

MONTGOMERY COUNTY MARYLAND
Invitation for Bids
#1086044

PROJECT MANUAL



Refurbishment of Parking Garage's Storm,
Sanitary, And Washdown Systems: Pipes
Valves, Actuators with Integrated
Electric/Pneumatic Control Packages

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION
DIVISION OF PARKING MANAGEMENT
ROCKVILLE, MARYLAND

November 9, 2018

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Notice to Bidders

Invitation for Bids

#1086044

For

Refurbishment of Parking Garage's Storm, Sanitary and Washdown Systems: Pipes, Vaults, Actuators with Integrated Electric/Pneumatic Control Packages Montgomery County Department of Transportation Division of Parking Management

This solicitation may be subject to the County's Wage Requirements law for service contracts. If this solicitation is subject to this law, then Item #27, under Section A, "Services Contract", on page 4, and "Wage Requirements Certification", under "Mandatory Submissions: (a) Bid Submissions," on page B, will be marked. And, in this event, the "Requirements for Services Contract Addendum" should be attached.

If this solicitation is subject to the Wage Requirements law, then the "Wage Requirements Certification" and, if applicable, the "501(c)(3) Non-profit Organization's Employee's Wage and Health Insurance Form" (see forms near the end of this document), must be completed and submitted with your bid. If you fail to submit and complete the required material information on the form(s), your bid may be unacceptable under County law and may be rejected for nonresponsiveness.

As noted in Attachment "C" (Section A on Page C2, Wage Requirements Compliance), a contractor required to comply with the Wage Requirements Law must quarterly (January, April, July, and October for the prior quarter) submit certified payroll records for all employees and all subcontractor's employees governed by the Wage Requirements Law, for each payroll period, to the Office of Business Relations and Compliance, Attn: Wage Program Manager. These payroll records must include the following for each employee and each subcontractor's employee: name; address; position/title; daily straight time hours worked; daily overtime hours worked; straight time hourly pay rate; overtime hourly pay rate; any deduction for health insurance; total gross wages paid for each period; and total net wages paid after any additions and deductions for each pay period.

Please note, the information pertaining to the Wage Requirements law that is contained in Attachment C. Note that for services contracts, you can find the current mandatory per-hour wage rate payable to employees under Section 11B-33A of the County Code, by going to the website (www.montgomerycountymd.gov/WRL).

MONTGOMERY COUNTY, MARYLAND
INVITATION FOR BIDS
GENERAL INFORMATION

NOTE TO POTENTIAL BIDDERS:

Your bid is to be returned in a sealed envelope that should be at least 9-1/2" x 12-1/2" in size, and is to be clearly marked with the IFB number, the Opening Date, and the Opening Time. The County will not be responsible for premature or late opening of a bid that is improperly addressed or identified. Bids must be received at the Office of Procurement, Rockville Center, 255 Rockville Pike, Suite 180, Rockville, MD 20850-4166 prior to the date and time specified in the attached solicitation.

The County will not accept bids it receives by fax or email. All faxed or emailed bids **will** be returned to the bidder.

Please note:

- The **Name and Signature Requirements** sections located on the Solicitation, Bid, and Award Sheet. **Failure to sign your bid as required may be cause for your bid to be deemed nonresponsive.**
- The **Mandatory Bid Submissions** on Page B. The checked items must be submitted with your bid. **Failure to submit the mandatory bid submissions may be cause for your bid to be deemed nonresponsive.**
- The **Method of Award** stated in this solicitation on Page A and Page 1, in Section A, Item #3.

BID COVER SHEET

MONTGOMERY COUNTY OFFICE OF PROCUREMENT
 ROCKVILLE CENTER, 255 ROCKVILLE PIKE, SUITE 180
 ROCKVILLE, MARYLAND 20850-4166

IFB#:	1086044	OPENING DATE:	December 11, 2018	OPENING TIME:	11:00 AM
FOR:	Refurbishment of Parking Garage's Storm, Sanitary and Washdown Systems: Pipes, Valves, Actuators with Integrated Electric/Pneumatic Control Packages			ISSUE DATE:	November 9, 2018

SECTION A – INSTRUCTIONS, CONDITIONS AND NOTICES	
The following checked (X) provisions in Section A are applicable to this solicitation and any resulting contract.	
1	<input checked="" type="checkbox"/> BID GUARANTEE: A bid guarantee of \$5000.00 is required for this bid.
2	<input checked="" type="checkbox"/> INTENT: A. <u> X </u> B. _____
3	<input checked="" type="checkbox"/> METHOD OF AWARD A. _____ B. _____ C. _____ D. _____ E. <u> X </u> (other) The contract will be awarded to the lowest responsible bidder submitting a responsive bid, as determined by the Director, Office of Procurement. The lowest bidder is determined by the aggregate amount of the unit prices extended by the quantities set forth on the Quotation Sheet. Bidders must bid each item in order to be eligible for an award
4	<input checked="" type="checkbox"/> OPTIONAL PRE-BID CONFERENCE Date: <u> 11/20/18 </u> Time: <u> 1:00 pm </u> Location: <u> 100 Edison Park Drive </u> <u> Gaithersburg, Maryland 20878 </u> <u> 1st Floor Conference Room </u>
5	OR EQUAL INTERPRETATION
6	<input checked="" type="checkbox"/> QUESTIONS: Technical Contact: <u> Adrian Q. Labor., Capital Project Manager, 240-777-8725, </u> <u> adrian.labor@montgomerycountymd.gov </u> Non-Technical Contact: <u> Eric V. Harris, CPPB, </u> <u> 240 777-9922, </u> <u> eric.harris@montgomerycountymd.gov </u>
7	SAMPLES
27	SERVICES CONTRACT (see "NOTICE TO BIDDERS" for website of the current wage rate)
28	<input checked="" type="checkbox"/> CONSTRUCTION CONTRACT (see Attachment D)
All provisions in the solicitation, including Section A, numbers 8 through 29, shall be applicable to any contract awarded as a result of this solicitation.	

SECTION B – GENERAL CONDITIONS OF CONTRACT BETWEEN COUNTY & CONTRACTOR	
All provisions in this section shall be applicable to any contract awarded as a result of this solicitation. The correct insurance requirements for this solicitation are listed in ATTACHMENT F - Appendix to Section B. These requirements supersede those listed in Provision 21 of the General Conditions between County and Contractor)	
SECTION C – SPECIAL TERMS AND CONDITIONS	
The following checked (X) provisions shall be applicable to any contract awarded as a result of this solicitation.	
1	<input type="checkbox"/> ADD OR DELETE
2	<input checked="" type="checkbox"/> ANNUAL PRICE ADJUSTMENT A. _____ Commodity/Service Group: B. <u> X </u> All Items
3	CATALOG DISCOUNT PRICES
4	CATALOG/PRICE LIST REQUIREMENTS
5	CERTIFICXTE OF ORIGIN
6	<input checked="" type="checkbox"/> CLEANING OF SITE
7	<input checked="" type="checkbox"/> CONTRACT ADMINISTRATOR: <u> Jeffrey Riese, </u> <u> Section Chief Engineering and Maintenance, </u> <u> Division of Parking Management, MCDOT </u>
8	<input checked="" type="checkbox"/> CONTRACT TERM <u> X </u> A. B. Other: _____
9	CONTRACT VALUE
10	CONTRACTOR RESPONSE
11	<input checked="" type="checkbox"/> CORRECTION OF WORK AFTER FINAL PAYMENT
12	<input checked="" type="checkbox"/> CORRECTION OF WORK BEFORE FINAL PAYMENT
13	DAMAGE/SHORTAGE
14	DEALER STATUS
15	<input checked="" type="checkbox"/> DELAYS AND EXTENSION OF TIME
16	DELIVERY INSTRUCTIONS
17	<input checked="" type="checkbox"/> DEPARTMENTS AUTHORIZED TO USE CONTRACT(S): <u> Department of Transportation </u>
18	EQUIPMENT PREPARATION

19		ESTIMATES
20	<input checked="" type="checkbox"/>	FAILURE TO PERFORM/DELIVER
21		HEAVY DUTY
22	<input checked="" type="checkbox"/>	INVOICES (See Sample Invoice Attachment G)
23		LABOR COSTS
24		MANUALS
25	<input checked="" type="checkbox"/>	MATERIAL AND WORKMANSHIP
26	<input checked="" type="checkbox"/>	MATERIALS
27	<input checked="" type="checkbox"/>	METHOD OF ORDERING
28		MULTIPLE AWARDS
29		NET PRICES
30	<input checked="" type="checkbox"/>	NEW MATERIALS
31		OPTION TO INCREASE QUANTITIES
32	<input checked="" type="checkbox"/>	ORDERING TERMS
33		PARTS/SERVICE
34		PAYMENTS
35	<input checked="" type="checkbox"/>	PERFORMANCE BOND: In the amount of \$250,000.00 is required.
36		(this provision has been intentionally left blank)
37	<input checked="" type="checkbox"/>	PROTECTION OF EXISTING FACILITIES
38		PURCHASE OF GOODS BY NON-PROFIT ORGANIZATIONS
39		PURCHASE ORDERS/JOB RELEASES
40	<input checked="" type="checkbox"/>	QUANTITIES
41	<input checked="" type="checkbox"/>	SAFETY STANDARDS
42		SERVICE
43	<input checked="" type="checkbox"/>	SITE INSPECTION
44		TRAVEL TIME
45	<input checked="" type="checkbox"/>	WARRANTY
46	<input checked="" type="checkbox"/>	LABOR AND MATERIAL PAYMENT BOND
47	<input checked="" type="checkbox"/>	PROFESSIONAL SERVICES
48	<input checked="" type="checkbox"/>	LIQUIDATED DAMAGE
49	<input checked="" type="checkbox"/>	CERTIFICATIONS OF PAYMENT TO SUBCONTRACTOR AND SUPPLIERS
50	<input checked="" type="checkbox"/>	NON-PRE-PRICED ITEMS

Section 016060	GENERAL ELECTRICAL REQUIREMENTS
Section 016310	PRODUCT SUBSTITUTIONS
Section 017000	PROJECT CLOSEOUT
Section 017200	PROJECT RECORD DOCUMENTS
Section 017400	WARRANTIES AND BONDS
Section 017823	OPERATION AND MAINTENANCE DATA
	DIVISION 02 – SITE CONSTRUCTION
Section 020700	SELECTIVE DEMOLITION
	DIVISION 03 – CONCRETE
Section 033000	CAST-IN-PLACE CONCRETE
Section 033500	CONCRETE REPAIRS
	DIVISION 22 – PLUMBING
Section 220517	SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
Section 220523	BALL VALVES FOR PLUMBING PIPING
Section 220529	HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
Section 220533	HEAT TRACING FOR PLUMBING PIPING
Section 220553	IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
Section 221116	DOMESTIC WATER PIPING
Section 221119	DOMESTIC WATER PIPING SPECIALTIES
Section 221413	FACILITY STORM DRAINAGE PIPING
Section 221423	STORM DRAINAGE PIPING SPECIALTIES
	DIVISION 26 – ELECTRICAL
Section 260010	BASIC ELECTRICAL REQUIREMENTS
Section 260519	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
Section 260526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
Section 260529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
Section 260533	RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
Section 260553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
Section 262726	WIRING DEVICES
Section 262813	FUSES
Section 262816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS

SECTION D – DRAWING AND SPECIFICATIONS

The following sections are all applicable to any contract awarded as a result of this solicitation.

Section 010000	UNIT QUANTITY WORK ITEMS
Section 010100	SUMMARY OF WORK
Section 010250	MEASUREMENT AND PAYMENT
Section 010350	MODIFICATION PROCEDURES
Section 010400	PROJECT COORDINATION
Section 010450	CUTTING AND PATCHING
Section 010500	FIELD ENGINEERING
Section 010950	DEFINITIONS
Section 012000	PROJECT MEETINGS
Section 012900	PAYMENT PROCEDURES
Section 013000	SUBMITTALS
Section 014000	QUALITY CONTROL
Section 015000	TEMPORARY FACILITIES
Section 016000	MATERIALS AND EQUIPMENT

MANDATORY SUBMISSIONS:

a. **BID SUBMISSIONS:**

The following checked (XX) items (each of which is described in detail in Section A, B, C, or D) and any related attachments to this solicitation must be submitted with your bid reply:

XX "SOLICITATION, BID AND AWARD SHEET" (including page E and pages E-1 through E-8 Quotation Sheet(s))

- Current Manufacturer catalog(s) Descriptive Literature Other:
 Price List(s) Delivery Schedule **XX** Bid Guarantee (see pages A & 1)
 Wage Requirements Certification (see "NOTICE TO BIDDERS" for website providing the current wage rate) and (See Attachment C)

Failure to submit the mandatory bid submissions may be cause for your bid to be deemed nonresponsive.
 (Bidders Must Complete the NAME & SIGNATURE REQUIREMENTS in Part II on the Solicitation, Bid and Award Sheet, Page E)

b. **AWARD SUBMISSIONS:**

The following checked (XX) items (each of which is described in detail in Section A, B, C, or D) and any related attachments to this solicitation, must be submitted within ten (10) working days after the date of the County's written notification of Intent to Award a Contract:

- XX** Minority, Female, Disabled Person Subcontractor Performance Plan. (Attachment B), If requested in the Intent to Award notice.
 Financial Data **XX** Personnel Data
 Installation Schedules Plans or Drawings
 Other: as follows: _____ **XX** Performance Bond (See Pages B & 10)

XX Certificate of Insurance (see Mandatory Insurance Requirements contained in Appendix to Section B.) Awardee must provide the applicable insurance coverage and all costs for this coverage must be calculated into your bid price.

