shall meet or exceed the compressive strength as listed on the drawings and in the structural calculation package.

- E. Tolerances: Construct all swimming pool shotcrete straight, true, plumb, and square within a tolerance horizontally and vertically of 1/8" in total distance.

1.3 SUBMITTALS AND SUBSTITUTIONS

- A. Provide submittals in conformance with the requirements of Division 1 of the specifications and ACI 318-19, ACI 506.2, and ACI 506R-16. Requests for substitution shall conform with requirements of Article 1.10.A of Section 13 11 00.
- B. Materials List: Within thirty (30) days after issuance of Notice to Proceed, and before shotcrete materials are delivered to the project site, submit to the Owner a complete list of materials proposed to be used in this portion of the Work, showing manufacturer's name and catalog number of all items such as admixtures and curing membranes, and the name and address of the supplier of cement and aggregate to be used.
- C. Submit proof of qualifications as specified in Article 1.2.A of this Section.

1.4 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect shotcrete materials before, during and after installation and to protect the installed Work specified in other Sections.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cement: Cement shall be Type I or II Portland Cement conforming to ASTM C150. Cement type shall be the same for all shotcrete work.
- B. Aggregate: ASTM C33, washed hard dense durable clean sharp sand from approved pit, free of organic matter and opaline, feldspar, or silicious magnesium substances and containing not more than 3% by weight of deleterious substances. Maximum size aggregate for shotcrete is 3/8" per ACI 506R, Table 1.1.1. When tested for organic impurities by ASTM C40 method, fine aggregate color not darker than reference standard color. When tested for soundness by ASTM C88 method, grading No. 2 of ASTM C1436, loss after 5 cycles not over 10% of fine aggregate.
- C. Water: Potable, clean, fresh, free from acid, alkali, organic matter or other impurities liable to be detrimental to the shotcrete.
- D. Admixtures: Admixtures shall conform to ASTM C1141 and only be used upon approval by the licensed batch plant engineer or the Contractor's third-party licensed engineer and then submitted to the Owner's Representative for review, refer to section 1.2C.

PART 3 EXECUTION

3.1 EXECUTION

- A. Inspection:
 - 1. Prior to all Work of this Section carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation may properly commence.
 - 2. Verify that items to be imbedded in shotcrete are in place and that shotcrete may be placed to the lines and elevations shown on the Drawings, with all required clearance from reinforcement.
- B. Discrepancies:
 - 1. In the event of discrepancy, immediately notify the Owner's Representative.
 - 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
 - 3. Failure to notify the Owner's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive the Work.

3.2 PREPARATION

A. General:

1. Thoroughly clean all areas where shotcrete is to be placed to ensure proper bonding of shotcrete.
2. Where shotcrete is to be placed against smooth surfaces (i.e., cast-in-place concrete), sandblast surfaces to receive shotcrete to provide clean aggregate surface, thereby ensuring proper bond between materials.

- B. Ground Wires: Adequate ground wires, to be used as screeds, shall be installed to establish the thickness and surface planes of the shotcrete work. Ground wires shall be placed so that they are tight and true to line and grade and in such a manner that they can be easily tightened.