XX Wage Requirements Certification of Posting Notice

Failure to submit information in a timely manner as indicated may be cause to consider the Bidder non responsible.

OPTIONAL SUBMISSIONS

The following checked (XX) items (each of which is described in detail in Section A, B, C, or D) and any related attachments to this solicitation), are requested to be submitted with your bid reply:

- Minority, Female, Disabled Person Subcontractor Performance Plan (See Attachment B)
XX (To ensure a contract can move forward as a result of this solicitation, the plan needs be submitted with your bid.)
 Mid-Atlantic Purchasing Team Rider Clause (See Page D)
XX References (See Below)
XX Minority Business Program & Offeror's Representation (Attachment A)
-

REFERENCES (at least three are requested to be submitted)

If references are required (see **Optional Submissions section**) for this solicitation, please provide them to the County with your bid. The three references must be from individuals or firms currently being serviced or supplied under similar contracts, or for whom work of a similar scope has been performed within the last year. Names for references shall be of individuals who directly supervised or had direct knowledge of the services or goods provided.

If you do not include them with your bid submission, and you are one of the three low bidders, you may be required to submit references within ten (10) days notice from the County. Failure to provide the County with references within that time frame may result in the Bidder being ruled nonresponsive or nonresponsive by the Director, Office of Procurement or his/her designee and the forfeiture of your bid guarantee (if applicable).

1. Name of Firm: _____
Address: _____ City: _____ ST: _____ Zip: _____
Contact Person: _____ Phone: _____
Email Address: _____

2. Name of Firm: _____
Address: _____ City: _____ ST: _____ Zip: _____
Contact Person: _____ Phone: _____
Email Address: _____

3. Name of Firm: _____
Address: _____ City: _____ ST: _____ Zip: _____
Contact Person: _____ Phone: _____
Email Address: _____

MID-ATLANTIC PURCHASING TEAM RIDER CLAUSE

USE OF CONTRACT(S) BY MEMBERS COMPRISING MID-ATLANTIC PURCHASING TEAM COMMITTEE

- A. Extension to Other Jurisdictions**
The [issuing jurisdiction] extends the resultant contract(s), including pricing, terms and conditions to the members of the Mid-Atlantic Purchasing Team, as well as all other public entities under the jurisdiction of the United States and its territories.
- B. Contract Agreement**
Any jurisdiction or entity using the resultant contract(s) may enter into its own contract with the successful Contractor(s). There shall be no obligation on the party of any participating jurisdiction to use the resultant contract(s). Contracts entered into with a participating jurisdiction may contain general terms and conditions unique to the jurisdiction including, by way of illustration and not limitation, clauses covering minority participation, non-discrimination, indemnification, naming the jurisdiction as an additional insured under any required Comprehensive General Liability policies, and venue.
- C.** A negative reply will not adversely affect consideration of your bid.
- D.** It is the awarded offeror's responsibility to notify the members shown below of the availability of the Contract(s)
- E.** The issuing jurisdiction shall not be held liable for any costs or damages incurred by another jurisdiction as a result of any award extended to the jurisdiction by the awardee.
- F. Inclusion of Governmental and Nonprofit Participants (Optional Clause)**
This shall include but not be limited to private schools, Parochial schools, non-public schools such as charter schools, special districts, intermediate units, non-profit agencies providing services on behalf of government and/or state community and/or private colleges/universities that require these goods, commodities and/or services.
- G. Notification and Reporting**
The Contractor agrees to notify if requested by the issuing jurisdiction of those entities that wish to use any contract resulting from this solicitation and will also provide usage information, which may be requested. The Contractor will provide the copy of the solicitation and resultant contract documents to any requesting jurisdiction or entity.

MID-ATLANTIC PURCHASING TEAM:

<u>YES</u>	<u>NO</u>	<u>JURISDICTION</u>	<u>YES</u>	<u>NO</u>	<u>JURISDICTION</u>
_____	_____	Alexandria, Virginia	_____	_____	Howard County Schools
_____	_____	Alexandria Public Schools	_____	_____	Herndon, Virginia
_____	_____	Alexandria Sanitation Authority	_____	_____	Leesburg, Virginia
_____	_____	Annapolis City	_____	_____	Loudoun County, Virginia
_____	_____	Anne Arundel County	_____	_____	Loudoun County Public Schools
_____	_____	Anne Arundel Schools	_____	_____	Loudoun County Water Authority
_____	_____	Arlington County, Virginia	_____	_____	Manassas, Virginia
_____	_____	Arlington County Public Schools	_____	_____	City of Manassas Public Schools
_____	_____	Baltimore City	_____	_____	Manassas Park, Virginia
_____	_____	Baltimore County Schools	_____	_____	MD-National Capital Park & Planning Comm.
_____	_____	Bladensburg, Maryland	_____	_____	Metropolitan Washington Airports Authority
_____	_____	Bowie, Maryland	_____	_____	Metropolitan Washington Council of Governments
_____	_____	BRCPC	_____	_____	Montgomery College
_____	_____	Carroll County	_____	_____	Montgomery County Public Schools
_____	_____	Carroll County Schools	_____	_____	Prince George's County, Maryland
_____	_____	Charles County Government	_____	_____	Prince George's Public Schools
_____	_____	Charles County Schools	_____	_____	Prince William County, Virginia
_____	_____	City of Fredericksburg	_____	_____	Prince William County Public Schools
_____	_____	College Park, Maryland	_____	_____	Prince William County Service Authority
_____	_____	District of Columbia Government	_____	_____	Rockville, Maryland
_____	_____	District of Columbia Schools	_____	_____	Spotsylvania County Govt. & Schools
_____	_____	District of Columbia Water & Sewer Auth.	_____	_____	Stafford County, Virginia
_____	_____	Fairfax County, Virginia	_____	_____	Takoma Park, Maryland
_____	_____	Fairfax County Water Authority	_____	_____	Upper Occoquan Sewage Authority
_____	_____	Falls Church, Virginia	_____	_____	University of the District of Columbia
_____	_____	Fauquier County Schools & Govt., Virginia	_____	_____	Vienna, Virginia
_____	_____	Frederick, Maryland	_____	_____	Washington Metropolitan Area Transit Auth.
_____	_____	Gaithersburg, Maryland	_____	_____	Washington Suburban Sanitary Commission
_____	_____	Greenbelt, Maryland	_____	_____	Winchester, Virginia
_____	_____	Harford County	_____	_____	Winchester Public Schools
_____	_____	Harford County Schools	_____	_____	
_____	_____	Howard County	_____	_____	

Vendor Name

IFB # 1086044	MONTGOMERY COUNTY, MARYLAND Refurbishment of Parking Garage's Storm, Sanitary and Washdown Systems: Pipes, Valves, Actuators with Integrated Electric/Pneumatic Control Packages SOLICITATION, BID AND AWARD SHEET	RETURN BID TO: OFFICE OF PROCUREMENT 255 ROCKVILLE PIKE, STE. 180 ROCKVILLE, MD 20850-4166
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PART I: SOLICITATION (Invitation for Bids ("IFB"))

SEALED BIDS IN ORIGINAL AND 3 COPIES TO FURNISH THE SUPPLIES AND/OR SERVICES DESCRIBED ON THE ATTACHED QUOTATION SHEET(S) WILL BE RECEIVED UP TO 11:00 A.M. LOCAL TIME ON 12/11/2018. BIDS WILL BE PUBLICLY OPENED AT THE DATE AND TIME STATED.

BIDS RECEIVED AFTER THE DATE AND TIME SPECIFIED WILL NOT BE CONSIDERED AND WILL BE RETURNED UNOPENED TO THE BIDDER. THE FOLLOWING DOCUMENTS ARE HEREBY INCORPORATED BY REFERENCE INTO AND MADE PART OF ANY CONTRACT AWARDED. In the event of any conflict among the provisions of the bid documents, or those documents comprising the resultant Contract, the conflict must be resolved by giving precedence to the below documents in the following order:

1. The "General Conditions of Contract between County and Contractor", and the "Special Terms and Conditions" shown in Sections B and C of this document.
2. The "Instructions, Conditions and Notices" shown in Section A of this IFB.
3. The specifications/scope of work shown in Section D of this document.
4. All solicitation amendments that change Section D will supersede in the event of a conflict.
5. All representations and certifications listed in this document.
6. This "Solicitation, Bid and Award Sheet" and the attached solicitation Quotation Sheet(s).

PART II-BID

The Bidder, by signing this solicitation, agrees that the County has 120 calendar days from the bid opening date in which to make an award of this solicitation. The Bidder agrees that its prices and/or discounts for all desired goods and/or services shall remain firm for the above time period prior to contract award. Also, the Bidder agrees that all instructions, terms, conditions, specifications, and amendments of this solicitation shall remain firm for the above time period prior to contract award. The County's Standard Payment Terms are Net Thirty (30) Days. This does not preclude an offeror from offering a prompt payment discount for payment of proper invoices in less than (30) days. An optional prompt payment term is not required, but may be offered conditioned on the following basis: Only a prompt payment discount, conditioned on a thirty-day or greater payment basis, will be utilized to recalculate prices for purposes of the Method of Award process for price/cost only. Prompt payment discounts may be offered on a shorter payment basis and adopted by the County at time of award, but will not be considered during the Method of Award process.

NAME AND SIGNATURE REQUIREMENTS FOR BIDS AND CONTRACTS: The correct and full legal business name of the bidder must be used in bids received and on all contracts issued as a result of this solicitation. A trade name (i.e., a shortened or different name under which the firm does business) must not be used when the full legal name is different. Corporations must have names that comply with State Law, which requires a suffix indicating the corporate status of the business (e.g. Inc., Incorporated, etc.). Trade names may be indicated by individuals or corporations with the individual or corporate name followed by "t/a" (trading as) or "d/b/a" (doing business as) respectively. The offeror's signature on the proposal, contract, amendment(s), or related correspondence, must conform to the following:

All signatures must be made by an authorized officer, partner, manager, member, or employee. The signing of an offer or a contract is a representation by the person signing that the person signing is authorized to do so on behalf of the offeror or contractor.

BIDDER'S CORRECT AND FULL LEGAL BUSINESS NAME:	TELEPHONE NO.:
ADDRESS:	TOLL FREE NO.:
REMITTANCE ADDRESS: (If Remittance Address is Different from Above Address)	FAX NO.:
BIDDER'S E-MAIL ADDRESS:	

ACKNOWLEDGEMENT OF AMENDMENTS	
The bidder acknowledges receipt of amendments to the solicitation for offers and related documents numbered and dated as follows:	
Amendment No./Date	Amendment No./Date

NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (TYPE OR PRINT):
SIGNATURE OF ABOVE PERSON: _____ DATE: _____

PART III: AWARD (TO BE MADE BY THE COUNTY'S CONTRACTING OFFICER (OFFICE USE ONLY))

YOUR BID IS ACCEPTED AS TO THE FOLLOWING AND/OR AS ATTACHED TO THIS DOCUMENT:	YOUR CONTRACT NUMBER IS:
	1086044

MONTGOMERY COUNTY, MARYLAND

BY _____
 PRINTED NAME OF CONTRACTING OFFICER SIGNATURE OF CONTRACTING OFFICER AWARD DATE

THIS FORM HAS BEEN APPROVED AS TO FORM AND LEGALITY BY THE OFFICE OF THE COUNTY ATTORNEY

IFB #1086044

QUOTATION SHEET

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)				Extended Price Total
A. CONCRETE REPAIRS (A.2)									
A.1 REBAR/WWF REINFORCED CONCRETE									
A.1.1 Slab Full Depth Repairs (A.3)				SF	Quantity per T.O.	1000		5000	
	A.1.1.a.	Unmodified Concrete Repair Material	1	up to 5" depth	SF	Bid Unit Cost	+	=	
			2	Over 5" up to 8" depth	SF	Bid Unit Cost	+	=	
	A.1.1.b.	Latex or Microsilica Modified Concrete/Repair Material	1	Up to 5" depth	SF	Bid Unit Cost	+	=	
			2	Over 5" up to 8" depth	SF	Bid Unit Cost	+	=	
	A.1.1.c.	High Early Strength Concrete Material	1	up to 5" depth	SF	Bid Unit Cost	+	=	
			2	Over 5" up to 8" depth	SF	Bid Unit Cost	+	=	
A.1.2 S.O.G. Repairs (A.4)				SF	Quantity per T.O.	1000		5000	
			1	4" depth	SF	Bid Unit Cost	+	=	
			2	5" depth	SF	Bid Unit Cost	+	=	
			3	6" depth	SF	Bid Unit Cost	+	=	
A.1.3 Curb Repairs (Up to 6" height + 12" width) (A.5)				LF	Quantity per T.O.	1000		5000	
			1	0"-3" partial depth	LF	Bid Unit Cost	+	=	
			2	Full depth	LF	Bid Unit Cost	+	=	
A.1.4 Sidewalk Curb Partial Depth Repairs (A.6)				SF	Quantity per T.O.	1000		5000	
			1	Up to 3" depth	SF	Bid Unit Cost	+	=	
			2	Over 3" up to 5" depth	SF	Bid Unit Cost	+	=	
			3	Over 5" up to 8" depth	SF	Bid Unit Cost	+	=	
A.2 POST-TENSIONED CONCRETE									
A.2.1 Slab Full Depth Repairs (A.3)					Quantity per T.O.	1000		5000	
	A.2.1.a.	Unmodified Concrete Repair Material	1	up to 5" depth	SF	Bid Unit Cost	+	=	
			2	Over 5" up to 8" depth	SF	Bid Unit Cost	+	=	
	A.2.1.b.	Latex or Microsilica Modified Concrete/Repair Material	1	Up to 5" depth	SF	Bid Unit Cost	+	=	
			2	Over 5" up to 8" depth	SF	Bid Unit Cost	+	=	

Quotation Sheet

Item		Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)				Extended Price Total	
	A.2.1.c.	High Early Strength Concrete Material	1	up to 5" depth	SF	Bid Unit Cost		+		=	
			2	Over 5" up to 8" depth	SF	Bid Unit Cost		+		=	
										Sub Total A	
B. WATERPROOFING											
B.1 VEHICULAR DECK COATING						Quantity per T.O.	1000		5000		
	B.1.1	Localized Repair of Deck Coating (A.7)			SF	Bid Unit Cost		+		=	
	B.1.2	Removal of Existing Coating (A.8)			SF	Bid Unit Cost		+		=	
B.2 PEDESTRIAN-GRADE DECK COATING						Quantity per T.O.	1000		5000		
	B.2.1	Localized Repair Pedestrian Coating (A.9)			SF	Bid Unit Cost		+		=	
	B.2.2	Removal of Existing Coating (A.10)			SF	Bid Unit Cost		+		=	
										Sub Total B	
C. PAVING											
C.1 ASPHALT PAVING						Quantity per T.O.	1000		5000		
	C.1.2	Replace Existing Paving (A.11)		Up to 4" thick	SF	Bid Unit Cost		+		=	
										SubTotal C	
D. PLUMBING											
D.1 Sand Filter Vault Maintenance (A.12)						Quantity per T.O.	10		50		
		Replace manhole cover	1		EA	Bid Unit Cost		+		=	
		Pump-out	2		EA	Bid Unit Cost		+		=	
		Power wash / clean	3		EA	Bid Unit Cost		+		=	
		Debris Disposal	4		EA	Bid Unit Cost		+		=	
		Replace steps / ladder	5		EA	Bid Unit Cost		+		=	
		Replace filter media	6		EA	Bid Unit Cost		+		=	
		Inspection & report	7		EA	Bid Unit Cost		+		=	
D.2 Washdown System Valve Vault Access and Pump-out (A.13)											
		Pump-out	1		EA	Bid Unit Cost		+		=	
		Power wash / clean	2		EA	Bid Unit Cost		+		=	
		Debris Disposal	3		EA	Bid Unit Cost		+		=	

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)		Extended Price Total
					Quantity (1)	Price	
D.3 Ball Valves							
D.3.1 Ball Valve Removal 2-Way (A.14)							
	12"	1	Upright	EA		=	
D.3.2 Ball Valve Removal 3-Way (A.14)							
	6"	1	Upright / Inverted	EA		=	
	8"	2	Upright / Inverted	EA		=	
	10"	3	Upright / Inverted	EA		=	
	12"	4	Upright / Inverted	EA		=	
D.4.1 Ball Valve Refurbishment 2-Way (A.15)							
	12"	1	Upright	EA		=	
D.4.2 Ball Valve Refurbishment 3-Way (A.15)							
	6"	1	Upright / Inverted	EA		=	
	8"	2	Upright / Inverted	EA		=	
	10"	3	Upright / Inverted	EA		=	
	12"	4	Upright / Inverted	EA		=	
D.5.1 Ball Valve Replacement 2-Way (A.16)							
	12"	1	Upright	EA		=	
D.5.2 Ball Valve Replacement 3-Way (A.16)							
	6"	1	Upright / Inverted	EA		=	
	8"	2	Upright / Inverted	EA		=	
	10"	3	Upright / Inverted	EA		=	
	12"	4	Upright / Inverted	EA		=	
D.6.1 Pneumatic Ball Valve Actuator Removal 2-Way (A.17)							
	12"	1	Upright	EA		=	
D.6.2 Pneumatic Ball Valve Actuator Removal 3-Way (A.17)							
	6"	1	Upright / Inverted	EA		=	

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)			Extended Price Total
	8"	2	Upright / Inverted	EA			=	
	10"	3	Upright / Inverted	EA			=	
	12"	4	Upright / Inverted	EA			=	
D.7.1 Pneumatic Ball Valve Actuator Refurbishment 2-Way (A.18)								
	12"	1	Upright	EA			=	
D.7.2 Pneumatic Ball Valve Actuator Refurbishment 3-Way (A.18)								
	6"	1	Upright / Inverted	EA			=	
	8"	2	Upright / Inverted	EA			=	
	10"	3	Upright / Inverted	EA			=	
	12"	4	Upright / Inverted	EA			=	
D.8.1 Pneumatic Ball Valve Actuator Replacement 2-Way (A.19)								
	12"	1	Upright	EA			=	
D.8.2 Pneumatic Ball Valve Actuator Replacement 3-Way (A.19)								
	6"	1	Upright / Inverted	EA			=	
	8"	2	Upright / Inverted	EA			=	
	10"	3	Upright / Inverted	EA			=	
	12"	4	Upright / Inverted	EA			=	
D.9 Replace Washdown System Valve Pipe Accessories (A.20)								
	Spool Piece		6"	EA	Quantity (1)	Price		
			8"	EA			=	
			10"	EA			=	
			12"	EA			=	
	Flange		6"	EA			=	
			8"	EA			=	
			10"	EA			=	
			12"	EA			=	

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)			Extended Price Total
	Reducer		6" - 4"	EA			=	
			8" - 6"	EA			=	
			10" - 8"	EA			=	
			12" - 10"	EA			=	
	Extensions		6"	LF			=	
			8"	LF			=	
			10"	LF			=	
			12"	LF			=	
D.10 Replace Washdown System Valve Support Apparatus (A.21)					Quantity (1)	Price		
	Pipe Stand		6"	EA			=	
			8"	EA			=	
			10"	EA			=	
			12"	EA			=	
	Pipe Saddle		6"	EA			=	
			8"	EA			=	
			10"	EA			=	
			12"	EA			=	
	Pipe Clamp		6"	EA			=	
			8"	EA			=	
			10"	EA			=	
			12"	EA			=	
D.11 DRAINS								
D.11.1 Replace Drain Grating / Sediment Basket (A.22)					Quantity	Price		
		1	4" Dia. or Sq.	EA			=	
		2	5" Dia. or Sq.	EA			=	
		3	6" Dia. or Sq.	EA			=	
		4	7" Dia. or Sq.	EA			=	
		5	8" Dia. or Sq.	EA			=	
D.11.2 Replace Trench Drain Grating (A.23)					Quantity per T.O.	100		1000
		1	4" wide	LF	Bid Unit Cost		+	=

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)					Extended Price Total
		2	5" wide	LF	Bid Unit Cost		+		=	
		3	6" wide	LF	Bid Unit Cost		+		=	
		4	7" wide	LF	Bid Unit Cost		+		=	
		5	8" wide	LF	Bid Unit Cost		+		=	
D.11.3 Replace Drain MILD-REINFORCED SLAB - Including Concrete Work (A.24)					Quantity per T.O.	10		50		
		1	3" Dia. Drain	EA	Bid Unit Cost		+		=	
		2	4" Dia. Drain	EA	Bid Unit Cost		+		=	
		3	6" Dia. Drain	EA	Bid Unit Cost		+		=	
		4	8" Dia. Drain	EA	Bid Unit Cost		+		=	
D.11.4 Replace Drain Piping (A.25)					Quantity per T.O.	10		50		
		1	4" Tee, hub-and-spigot	EA	Bid Unit Cost		+		=	
		1	5" Tee, hub-and-spigot	EA	Bid Unit Cost		+		=	
		1	6" Tee, hub-and-spigot	EA	Bid Unit Cost		+		=	
		1	8" Tee, hub-and-spigot	EA	Bid Unit Cost		+		=	
		1	10" Tee, hub-and-spigot	EA	Bid Unit Cost		+		=	
		2	4" Tee, hubless	EA	Bid Unit Cost		+		=	
		2	5" Tee, hubless	EA	Bid Unit Cost		+		=	
		2	6" Tee, hubless	EA	Bid Unit Cost		+		=	
		2	8" Tee, hubless	EA	Bid Unit Cost		+		=	
		2	10" Tee, hubless	EA	Bid Unit Cost		+		=	
						500		5000		
		3	4" Pipe, service class	LF	Bid Unit Cost		+		=	
		4	5" Pipe, service class	LF	Bid Unit Cost		+		=	
		5	6" Pipe, service class	LF	Bid Unit Cost		+		=	
		6	8" Pipe, service class	LF	Bid Unit Cost		+		=	
		7	10" Pipe, service class	LF	Bid Unit Cost		+		=	
		8	4" Pipe, hubless	LF	Bid Unit Cost		+		=	
		9	5" Pipe, hubless	LF	Bid Unit Cost		+		=	
		10	6" Pipe, hubless	LF	Bid Unit Cost		+		=	
		11	8" Pipe, hubless	LF	Bid Unit Cost		+		=	
		12	10" Pipe, hubless	LF	Bid Unit Cost		+		=	
D.11.5 Replace Water Lines (A.26)					Quantity per T.O.	500		1000		
		1	1" Dia.	LF	Bid Unit Cost		+		=	

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)				Extended Price Total
		2	1 1/4" Dia.	LF	Bid Unit Cost		+	=	
		3	1 1/2" Dia.	LF	Bid Unit Cost		+	=	
		4	2" Dia.	LF	Bid Unit Cost		+	=	
		5	3" Dia.	LF	Bid Unit Cost		+	=	
					Quantity per T.O.	10		50	
		6	1" Ball Valve	EA	Bid Unit Cost		+	=	
		7	1 1/4" Ball Valve	EA	Bid Unit Cost		+	=	
	D.11.6 Hydro-jetting Existing Drains (A.27)				Quantity per T.O.	10		50	
		1	Drain	EA	Bid Unit Cost		+	=	
		2	Trench drains	EA	Bid Unit Cost		+	=	
						500		5000	
		3	Pipe	LF	Bid Unit Cost		+	=	
							+	=	
	D.11.7 Drain Piping Investigation - Video (A.28)				Quantity per T.O.	10		50	
		1	Drain	EA	Bid Unit Cost		+	=	
						500		5000	
		2	Pipe	LF	Bid Unit Cost		+	=	
									SubTotal D

E. ELECTRICAL

E.1.1 REPLACE Washdown System Pneumatic / Electric Controls (A.29)									
					Quantity	Price			
		1	One valve control cabinet	EA				=	
		1a	Pneumatic hose	LF				=	
		2	Two valve control cabinet	EA				=	
		2a	Pneumatic hose	LF				=	
		3	Three valve control cabinet	EA				=	
		3a	Pneumatic hose	LF				=	
		4	Four valve control cabinet	EA				=	
		4a	Pneumatic hose	LF				=	
E.1.2 REPLACE CONDUIT AND WIRING (A.30)									
					Quantity per T.O.	1000		5000	