3.3 PROPORTIONING AND MIXING

- A. Accurately control proportion of water to Portland cement to produce thorough and uniform hydration of the shotcrete that, when shot, forms a homogeneous mass containing neither sags nor dry sand formation. Proportion by mass per ASTM C94 or by volume per ASTM C685.
- B. Shotcrete shall have a minimum compressive strength of 4,000 PSI at 28 days. Shotcrete material shall have a water/cement ratio of 0.40 minimum to 0.50 maximum per ACI 506R, Chapter 6, Proportioning and Preconstruction Testing; Section 6.3.3, Wet Mix Process.
- C. Discontinue shotcrete work if the time between the addition of mixing water to cement and aggregate, or cement to aggregates, and placement of shotcrete exceeds ninety (90) minutes when the ambient temperature is below 85 degrees Fahrenheit, or exceeds sixty (60) minutes when the ambient temperature is above 85 degrees Fahrenheit. Batch, mix and deliver wet-mixture shotcrete per ASTM C94 or C685.
- D. Hot Weather Shotcreting – Unless otherwise specified, do not place shotcrete when shotcrete temperature is above 95°F, unless prequalification testing shows that the required quality of materials can be achieved at high temperatures. The temperature of reinforcement and receiving surfaces shall be below 90°F prior to shotcrete placement.
- E. Cold Weather Shotcreting – Unless otherwise specified, shooting may proceed when ambient temperature is 40°F and rising. Stop shooting when ambient temperature is 40°F and falling, unless measures are taken to protect the shotcrete. Shotcrete material temperature, when shot, shall not be less than 50°F. Do not place against frozen surfaces.

3.4 SHOTCRETE PLACING, FINISHING, AND CURING

- A. Operations: Utilize a standard type of air compressor, capable of providing a minimum of 250 cubic feet of air per minute per nozzle by an ACI certified nozzleman.
- B. Placing: Except when shooting reinforcing, hold the nozzle perpendicular to and 2-1/2 to 3 feet from surface. At reinforcing bars, hold the nozzle so as to direct shotcrete behind the bars, and shoot each side of each bars separately. A nozzleman's helper equipped with an air jet shall precede the nozzle and blow out rebound or sand lodged behind bars, on forms, or placed shotcrete. Placing shotcrete horizontal members from the top is not allowed unless approved methods are employed to eliminate all rebound. Material shall emerge from the nozzle in a uniform flow. If flow becomes intermittent for any reason, direct the nozzle away from the surface until the flow is again steady and constant. Do not reuse rebound or loose sand for any purpose.
- C. Puddled Shotcrete: Use of "puddled shotcrete" in which the air pressure is reduced and the water content is increased to facilitate placing in difficult locations is not allowed. Do not place shotcrete where nozzle stream cannot impinge directly on the involved surface. Where difficult shooting conditions occur, obtain proper results by maintaining correct air pressure and water ratio and reduce supply of material.
- D. Construction Joints: Form joints with sloping beveled edges. Clean and dampen the hardened joint surfaces before placing additional shotcrete. Square edged construction joints are not allowed. The film of laitance which forms on the surface of the shotcrete shall be removed within approximately two hours after application by brushing with a stiff broom. If this film is not removed within two hours, it shall be removed by thorough wire brushing or sand blasting. Construction joints over eight hours old shall be thoroughly cleaned with air and water prior to receiving shotcrete.
- E. Finishing: Rod exposed surfaces to true planes and lines on reaching the thickness and plane established by forms and ground wires. Tamp and wood float surfaces level and provide a rough raked finish. Carefully coordinate finish requirements with other trades (ceramic tile, pool plaster) to ensure shotcrete finish is appropriate substrate for final finish material.
- F. Curing: Keep shotcrete continuously damp for not less than seven (7) days after placing. Use sealed curing sheeting or other approved curing method where water curing is not feasible. Do not use curing compound of any kind.

3.5 DEFECTIVE WORK

- A. Cut out, remove and replace, or repair to the satisfaction of the Owner's Representative, shotcrete not meeting minimum strength, not true, plumb or level, not to required elevations, containing cracks detrimental to performance or appearance, containing shavings, debris or with honeycombs or voids.

- B. Promptly perform Work required to repair, patch, replace, render properly cleaned surfaces (by sandblasting if necessary) or otherwise make good any defective shotcrete at Contractor's expense, including all expense of additional inspection, tests, or supervision made necessary as a result of defective shotcrete.

3.6 CLEAN-UP

- A. Upon completion of the Work of this Section, immediately remove all swimming pool shotcrete materials, debris and rubbish occasioned by this work to the approval of the Owner's Representative.

END OF SECTION