Quotation Sheet

Item	Repair Category	Sub-Cat.	Sub-Category Description	Units	BID UNIT COSTS PER TASK ORDER (T.O.)					Extended Price Total
		1	Intermediate metal conduit, ¾" diameter, to 10' high.	LF	Bid Unit Cost		+	=		
		2	Intermediate metal conduit, 1" diameter, to 10' high.	LF	Bid Unit Cost		+	=		
		3	Wire, copper solid, 600 volt, #12, type THW, in raceway.	100 LF	Bid Unit Cost		+	=		
		4	Wire, copper solid, 600 volt, #10, type THW, in raceway.	100 LF	Bid Unit Cost		+	=		
E.1.3 Provide Grounding and bonding of water piping systems (A.31)					Quantity per T.O.	10		500		
		1	#8 AWG, type THW	100 LF	Bid Unit Cost		+	=		
		2	#6 AWG, type THW	100 LF	Bid Unit Cost		+	=		
		3	#4 AWG, type THW	100 LF	Bid Unit Cost		+	=		
		4	#2 AWG, type THW	100 LF	Bid Unit Cost		+	=		
		5	#1/0 AWG, type THW	100 LF	Bid Unit Cost		+	=		
		6	#1/2 AWG, type THW	100 LF	Bid Unit Cost		+	=		
					Quantity per T.O.	10		50		
		7	Water pipe clamp 1"	EA	Bid Unit Cost		+	=		
		8	Water pipe clamp 1.5"	EA	Bid Unit Cost		+	=		
		9	Water pipe clamp 2"	EA	Bid Unit Cost		+	=		
		10	Water pipe clamp 2.5"	EA	Bid Unit Cost		+	=		
		11	Water pipe clamp 3"	EA	Bid Unit Cost		+	=		
		12	Water pipe clamp 4"	EA	Bid Unit Cost		+	=		
E.1.4 Heat Tracing for Plumbing Piping (A.32)					Quantity per T.O.	100		1000		
		1	Heating Cable	EA	Bid Unit Cost		+	=		
					Quantity	Price				
		2	Controls	EA				=		
		3	Accessories	EA				=		
								SubTotal E		

AGGREGATE AMOUNT of the SubTotals (A, B, C,D &E) =

MONTGOMERY COUNTY, MARYLAND
OFFICE OF PROCUREMENT

SECTION A - INSTRUCTIONS, CONDITIONS AND NOTICES
(Numbers 1-7, 26, 27 and 28 are subject to selection on Bid Cover Sheet)

1. BID GUARANTEE

A Bid Guarantee (Bid Bond, Certified or Treasurer's Check, or Irrevocable Letter of Credit), must be enclosed and accompany each Bid and be duly executed by the Bidder as a principle, and made payable to Montgomery County. See the Bid Cover Sheet for the amount required for the Bid Guarantee for this particular bid. Bid Guarantees, other than Bid Bonds, will be returned to all except the three (3) lowest bidders within 15 days after the formal opening of Bids, and the remaining Guarantees will be returned to the three lowest bidders within 5 days after the County and the accepted Bidder(s) have executed the contract(s). If no contract has been executed within the time specified herein, the Bidder may request the return of the Bid Guarantee. The County reserves the right of approval of any instrument offered as Bid Guarantee.

2. INTENT

- A. The Intent of this Invitation for Bids is to establish a Fixed Price or Rate of Discount Contract for the purchase of goods/services for Montgomery County, Maryland, as per the Terms, Conditions, Specifications, and/or Scope of Work, and Quotation Sheet contained herein.
- B. The Intent of the Invitation for Bids is to establish a Time and Materials Contract(s) with a responsible Contractor(s) to complement County forces at various County facilities, as may be required and as may be directed by the Director, Office of Procurement, and as called for in the SCOPE OF WORK statement(s) attached. All work shall be performed by a Specialty Contractor of established reputation who is regularly engaged in the performance of the specified work and who maintains, and makes available for this purpose, a regular force of skilled workmen.

3. METHOD OF AWARD

- A. The contract will be awarded to the responsible bidder submitting a responsive bid, as determined by the Director, Office of Procurement. The lowest bidder is determined by the aggregate amount of the unit prices extended by the quantities set forth on the Quotation Sheet. Bidders must bid each item in order to be eligible for an award.
- B. The contract will be awarded by group to the responsible bidder submitting a responsive bid, as determined by the Director, Office of Procurement. The lowest bid is determined by the aggregate amount of the unit prices extended by the quantities set forth in each group on the Quotation Sheet. Bidders must bid each item within a particular group in order to be eligible for an award for the group itself.
- C. The contract will be awarded to the responsible bidder submitting a responsive bid, as determined by the Director, Office of Procurement. The lowest bidder is determined by the lowest unit price bid.
- D. The contract will be awarded by line item to the responsible bidder submitting a responsive bid, as determined by the Director, Office of Procurement.
- E. The contract will be awarded by any other Method of Award as stated on the Bid Cover Sheet.

Regardless of which Method of Award is selected for this bid (Items A-E), THE DIRECTOR, OFFICE OF PROCUREMENT, reserves the right to award a contract by individual items, in the aggregate, or in any combination thereof, or to reject any or all bids and to waive any informality in bids received whenever such rejection or waiver is in the best interest of the County. Additionally, bidders are hereby notified that the Montgomery County Code, Section 11B-56 concerning the procurement of recycled materials

and supplies is applicable to this solicitation. The Code requires, where practicable, procurement by the County of materials and supplies recycled from solid waste, and authorize the use of a percentage price preference. The percentage price preference for this solicitation is stated on the Bid Cover Sheet of this particular bid.

Recycled Material as defined by Section 11B-56 means "material recovered from or otherwise diverted from the waste stream, including recycled paper. It includes post-consumer waste, industrial scrap material and obsolete inventories..." A percentage price preference means "the percentage by which a responsive bid from a responsible bidder whose product contains recycled materials (or a greater use of recycled materials) may exceed the lowest responsive bid submitted by a responsible bidder whose product does not contain recycled materials (or a lesser use of recycled materials)."

Bidders offering recycled products as defined by the County Code are cautioned that in order to be eligible for the price preference, the County must be aware at bid opening that the product being offered is recycled. Failure to provide specifications and/or other documentation at bid opening indicating that the product being offered is recycled may result in the bidder not receiving the price preference.

Bidders are also advised that a decision on use of a specification for a good containing recycled materials or a percentage price preference is within the sole discretion of the County and may not be appealed.

4. OPTIONAL PRE-BID CONFERENCE(S)

One or more optional Pre-Bid Conference(s) will be held. It is optional, though highly recommended that prospective bidders attend the pre-bid conference(s). For information regarding the date, time, and place of the conference(s), see the Bid Cover Sheet.

5. OR EQUAL INTERPRETATION

Identification of an item by manufacturer's name, trade name, catalog number, or reference is intended to be descriptive but not restrictive in that it is used for the purpose of describing the type, style, quality, performance and minimum specifications of the product desired, and shall not be interpreted to mean the only acceptable product. Bids on other makes and/or models will be considered provided the bidder clearly states in the spaces provided in the Quotation Sheet what is being proposed and forwards with the bid complete descriptive literature indicating the character of the article being offered and addressing all specifications of this solicitation.

The County reserves the right to accept or reject, in its sole discretion, items offered as an "equal".

6. QUESTIONS

All technical and non-technical questions pertaining to this Invitation for Bids should be directed to the individuals whose names are indicated on the Bid Cover Sheet.

7. SAMPLES

When samples are required it will be so indicated. Samples must be submitted so as to arrive at the designated location prior to the opening of bids and must be identified with the NAME OF BIDDER, BID NUMBER AND BID ITEM NUMBER. Failure to properly identify samples may cause bid to be considered nonresponsive. Samples shall be free of charge and delivered at the bidder's expense. The County will have the right to destroy, alter, or mutilate samples in examination for specification or performance compliance without charge from bidder. Samples may be removed within ten (10) days after award. Samples may at the County's option be retained for the life of any subsequent contract period.

8. ACCEPTANCE TIME

By submission of an offer under this solicitation, the offeror agrees that the County has 120 days after the opening date in order to issue an award. The County reserves the right to reject, as nonresponsive, any offer that specifies less than 120 days of acceptance time. Upon mutual agreement between the

County and the Offeror, the acceptance time for the Offeror's bid may be extended.

9. ALTERNATE OFFERS

Bidders must bid only one (1) product and one (1) price per bid item even though they feel they can offer more than one item that will meet the specifications. Bidders must determine for themselves which to offer. If a bidder submits more than one (1) product and/or more than one (1) price for a given bid item or items, it may be cause for the item or items bid upon to be considered non-responsive and rejected.

10. AWARD OR REJECTION OF BID

- A. Failure to enclose and submit requested data, surety, or other documents in the sealed bid return envelope as may be required herein may be cause for rejection of the bid.
- B. The County reserves the right to accept or reject any or all bids, or portion thereof, to give an offeror an opportunity to cure any deficiency resulting from a minor irregularity in a bid or to waive the deficiency, whichever is to the advantage of the County, and to award the Contract in the best interest of the County. The decision of the Director with respect to whether a defect is a minor informality is made in the sole discretion of the Director and is not subject to review and may not be challenged by a bidder.
- C. Conditional or qualified bids are subject to rejection.
- D. The County reserves the right to reject the bid of a bidder who has previously failed to perform properly or to complete in a timely manner, contracts of a similar nature, or if investigation shows the bidder unable to perform the requirements of the contract.

11. BID PREPARATION EXPENSES

All costs incurred in the preparation and submission of bids will be borne by the bidder and shall not be incurred in anticipation of receiving reimbursement from the County.

12. BID PROTESTS

All protests made pursuant to this solicitation must be in writing and delivered to the Director, Office of Procurement: (a) within ten (10) calendar days after the Director, Office of Procurement, publicly posts the proposed contract award, if the bidder seeks as a remedy the award of the contract or costs under Section 11B-36(h) of the Montgomery County Code, or (b) before the submission date for bids, if the bidder seeks as a remedy the cancellation or amendment of the solicitation. **Each protest must contain a protest filing fee in the amount of \$500 (US currency); if the fee is paid by check, then the check must be made out to "Montgomery County Government".** The Director, Office of Procurement, may return the filing fee to the protesting bidder, if the protest is sustained. The Director, Office of Procurement, must dismiss any protest not timely received.

Only an "aggrieved" bidder may file a protest. Aggrieved means that the bidder who is filing the protest may be eligible for an award of the contract if the protest is sustained (e.g., a fourth ranked bidder is not aggrieved unless the grounds for a protest, if sustained, would disqualify the top three ranked bidders or would require that the solicitation be reissued).

Each protest must contain the following: identification of the solicitation; the name, address, email address, fax and telephone numbers of the protesting offeror; a statement supporting that the bidder is aggrieved; and specification of all grounds for the protest, including submission of detailed facts and all relevant documents, citation to relevant language in the solicitation, regulations, or law relied upon; and, all other matters which the bidder contends supports the protest. The burden of production of all relevant evidence, data, and documents, and the burden of persuasion, to support the protest is on the bidder making the protest.

13. BID WITHDRAWAL/MODIFICATION

Bids may be withdrawn or modified upon receipt of a written request received before the time specified for bid opening date and time. Requests to withdraw or modify a bid received after a bid opening date and time will not be considered.

14. BIDDER'S PAYMENT TERMS

The County will reject as nonresponsive a bid under this solicitation, which is conditioned on payment of proper invoices in less than thirty (30) days. The County's Standard Payment Terms are Net Thirty (30) Days. This does not preclude an offeror from offering a prompt payment discount for payment of proper invoices in less than thirty (30) days. An optional prompt payment term is not required, but may be offered conditioned on the following basis: Only a prompt payment discount conditioned on a thirty-day or greater payment basis will be utilized to recalculate prices for purposes of the Method of Award process for price only. Prompt payment discounts may be offered on a shorter payment basis and adopted by the County at time of award, but will not be considered during the Method of Award process.

15. BIDS

Sealed Bids are hereby solicited, to be opened in Suite 180, Rockville Center, 255 Rockville Pike, Rockville, MD 20850, for the purchase of Supplies, Material, Equipment, and/or Services in accordance with the Instructions, Terms, Conditions and Specifications and/or scope of work set forth in this Invitation. Bids are to be returned in a sealed envelope which should be at least 9 1/2" X 12 1/2" in size, and be clearly marked with the IFB number, opening date, and the opening time. Bids received after the time specified will not be considered and will be returned unopened to the bidder. The County will not be responsible for premature or late opening of bids improperly addressed or identified.

Information regarding the bid results (apparent low bidder) for this bid or any bid issued by the Montgomery County Office of Procurement, will be posted on Montgomery County's website at:
<http://www.montgomerycountymd.gov/PRO/Awardee.html>

16. ERRORS IN BIDS

- A. Failure of the bidder to thoroughly understand all aspects of the Invitation for Bids before submitting the bid will not act as an excuse to permit withdrawal of the bid nor secure relief on pleas of error.
- B. The unit price will govern in the event of a discrepancy between the unit price bid and the extended price.
- C. The sum of the extended prices will govern in the event of a discrepancy between the aggregate total bid and the extended prices.
- D. The written words will govern in the event of a discrepancy between the prices written in words and the prices written in figures.

17. JOINT PROCUREMENT (Optional Use of the Contract)

The following entities within Montgomery County must be able to purchase directly from contracts resulting from this solicitation:

Maryland-National Capital Park & Planning Commission (M-NCPPC)
Montgomery College (MC)
Montgomery County Public Schools (MCPS)
Montgomery County Revenue Authority
Montgomery County Housing Opportunities Commission (HOC)
Washington Suburban Sanitary Commission (WSSC)
Municipalities & Special Tax Districts in Montgomery County.

While this IFB is prepared on behalf of Montgomery County, it is intended to apply for the benefit of the above-named entities as though they were expressly named throughout the document. Each of these entities may purchase from the successful vendor under the same prices and goods and/or services of the contract with Montgomery County, in accordance with each entity's respective laws and regulations, or an entity may choose not to procure from the successful bidder at the entity's sole discretion. If one of the above-named entities elects to purchase under the contract, the price shall be determined by using unit costs and other pertinent costs that are provided in

the bid. Montgomery County shall not be held liable for any costs, payments, invoices, or damages incurred by the above jurisdictions. Each jurisdiction above will be solely responsible for and contract directly with the bidder under the jurisdictions own procurement laws and regulations. ANY SPECIAL DISCOUNTS UNIQUE TO A PARTICULAR ENTITY (e.g. Montgomery County Public Schools educational discounts) SHOULD BE OFFERED TO THAT ENTITY.

18. MINORITY, FEMALE, DISABLED PERSON PROGRAM COMPLIANCE

Under County law, this solicitation is subject to the Montgomery County Code and the Montgomery County Procurement Regulations regarding participation in the Minority, Female, Disabled Person (MFD) Procurement Program. Further information regarding the County's MFD program is contained within this solicitation (see the provision entitled "Minority-Owned Business Addendum to the General Conditions of Contract between County and Contractor" and its companion document entitled "Minority, Female, and Disabled-Person Subcontractor Performance Plan").

19. MONTGOMERY COUNTY CODE AND PROCUREMENT REGULATIONS

The Montgomery County and Procurement Regulations are applicable to this solicitation and any contract awarded pursuant to this solicitation.

20. NAME AND SIGNATURE REQUIREMENTS FOR BIDS AND CONTRACTS

The correct and full legal business name of the entity involved must be used on bids received and on contract(s) issued as a result of this solicitation. A trade name, i.e., a shortened or different name under which the firm does business, must not be used when the full legal name is different. Corporations must have names that comply with State law, which requires a suffix indicating the corporate status of that business (e.g., Inc., Incorporated, etc.). Trade names may be indicated by individuals or corporations with the individual or corporate name followed by "v/a" (trading as) or "d/b/a" (doing business as), respectively. The signature on the bid, contract, amendment, or related correspondence must conform to the following: All signatures must be made by an authorized officer, partner, manager, member, or employee. The signing of an offer or a contract is a representation by the person signing that the person signing is authorized to do so on behalf of the offeror or contractor.

No bids will be accepted unless submitted in ink or typewritten. Changes made to the prices bid prior to the opening must be done legibly and initialed by the offeror making the changes.

21. PROMPT PAYMENT DISCOUNT TERMS

Bidders please note: Prompt payment discounts will be considered in the evaluation of your bid if the discount on payments is not conditioned on payment being made in less than thirty (30) days from receipt of invoice.

22. PROPRIETARY & CONFIDENTIAL INFORMATION

This is to notify prospective bidders that the County has unlimited data rights regarding bids submitted in response to its solicitations. Unlimited data rights means that Montgomery County has the right to use, disclose, reproduce, prepare derivative works, distribute copies to the public, or perform publicly and display publicly any information submitted by offerors in response to this or any solicitation issued by the County. However, information that is deemed to be confidential commercial or financial information as defined by the Maryland Information Act, State Government Article §10-617, will be exempted from disclosure if the submitter can show that release of such information would cause substantial competitive harm to the submitter.

It is the responsibility of the bidder to clearly identify each part of his/her offer that it believes is confidential commercial or financial information by stamping the bottom right hand corner of each pertinent page with one inch bold face letters stating the words "confidential" or "proprietary". The bidder agrees, with regard to any portion of the bid that is not stamped "proprietary" or "confidential" that it believes, and expressly permits, the County to deem it not to be proprietary or confidential.

23. PUBLIC POSTING

Of particular importance is the fact that the notice of a decision to make an award will be accomplished by a posting of the proposed contract awardee on a public list located in the Office of Procurement, Rockville Center, 255 Rockville Suite 180, Rockville, Maryland 20850.

The time period for appeal contained in Section 11B-36 commences THE DAY FOLLOWING the date of the posting.

It is the responsibility of the offerors to keep informed of the current status of any proposed awardees for contracts in which they are interested, as per Section 3.2.2 of the Procurement Regulations.

Information regarding the proposed awardee(s) under this bid or any bid issued by the Montgomery County Office of Procurement will be posted on Montgomery County's website at: <http://www.montgomerycountymd.gov/PRO/Awardee.html>

24. QUALIFICATION OF BIDDERS

Bidders may be required to furnish satisfactory evidence that they are qualified dealers or manufacturers of the items listed, or are regularly engaged in performing the services on which they are submitting a bid, and in both cases maintain a regularly established place of business. An authorized representative of the County may visit and inspect any prospective Contractor's plant, manufacturing facility or place of business, etc. where the goods, services or construction are performed to determine ability, capacity, reliability, financial stability, and other factors necessary to perform the contract. The County may visit and inspect any prospective Contractor's use of a Subcontractor's plant, manufacturing facility or place of business, etc. where the goods, services or construction are performed to determine ability, capacity, reliability, financial stability, and other factors necessary to perform the contract. In both instances above, the information gathered on the visit and inspection on the Contractor or its Subcontractor(s) may be used by the County to determine the responsibility of a Bidder.

If so requested, a bidder may be required to submit information about its reputation, past performance, business, and financial capability, and other factors that demonstrate that the bidder is capable of satisfying the County's needs and requirements for this solicitation.

25. SOLICITATION AMENDMENTS

In the event that an amendment to this solicitation is issued, all solicitation terms and conditions will remain in effect unless they are specifically changed by the amendment. Bidders are responsible for checking the website at <http://www.montgomerycountymd.gov/PRO/solicitations.html> periodically to remain informed of any solicitation amendments.

OFFERORS MUST ACKNOWLEDGE RECEIPT OF SUCH SOLICITATION AMENDMENTS, to the place designated, and prior to the hour and date specified in the solicitation (as amended) for receipt of Bids. **UNLESS A WAIVER IS GRANTED, OFFERORS THAT DO NOT**

TIMELY ACKNOWLEDGE RECEIPT OF SOLICITATION AMENDMENTS BY ONE OF THE FOLLOWING METHODS WILL BE REJECTED:

- (a) by sending the amendment separately to the Office of Procurement prior to the due date and time.
- (b) by acknowledging receipt of the amendment on the Solicitation, Bid, and Award sheet submitted.
- (c) by stating that the amendment is acknowledged in a signed letter that refers to the solicitation and amendment numbers, and is submitted with the bid or prior to the bid due date and time.

A waiver may be granted by the Director, Office of Procurement, if it is deemed to be in the County's best interest. No waiver may be granted, however, until the offeror states in writing that the offeror will be bound by any substantive changes made by the amendment to the terms of the solicitation. If an offeror desires to change an offer that has already been submitted, the change may be made by a signed letter that refers to the solicitation and amendment numbers, and which is received at the place

designated, and prior to the hour and date specified in the solicitation (as amended) for receipt of offers.

26. VERBAL EXPLANATIONS

Verbal explanations or instructions given by a Montgomery County employee to an offeror in regard to this solicitation will not be binding on the County. Any information given to an offeror, in response to a request, will be furnished to all offerors as an amendment to this solicitation, if such information is deemed necessary for the preparation of bids, or if the lack of such information would be detrimental to the uninformed offerors. Such amendments only, when issued by the Director, Office of Procurement, will be considered as being binding on the County.

27. SERVICES CONTRACT (County Code 11B-33A)

Under County law, a solicitation for a contractor to provide services is subject to the Montgomery County Code regarding compliance with certain wage requirements payable to the Contractor's employees. Additional information regarding the County's wage requirements is contained within this solicitation (see the provision entitled "Wage Requirements for Services Contracts Addendum to the General Conditions of Contract between County and Contractor" and its companion documents entitled "Wage Requirements Certification" and "501(a)(3) Non-profit organization/s Employee's Wage and Health Insurance Form). If a bidder fails to submit and complete the required material information on the Wage Requirements Certification form, its bid may be deemed unacceptable under County law and may be rejected for nonresponsiveness.

28. PREVAILING WAGE (County Code §§11B-33C, and 20-75)

The Wage Law applies to all construction contracts. Under County law, a County financed construction contract is subject to the Montgomery County Code regarding compliance with the prevailing wage paid to construction workers, as established for the County by the Maryland State Commissioner of Labor and Industry. Additional information regarding the County's prevailing wage requirements is contained within this solicitation/contract (see the provision entitled "Prevailing Wage Requirements for Construction Contract Addendum to the General Conditions of Contract between County and Contractor").

An aggrieved employee is a third-party beneficiary of this Contract and the employee may, by civil action, recover the difference between the prevailing wage for the type of work performed and the amount actually received, with interest and a reasonable attorney's fee.

29. TIE BIDS

In conjunction with the bid's selected method of award (Section A.3.), tie bids will be resolved by making a proposed award of the contract(s) to the bidder who has its principal place of business in Montgomery County, Maryland. If bids are still tied, then the tie will be resolved in accordance with the criteria in the order stated under Procurement Regulation 4.1.1.4(e).

SECTION B - GENERAL CONDITIONS OF CONTRACT BETWEEN COUNTY & CONTRACTOR

1. ACCOUNTING SYSTEM AND AUDIT, ACCURATE INFORMATION

The contractor certifies that all information the contractor has provided or will provide to the County is true and correct and can be relied upon by the County in awarding, modifying, making payments, or taking any other action with respect to this contract including resolving claims and disputes. Any false or misleading information is a ground for the County to terminate this contract for cause and to pursue any other appropriate remedy. The contractor certifies that the contractor's accounting system conforms with generally accepted accounting principles, is sufficient to comply with the contract's budgetary and financial obligations, and is sufficient to produce reliable financial information.

The County may examine the contractor's and any first tier subcontractor's records to determine and verify compliance with the contract and to resolve or decide any claim or dispute arising under this contract. The contractor and any first tier subcontractor must grant the County access to these records at all reasonable times during the contract term and for 3 years after final payment. If the contract is supported to any extent with federal or state funds, the

appropriate federal or state authorities may also examine these records. The contractor must include the preceding language of this paragraph in all first tier subcontracts.

2. AMERICANS WITH DISABILITIES ACT

The contractor agrees to comply with the nondiscrimination requirements of Titles II and III, and other provisions, of the Americans with Disabilities Act of 1990, Pub. Law 101-336, and ADA Amendments Act of 2008, Pub. Law 110-325, as amended, currently found at 42 U.S.C., § 12101, et seq., and 47 U.S.C., ch. 5.

3. APPLICABLE LAWS

This contract must be construed in accordance with the laws and regulations of Maryland and Montgomery County. The Montgomery County Procurement Regulations are incorporated by reference into, and made a part of, this contract. In the case of any inconsistency between this contract and the Procurement Regulations, the Procurement Regulations govern. The contractor must, without additional cost to the County, pay any necessary fees and charges, obtain any necessary licenses and permits, and comply with applicable federal, state and local laws, codes and regulations. For purposes of litigation involving this contract, except for contract Disputes discussed in paragraph 8 below, exclusive venue and jurisdiction must be in the Circuit Court for Montgomery County, Maryland or in the District Court of Maryland for Montgomery County.

The prevailing wage law (County Code §11B-33C) applies to construction contracts. Specifically, under County law, a County financed construction contract is subject to the Montgomery County Code regarding compliance with the prevailing wage paid to construction workers, as established for the County by the Maryland State Commissioner of Labor and Industry. Additional information regarding the County's prevailing wage requirements is contained within this solicitation/contract (see the provision entitled "Prevailing Wage Requirements for Construction Contract Addendum to the General Conditions of Contract between County and Contractor").

Furthermore, certain non-profit and governmental entities may purchase supplies and services, similar in scope of work and compensation amounts provided for in a County contract, using their own contract and procurement laws and regulations, pursuant to the Md. State Finance and Procurement Article, Section 13-101, et. seq.

Contractor and all of its subcontractors must comply with the provisions of County Code §11B-35A and must not retaliate against a covered employee who discloses an illegal or improper action described in §11B-35A. Furthermore, an aggrieved covered employee under §11B-35A is a third-party beneficiary under this Contract, who may by civil action recover compensatory damages including interest and reasonable attorney's fees, against the contractor or one of its subcontractors for retaliation in violation of that Section.

Contractor and all of its subcontractors must provide the same benefits to an employee with a domestic partner as provided to an employee with a spouse, in accordance with County Code §11B-33D. An aggrieved employee, is a third-party beneficiary who may, by civil action, recover the cash equivalent of any benefit denied in violation of §11B-33D or other compensable damages.

The contractor agrees to comply with the requirements of the Displaced Service Workers Protection Act, which appears in County Code, Chapter 27, Human Rights and Civil Liberties, Article X, Displaced Service Workers Protection Act, §§ 27-64 through 27-66.

Montgomery County's Earned Sick and Safe Leave Law, found at Sections 27-76 through 27-82 of the County Code, became effective October 1, 2016. An employer doing business in the County, as defined under the statute, must comply with this law. This includes an employer vendor awarded a County contract. A vendor may obtain information regarding this law at <http://www.montgomerycountymd.gov/humanrights/>

4. ASSIGNMENTS AND SUBCONTRACTS

The contractor must not assign or transfer this contract, any interest herein or any claim hereunder, except as expressly authorized in writing by the Director, Office of Procurement. Unless performance is separately and expressly waived in writing by the Director, Office of Procurement, an assignment does not release the contractor from responsibility for performance of this contract. Unless otherwise provided in the contract, the contractor may not contract with any other party for furnishing any of the materials or services herein contracted for without the written approval of the Director, Office of Procurement. Any subcontract for any work hereunder must comport with the terms of this Contract and County law, and must include any other terms and conditions that the County deems necessary to protect its interests.

5. CHANGES

The Director, Office of Procurement, may unilaterally change the work, materials and services to be performed. The change must be in writing and within the general scope of the contract. The contract will be modified to reflect any time or money adjustment the contractor is entitled to receive. Contractor must bring to the Contract Administrator, in writing, any claim about an adjustment in time or money resulting from a change, within 30 days from the date the Director, Office of Procurement, issued the change in work, or the claim is waived. Any failure to agree upon a time or money adjustment must be resolved under the "Disputes" clause of this contract. The contractor must proceed with the prosecution of the work as changed, even if there is an unresolved claim. No charge for any extra work, time or material will be allowed, except as provided in this section.

6. CONTRACT ADMINISTRATION

- A. The contract administrator, subject to paragraph B below, is the Department representative designated by the Director, Office of Procurement, in writing and is authorized to:
- (1) serve as liaison between the County and the contractor;
 - (2) give direction to the contractor to ensure satisfactory and complete performance;
 - (3) monitor and inspect the contractor's performance to ensure acceptable timeliness and quality;
 - (4) serve as records custodian for this contract, including wage and prevailing wage requirements;
 - (5) accept or reject the contractor's performance;
 - (6) furnish timely written notice of the contractor's performance failures to the Director, Office of Procurement, and to the County Attorney, as appropriate;
 - (7) prepare required reports;
 - (8) approve or reject invoices for payment;
 - (9) recommend contract modifications or terminations to the Director, Office of Procurement;
 - (10) issue notices to proceed; and
 - (11) monitor and verify compliance with any MFD Performance Plan.
- B. The contract administrator is NOT authorized to make determinations (as opposed to recommendations) that alter, modify, terminate or cancel the contract, interpret ambiguities in contract language, or waive the County's contractual rights.

7. COST & PRICING DATA

Chapter 11B of the County Code and the Montgomery County Procurement Regulations require that cost & pricing data be obtained from proposed awardes/contractors in certain situations. The contractor guarantees that any cost & pricing data provided to the County will be accurate and complete. The contractor grants the Director, Office of Procurement, access to all books, records, documents, and other supporting data in order to permit adequate evaluation of the contractor's proposed price(s). The contractor also agrees that the price to the County, including profit or fee, may, at the option of the County, be reduced to the extent that the price was based on inaccurate, incomplete, or noncurrent data supplied by the contractor.

8. DISPUTES

Any dispute arising under this contract that is not disposed of by agreement must be decided under the Montgomery County Code and the Montgomery County Procurement Regulations. Pending final resolution of a dispute, the Contractor must proceed diligently with contract performance. Subject to subsequent revocation or alteration by the Director, Office of Procurement,

the head of the County department, office or agency ("Department Head") of the contract administrator is the designee of the Director, Office of Procurement, for the purpose of dispute resolution. The Department Head, or his/her designee, must forward to the Director, Office of Procurement, a copy of any written resolution of a dispute. The Department Head may delegate this responsibility to another person (other than the contract administrator). A contractor must notify the contract administrator of a claim in writing, and must attempt to resolve a claim with the contract administrator prior to filing a dispute with the Director, Office of Procurement or designee. The contractor waives any dispute or claim not made in writing and received by the Director, Office of Procurement, within 30 days of the event giving rise to the dispute or claim, whether or not the contract administrator has responded to a written notice of claim or resolved the claim. The Director, Office of Procurement, must dismiss a dispute that is not timely filed. A dispute must be in writing, for specific relief, and any requested relief must be fully supported by affidavit of all relevant calculations, including cost and pricing information, records, and other information. At the County's option, the contractor agrees to be made a party to any related dispute involving another contractor.

9. DOCUMENTS, MATERIALS, AND DATA

All documents materials or data developed as a result of this contract are the County's property. The County has the right to use and reproduce any documents, materials, and data, including confidential information, used in the performance of, or developed as a result of, this contract. The County may use this information for its own purposes, including reporting to state and federal agencies. The contractor warrants that it has title to or right of use of all documents, materials or data used or developed in connection with this contract. The contractor must keep confidential all documents, materials, and data prepared or developed by the contractor or supplied by the County.

10. DURATION OF OBLIGATION

The contractor agrees that all of contractor's obligations and warranties, including all requirements imposed by the Minority Owned Business Addendum to these General Conditions, if any, which directly or indirectly are intended by their nature or by implication to survive contractor performance, do survive the completion of performance, termination for default, termination for convenience, or termination by mutual consent of the contract.

11. ENTIRE AGREEMENT

There are no promises, terms, conditions, or obligations other than those contained in this contract. This contract supersedes all communications, representations, or agreements, either verbal or written, between the parties hereto, with the exception of express warranties given to induce the County to enter into the contract.

12. ETHICS REQUIREMENTS/POLITICAL CONTRIBUTIONS

The contractor must comply with the ethics provisions contained in Chapters 11B and 19A, Montgomery County Code, which include the following:

- (a) a prohibition against making or offering to make certain gifts. Section 11B-51(a).
- (b) a prohibition against kickbacks. Section 11B-51(b).
- (c) a prohibition against a person engaged in a procurement from employing or offering to employ a public employee. Section 11B-52 (a).
- (d) a prohibition against a contractor that is providing a recommendation to the County from assisting another party or seeking to obtain an economic benefit beyond payment under the contract. Section 11B-52 (b).
- (e) a restriction on the use of confidential information obtained in performing a contract. Section 11B-52 (c).
- (f) a prohibition against contingent fees. Section 11B-53.

Furthermore, the contractor specifically agrees to comply with Sections 11B-51, 11B-52, 11B-53, 19A-12, and/or 19A-13 of the Montgomery County Code. In addition, the contractor must comply with the political contribution reporting requirements currently codified under the Election Law at Md. Code Ann., Title 14.

13. GUARANTEE

- A. Contractor guarantees for one year from acceptance, or for a longer period that is otherwise expressly stated in the County's written solicitation, all goods, services, and construction offered, including those used in the course of providing the goods, services, and/or construction. This

includes a guarantee that all products offered (or used in the installation of those products) carry a guarantee against any and all defects for a minimum period of one year from acceptance, or for a longer period stated in the County's written solicitation. The contractor must correct any and all defects in material and/or workmanship that may appear during the guarantee period, or any defects that occur within one (1) year of acceptance even if discovered more than one (1) year after acceptance, by repairing, (or replacing with new items or new materials, if necessary) any such defect at no cost to the County and to the County's satisfaction.

- B. Should a manufacturer's or service provider's warranty or guarantee exceed the requirements stated above, that guarantee or warranty will be the primary one used in the case of defect. Copies of manufacturer's or service provider's warranties must be provided upon request.
- C. All warranties and guarantees must be in effect from the date of acceptance by the County of the goods, services, or construction.
- D. The contractor guarantees that all work shall be accomplished in a workmanlike manner, and the contractor must observe and comply with all Federal, State, County and local laws, ordinances and regulations in providing the goods, and performing the services or construction.
- E. Goods and materials provided under this contract must be of first quality, latest model and of current manufacture, and must not be of such age or so deteriorated as to impair their usefulness or safety. Items that are used, rebuilt, or demonstrator models are unacceptable, unless specifically requested by the County in the Specifications.

14. HAZARDOUS AND TOXIC SUBSTANCES

Manufacturers and distributors are required by federal "Hazard Communication" provisions (29 CFR 1910.1200), and the Maryland "Access to Information About Hazardous and Toxic Substances" Law, to label each hazardous material or chemical container, and to provide Material Safety Data Sheets to the purchaser. The contractor must comply with these laws and must provide the County with copies of all relevant documents, including Material Safety Data Sheets, prior to performance of work or contemporaneous with delivery of goods.

15. HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA) COMPLIANCE

In addition to the provisions stated above in Section 3. "Applicable Laws," contractor must comply with all requirements in the federal Health Insurance Portability and Accountability Act (HIPAA), to the extent that HIPAA is applicable to this contract. Furthermore, contractor must enter into the County's standard Business Associate Agreement or Qualified Service Organization Agreement when contractor or the County, as part of this contract, may use or disclose to one another, to the individual whose health information is at issue, or to a third-party, any protected health information that is obtained from, provided to, made available to, or created by, or for, the contractor or the County.

16. IMMIGRATION REFORM AND CONTROL ACT

The contractor warrants that both the contractor and its subcontractors do not, and shall not, hire, recruit or refer for a fee, for employment under this contract or any subcontract, an alien while knowing the alien is an unauthorized alien, or any individual without complying with the requirements of the federal Immigration and Nationality laws, including any verification and record keeping requirements. The contractor further assures the County that, in accordance with those laws, it does not, and will not, discriminate against an individual with respect to hiring, recruitment, or referral for a fee, of an individual for employment or the discharge of an individual from employment, because of the individual's national origin or, in the case of a citizen or prospective citizen, because of the individual's citizenship status.

17. INCONSISTENT PROVISIONS

Notwithstanding any provisions to the contrary in any contract terms or conditions supplied by the contractor, this General Conditions of Contract document supersedes the contractor's terms and conditions, in the event of any inconsistency.

18. INDEMNIFICATION

The contractor is responsible for any loss, personal injury, death and any other damage (including incidental and consequential) that may be done or suffered by reason of the contractor's negligence or failure to perform any contractual obligations. The contractor must indemnify and save the County harmless from any loss, cost, damage and other expenses, including attorney's fees and litigation expenses, suffered or incurred due to the contractor's negligence or failure to perform any of its contractual obligations. If requested by the County, the contractor must defend the County in any action or suit brought against the County arising out of the contractor's negligence, errors, acts or omissions under this contract. The negligence of any agent, subcontractor or employee of the contractor is deemed to be the negligence of the contractor. For the purposes of this paragraph, County includes its boards, agencies, agents, officials and employees.

19. INDEPENDENT CONTRACTOR

The contractor is an independent contractor. The contractor and the contractor's employees or agents are not agents of the County.

20. INSPECTIONS

The County has the right to monitor, inspect and evaluate or test all supplies, goods, services, or construction called for by the contract at all reasonable places (including the contractor's place of business) and times (including the period of preparation or manufacture).

21. INSURANCE

Prior to contract execution by the County, the proposed awardee/contractor must obtain at its own cost and expense the minimum insurance specified in the applicable table (See Tables A and B) or attachment to these General Conditions, with one or more insurance company(s) licensed or qualified to do business in the State of Maryland and acceptable to the County's Division of Risk Management. The minimum limits of coverage listed shall not be construed as the maximum as required by contract or as a limitation of any potential liability on the part of the proposed awardee/contractor to the County, nor shall failure by the County to request evidence of this insurance in any way be construed as a waiver of proposed awardee/contractor's obligation to provide the insurance coverage specified. Contractor must keep this insurance in full force and effect during the term of this contract, including all extensions. Unless expressly provided otherwise, Table A is applicable to this contract. The insurance must be evidenced by one or more Certificate(s) of Insurance and, if requested by the County, the proposed awardee/contractor must provide a copy of any and all insurance policies to the County. At a minimum, the proposed awardee/contractor must submit to the Director, Office of Procurement, one or more Certificate(s) of Insurance prior to award of this contract, and prior to any contract modification extending the term of the contract, as evidence of compliance with this provision. The contractor's insurance must be primary. Montgomery County, MD, including its officials, employees, agents, boards, and agencies, must be named as an additional insured on all liability policies. Contractor must provide to the County at least 30 days written notice of a cancellation of, or a material change to, an insurance policy. In no event may the insurance coverage be less than that shown on the applicable table, attachment, or contract provision for required insurance. After consultation with the Department of Finance, Division of Risk Management, the Director, Office of Procurement, may waive the requirements of this section, in whole or in part.

Please disregard TABLE A. and TABLE B., if they are replaced by the insurance requirements as stated in an attachment to these General Conditions of Contract between County and Contractor.

TABLE A. INSURANCE REQUIREMENTS
(See Paragraph #21 under the General Conditions of Contract between County and Contractor)

CONTRACT DOLLAR VALUES (IN \$1,000's)

Up To	Up To	Up To	Over
<u>50</u>	<u>100</u>	<u>1,000</u>	<u>1,000</u>

Workers Compensation (for

contractors with employees)				
Bodily Injury by				
Accident (each)	100	100	100	See
Disease (policy limits)	500	500	500	Attach.
Disease (each employee)	100	100	100	
Commercial General Liability	300	500	1,000	See
for bodily injury and property				Attach.
damage per occurrence, including				
contractual liability, premises				
and operations, and independent				
contractors				
Minimum Automobile Liability				
(including owned, hired and non				
owned automobiles)				
Bodily Injury				
each person	100	250	500	See
each occurrence	300	500	1,000	Attach.
Property Damage				
each occurrence	300	300	300	
Professional Liability*	250	500	1,000	See
for errors, omissions				Attach.
and negligent acts, per				
claim and aggregate, with				
one year discovery period and				
maximum deductible of \$25,000				

Certificate Holder
 Montgomery County Maryland (Contract #)
 Office of Procurement
 255 Rockville Pike, Suite 180
 Rockville, Maryland 20850 4166

*Professional services contracts only

TABLE B. INSURANCE REQUIREMENTS
 (See Paragraph #21 under the General Conditions of Contract
 between County and Contractor)

	Up To <u>50</u>	Up To <u>100</u>	Up To <u>1,000</u>	Over <u>1,000</u>
Commercial General Liability minimum combined single limit for bodily injury and property damage per occurrence, including contractual liability, premises and operations, independent contractors, and product liability	300	500	1,000	See Attach.

Certificate Holder
 Montgomery County Maryland (Contract #)
 Office of Procurement
 255 Rockville Pike, Suite 180
 Rockville, Maryland 20850 4166

22. INTELLECTUAL PROPERTY APPROVAL AND INDEMNIFICATION - INFRINGEMENT

If contractor will be preparing, displaying, publicly performing, reproducing, or otherwise using, in any manner or form, any information, document, or material that is subject to a copyright, trademark, patent, or other property or privacy right, then contractor must: obtain all necessary licenses, authorizations, and approvals related to its use; include the County in any approval, authorization, or license related to its use; and indemnify and hold harmless the County related to contractor's alleged infringing or otherwise improper or unauthorized use. Accordingly, the contractor must protect,

indemnify, and hold harmless the County from and against all liabilities, actions, damages, claims, demands, judgments, losses, costs, expenses, suits, or actions, and attorneys' fees and the costs of the defense of the County, in any suit, including appeals, based upon or arising out of any allegation of infringement, violation, unauthorized use, or conversion of any patent, copyright, trademark or trade name, license, proprietary right, or other related property or privacy interest in connection with, or as a result of, this contract or the performance by the contractor of any of its activities or obligations under this contract.

23. NON-CONVICTION OF BRIBERY

The contractor hereby declares and affirms that, to its best knowledge, none of its officers, directors, or partners or employees directly involved in obtaining contracts has been convicted of bribery, attempted bribery, or conspiracy to bribe under any federal, state, or local law.

24. NON-DISCRIMINATION IN EMPLOYMENT

The contractor agrees to comply with the non-discrimination in employment policies and/ or provisions prohibiting unlawful employment practices in County contracts as required by Section 11B 33 and Section 27 19 of the Montgomery County Code, as well as all other applicable state and federal laws and regulations regarding employment discrimination.

The contractor assures the County that, in accordance with applicable law, it does not, and agrees that it will not, discriminate in any manner on the basis of race, color, religious creed, ancestry, national origin, age, sex, marital status, disability, or sexual orientation.

The contractor must bind its subcontractors to the provisions of this section.

25. PAYMENT AUTHORITY

No payment by the County may be made, or is due, under this contract, unless funds for the payment have been appropriated and encumbered by the County. Under no circumstances will the County pay the contractor for legal fees. The contractor must not proceed to perform any work (provide goods, services, or construction) prior to receiving written confirmation that the County has appropriated and encumbered funds for that work. If the contractor fails to obtain this verification from the Office of Procurement prior to performing work, the County has no obligation to pay the contractor for the work.

If this contract provides for an additional contract term for contractor performance beyond its initial term, continuation of contractor's performance under this contract beyond the initial term is contingent upon, and subject to, the appropriation of funds and encumbrance of those appropriated funds for payments under this contract. If funds are not appropriated and encumbered to support continued contractor performance in a subsequent fiscal period, contractor's performance must end without further notice from, or cost to, the County. The contractor acknowledges that the County Executive has no obligation to recommend, and the County Council has no obligation to appropriate, funds for this contract in subsequent fiscal years. Furthermore, the County has no obligation to encumber funds to this contract in subsequent fiscal years, even if appropriated funds may be available. Accordingly, for each subsequent contract term, the contractor must not undertake any performance under this contract until the contractor receives a purchase order or contract amendment from the County that authorizes the contractor to perform work for the next contract term.

26. P-CARD OR SUA PAYMENT METHODS

The County is expressly permitted to pay the vendor for any or all goods, services, or construction under the contract through either a procurement card ("p-card") or a Single Use Account ("SUA") method of payment, if the contractor accepts the noted payment method from any other person. In that event, the County reserves the right to pay any or all amounts due under the contract by using either a p-card (except when a purchase order is required) or a SUA method of payment, and the contractor must accept the County's p-card or a SUA method of payment, as applicable. Under this paragraph, contractor is prohibited from charging or requiring the County to pay any fee, charge, price, or other obligation for any reason related to or associated with the County's use of either a p-card or a SUA method of payment.

27. PERSONAL PROPERTY

All furniture, office equipment, equipment, vehicles, and other similar types of personal property specified in the contract, and purchased with funds provided under the contract, become the property of the County upon the end of the contract term, or upon termination or expiration of this contract, unless expressly stated otherwise.

28. PROTECTION OF PERSONAL INFORMATION BY GOVERNMENT AGENCIES

In any contract under which Contractor is to perform services and the County may disclose to Contractor personal information about an individual, as defined by State law. Contractor must implement and maintain reasonable security procedures and practices that: (a) are appropriate to the nature of the personal information disclosed to the Contractor; and (b) are reasonably designed to help protect the personal information from unauthorized access, use, modification, disclosure, or destruction. Contractor's requirement to implement and maintain reasonable security practices and procedures must include requiring any third-party to whom it discloses personal information that was originally disclosed to Contractor by the County to also implement and maintain reasonable security practices and procedures related to protecting the personal information. Contractor must notify the County of a breach of the security of a system if the unauthorized acquisition of an individual's personal information has occurred or is reasonably likely to occur, and also must share with the County all information related to the breach. Contractor must provide the above notification to the County as soon as reasonably practicable after Contractor discovers or is notified of the breach of the security of a system. Md. Code Ann., State Gov't. § 10-1301 through 10-1308 (2013).

29. TERMINATION FOR DEFAULT

The Director, Office of Procurement, may terminate the contract in whole or in part, and from time to time, whenever the Director, Office of Procurement, determines that the contractor is:

- (a) defaulting in performance or is not complying with any provision of this contract;
- (b) failing to make satisfactory progress in the prosecution of the contract; or
- (c) endangering the performance of this contract.

The Director, Office of Procurement, will provide the contractor with a written notice to cure the default. The termination for default is effective on the date specified in the County's written notice. However, if the County determines that default contributes to the curtailment of an essential service or poses an immediate threat to life, health, or property, the County may terminate the contract immediately upon issuing oral or written notice to the contractor without any prior notice or opportunity to cure. In addition to any other remedies provided by law or the contract, the contractor must compensate the County for additional costs that foreseeably would be incurred by the County, whether the costs are actually incurred or not, to obtain substitute performance. A termination for default is a termination for convenience if the termination for default is later found to be without justification.

30. TERMINATION FOR CONVENIENCE

This contract may be terminated by the County, in whole or in part, upon written notice to the contractor, when the County determines this to be in its best interest. The termination for convenience is effective on the date specified in the County's written notice. Termination for convenience may entitle the contractor to payment for reasonable costs allocable to the contract for work or costs incurred by the contractor up to the date of termination. The contractor must not be paid compensation as a result of a termination for convenience that exceeds the amount encumbered to pay for work to be performed under the contract.

31. TIME

Time is of the essence.

32. WORK UNDER THE CONTRACT

Contractor must not commence work under this contract until all conditions for commencement are met, including execution of the contract by both parties, compliance with insurance requirements, encumbrance of funds, and issuance of any required notice to proceed.

33. WORKPLACE SAFETY

The contractor must ensure adequate health and safety training and/or certification, and must comply with applicable federal, state and local Occupational Safety and Health laws and regulations.

PMMD-45. Revised 11/01/2016

THIS FORM MUST NOT BE MODIFIED WITHOUT THE PRIOR APPROVAL OF THE OFFICE OF THE COUNTY ATTORNEY.

SECTION C - SPECIAL TERMS AND CONDITIONS

(Subject to selection on Bid Cover Sheet)

1. ADD OR DELETE

During the contract term, the County shall have the right to add or delete facilities to be served as may be considered necessary or desirable.

In the event the facilities are added, (except as provided herein) a mutually acceptable price for the routine service will be negotiated in a manner consistent with the contract terms. No payment will be made for facilities deleted.

2. ANNUAL PRICE ADJUSTMENT

Prices quoted are firm for a period of one year after execution of the contract. Any request for a price adjustment after this one-year period, is subject to the following:

- ◆ Approval or rejection by the Director, Office of Procurement or designee.
- ◆ Must be submitted in writing to the Director, Office of Procurement, and accompanied by supporting documentation justifying the Contractor's request. A request for any price adjustment may not be approved unless the contractor submits to the County sufficient justification to support that the Contractor's request is based on its net increase in costs in delivering the goods/services to the County under the contract terms.
- ◆ Must be submitted sixty (60) days prior to the contract expiration date, if the contract is being amended.
- ◆ May not be approved in an amount that exceeds the annual percentage change of the Consumer Price Index (CPI) for the twelve-month period immediately prior to the date of the request. The request must not exceed the CPI-U for Washington-Arlington-Alexandria, DC-VA-MD-WV, all items., unless a commodity or service group is specifically stated on the Bid Cover Sheet.
- ◆ The County will approve only one price adjustment for each contract term, if a price adjustment is approved. Should be effective sixty (60) days from the date of receipt of the contractor's request.
- ◆ Must be executed by written contract amendment.

3. CATALOG DISCOUNT PRICES

Prices are to be quoted in terms of Percentage Discount from a Current Price List, inclusive of all charges for delivery as specified herein. "List" shall be manufacturer's published catalogs and price lists and/or Contractor's own published catalogs and price lists. Sources of "List Prices" are to be clearly described on the Quotation Sheet.

Price increases as may be reflected in newly published price lists will be honored upon notification in writing and approval of the Director, Office of Procurement or the designee. The discount quoted shall remain firm for the entire contract period.

4. CATALOGS/PRICE LIST REQUIREMENTS

It will be the responsibility of the successful Contractor to provide current, complete manufacturer's catalogs including current styles, models, numbers, and latest published price lists within ten (10) working days of written notification of the County's intent to award a contract. Such material must be provided before finalization of any documents.

Should the vendor fail to provide such materials, the County may consider the bidder as nonresponsive and proceed with award of contract to next lowest responsive bidder.

5. CERTIFICATE OF ORIGIN

Certificate of origin must be submitted with delivery of units. Units delivered without Certificate of Origin and Owner Warranty will not be accepted.

6. CLEANING OF SITE

The Contractor shall at all times, keep the premises free from accumulation of waste materials or rubbish caused by the work performed. Upon completion of the work, waste materials, rubbish, and tools, equipment, machinery and surplus materials shall be removed from and about the project (job). All building surfaces and work areas are to be left "broom clean."

7. CONTRACT ADMINISTRATOR

A Contract Administrator shall be designated by the Director, Office of Procurement or authorized representative. Along with the duties and responsibilities outlined in Provision 6 – Contract Administration of the General Conditions for Contract between County and Contractor, the Contract Administrator shall be responsible for:

- A. Instructing the Contractor of the details of work required including the labor and the material/equipment to be used;
- B. Approving the Contractor's maintained record of time and material used for the job. The Administrator must sign and date these records;
- C. Approving the rental of equipment and/or tools that may be considered "not customary" to the trade;
- D. Inspecting all work performed and authorizes payment upon acceptance.

The designated Contract Administrator for the Department of Transportation is Jeffrey Riese, Division of Parking Management, 4th Floor 100 Edison Park Drive, Gaithersburg, Maryland 20878, Jeffrey.Riese@montgomerycountymd.gov, Fax # 240 777 8730, and Tel 240 777 8740.

The Contract Administrator for any other department will be listed on the Purchase Order or the Contract Amendment.

8. CONTRACT TERM

- A. The term of the contract is for one (1) year from the date of signature by the Director, Office of Procurement. Before the contract term ends, the Director may (but is not required to) renew this contract, if the Director determines that renewal is in the best interests of the County. The Contractor's satisfactory performance does not guarantee renewal of this Contract. The Director may exercise this option to renew for four (4) additional one-year periods.

- B. The contract term shall be for the period of time as stated on the Bid Cover Sheet.

9. CONTRACT VALUE

This is a Requirements Contract for providing a readily available source to serve at the County's discretion for the services specified. The estimated annual expenditure for such requirements as stated on the Quotation Sheet, represents only the County's best estimates, and is not to be taken as a guarantee of any specific dollar expenditure.

In addition, any jobs estimated to exceed \$15,000.00 will not normally be performed under this contract and, instead, may be subjected individually to competitive bidding procedures. Such determination will be made by the Director, Office of Procurement, when determined to be in the County's best interest.

10. CONTRACTOR RESPONSE

In an emergency situation, the Director, Office of Procurement or a designated representative may place a call, day or night, against this contract and the Contractor shall respond within a two (2) hour period to affect repairs/replacement as required. This provision will be used only during a declared Federal, State of Maryland, and/or local Maryland jurisdiction emergency or when any of the County's vital services are impaired, such as those of the Fire, Police, or Health Departments, or Detention Center. The

County will have a representative on the project that will be responsible for advising the Contractor of the problem and signing off on the Contractor's record of time and materials. The Contractor shall provide a phone number for emergency use outside normal business hours. In other than an emergency situation as described above, the Contractor is expected to respond within a twenty-four (24) hour period to calls for service.

11. CORRECTION OF WORK AFTER FINAL PAYMENT

The Contractor shall remedy any defects due to faulty material or workmanship and pay for any damage to other work resulting therefrom, which shall appear or occur within the guarantee period beginning with the date of final payment, or from the date of the County's substantial usage of the project, whichever is earlier. The County shall give notice of observed defects with reasonable promptness.

12. CORRECTION OF WORK BEFORE FINAL PAYMENT

The Contractor shall promptly remove from the premises all work condemned by the County as failing to conform to the contract, whether incorporated or not, and the Contractor shall promptly replace and re-execute condemned work in accordance with the contract and without expense to the County and shall bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

13. DAMAGE/SHORTAGE

The County will not accept any new units until all damage has been repaired and factory shortages have been received. The County shall not be liable for any equipment delivered which is damaged, short components, or is not fully prepared for service.

14. DEALER STATUS

Bidders, by offering quotations herein, certify that they are current authorized dealers in good status for all quoted manufacturers. Manufacturer's written certification of dealer status must be provided within ten (10) working days prior to award of the Contract, if so requested by the County at any time during the contract period. Should the Contractor lose dealer status at any time during the contract period for any contracted items, that portion of the contract will automatically be cancelled with no further obligation by the County.

15. DELAYS AND EXTENSION OF TIME

If the Contractor is delayed at any time in the delivery of Supplies, Material, Equipment and/or Services by any act or neglect of any separate Contractor employed by the County, or by changes ordered in the Supplies, Materials, Equipment and Services, or by strikes, lockouts, fires, unusual delay in transportation, unavoidable casualties or any causes beyond the Contractor's control, or by delay authorized by the County, the County shall decide the extent of such delay or the justification of any other delay, then the time of completion shall be extended for such reasonable time as the County may decide.

No charges or claims for damages may be made by the Contractor or paid to the Contractor for any delay, disruption, inefficiency, interference or hindrance from any cause whatsoever, whether foreseeable or not, including (i) acts or omissions by the County, its agents, employees or consultants, (ii) contract documents that are negligently prepared or contain inaccurate statements, or (iii) force majeure and circumstances beyond the Contractor's control. The sole remedy for delays, disruptions or hindrances will non-compensable time extensions for completion of the work.

This provision does not apply to claims that meet all of the following conditions:

- a. The claim arises under a contract awarded under a competitive sealed bid;
- b. The claim is for actual and direct damages incurred as a result of a delay in completing the construction project which is the subject of this contract;
- c. The contract establishes a specific time limit for completing the construction project and the claim is for critical path delays that prevent achievement of substantial completion of the contract within that time limit;
- d. The delay for which damages are claimed is caused by the County;

and

- e. The delay is not caused by actions taken by the County to protect the public health or safety or to conform to law.

A time extension may be granted only for a excusable delay that is beyond the Contractor's control and occurs without the Contractor's fault or negligence. No time extension will be granted in the absence of a written claim for the time extension. The claim must be received by the Department within 15 days after the date of the alleged cause for extension of time occurred. All claims for a time extension must state specifically the amount of delay that the Contractor believes to have been incurred and must include an analysis of how the delay affects completion of the project. If a claim for a time extension, including the facts and analysis specified above, is not received by the Department within the prescribed time, the claim is waived. No compensation must be paid for any time extensions.

16. DELIVERY INSTRUCTIONS

All deliveries are to be made to the locations identified and listed in the bid and are to be coordinated and scheduled with the individuals as indicated.

17. DEPARTMENTS AUTHORIZED TO USE CONTRACT(S)

The primary user of this contract will be the Department named on the Bid Cover Sheet. This agency is authorized to use its own internal Job Release System and Financial Department methods. All other users of this contract must route their usage through THE CONTRACTING OFFICER, or designee. Contractors are cautioned not to perform work for any other than the primary user without written authorization from the Director, Office of Procurement.

18. EQUIPMENT PREPARATION

New vehicles/equipment service and preparation, as recommended by the manufacturer, shall be completed by the successful Contractor prior to delivery. Equipment delivered shall be prepared and ready for the designed and intended service use. No dealer identification is to be affixed to any new units.

19. ESTIMATES

Prior to the commencement of work on any requirements, the Contract Administrator and the Contractor will prepare an "Estimate to Complete" containing the following:

- A. Brief description of the work to be performed.
- B. Number of labor hours and types of labor.
- C. Material cost estimate.
- D. Estimated completion date.

All estimates must be signed and dated by the Contract Administrator and the Contractor, and reference the contract number. A copy of the estimate must be sent to THE DIRECTOR, OFFICE OF PROCUREMENT; labeled "File with Contract."

20. FAILURE TO PERFORM/DELIVER

In the event of a Contractor's failure to comply with the established delivery schedule, the County reserves the right to make an open market purchase of the required materials and/or services, and to charge as damages, the difference between the established price and the actual cost incurred by the County and to collect such charges from the Contractor, from any money due under this contract, or any other contract with the County. Alternatively, the County may assess liquidated damages at the rate of 1% per day of the cost of such item or service for each day of delay beyond the established delivery date.

21. HEAVY DUTY

The term "heavy duty" shall be interpreted to mean, "the item shall be designed for unusual strain and/or severe service."

22. INVOICES

All true and corrected invoices and all inquiries regarding payment are to be sent to the Contract Administrator listed above to designated Capital Projects Managers by United States Postal Service, Courier or a copy emailed. Failure to promptly comply with this requirement must delay payment.

23. LABOR COSTS

The labor costs for other than normal straight time shall be billed to the County in accordance with labor agreements or the effective company policy. Said labor costs shall be adjusted to reflect only those actual costs paid or accrued by the Contractor and shall include the same rate percent (%) of profit as is included in the straight time labor rate.

24. MANUALS

The Contractor shall provide a minimum of two (2) copies of Operator's Manuals and one (1) copy each of Shop Manual and Parts Manual to be furnished upon delivery of the units.

25. MATERIAL AND WORKMANSHIP

The work shall be under the general direction of the Contractor but subject to the inspection of the Contract Administrator, or the authorized representative, who may require the Contractor to correct defective workmanship and materials without cost to the County.

All material and practices which are necessary, or which are normally provided and performed in order to accomplish the desired results, shall be furnished by the Contractor at the bid price and shall conform in strength, quality of material, appearance, and workmanship to that usually provided by the trade.

26. MATERIALS

The County reserves the right to furnish any or all materials for work under this contract. Normally, the Contractor will furnish required materials. Materials supplied by the Contractor shall be at Contractor's Cost including, if appropriate, material handling costs as part of material costs, shall include only costs clearly excluded from the Labor Hour rate. Material handling cost may include all appropriate indirect costs allocated to direct materials in accordance with the Contractor's usual accounting procedures. Contractor's charges for materials shall be based on established Catalog or List Price in effect when material is furnished, less all applicable discounts and in no event shall the price exceed the Contractor's sales price to its most favored customer for the same item in like quantity, or the current market price, whichever is lower.

27. METHOD OF ORDERING

It is the intention of the County to issue written purchase orders or blanket purchase order(s) to the contractor(s). If blanket purchase order(s) is/are issued, written individual releases against such blanket order(s) will be made by the using agency as required. Issuance of all purchase orders will be contingent upon appropriation of funds by the Montgomery County Council and encumbrance of such funds after July 1, of each year, as provided by the Montgomery County Code.

28. MULTIPLE AWARDS

In the event of multiple awards resulting from this solicitation, the contract period will approximate one (1) year, as it is the County's intent that all contracts awarded under this solicitation terminate on the same date.

29. NET PRICES

Prices are net, inclusive of all charges for transportation FOB Destination, freight prepaid and allowed, and inside delivery, and all other charges necessary for performance under the Contract. Prices are less Federal, State, and Local taxes.

30. NEW MATERIALS

Unless this contract specifies otherwise, the Contractor represents that the supplies and components are new and are not of such age or so deteriorated as to impair their usefulness or safety.

31. OPTION TO INCREASE QUANTITIES

Montgomery County reserves the right, at its option, to increase the quantities for any item awarded, not to exceed 100% of the quantities shown on the Quotation Sheet(s). The County reserves the right to purchase additional units within the date shown by the bidder on the Quotation Sheet(s), or within six (6) months of the date that the initial award is made, whichever is later. The Contractor agrees to accept such increases at the same unit prices as provided in the initial contract for the initial quantities. No guarantee of purchases of

any specific quantity or total dollar amount is made. In addition, all purchases are contingent upon the appropriate fiscal funding.

32. ORDERING TERMS

Orders for goods/services that are placed before the expiration of the contract term and are to be started and/or completed before the expiration of the contract are to be honored with all terms, conditions, and prices of the Contract in effect until the final delivery of goods and/or completion of the work is made and accepted by the County.

33. PARTS/SERVICE

To best serve the needs and interests of Montgomery County, it is the intention of these specifications to secure bids only on units which can be efficiently maintained and serviced without the necessity of the County stocking expensive parts, or being subject to the inconvenience of frequent and/or long periods of interrupted service due to non-availability of parts. Bidders shall specify nearest location of parts depots from which parts may be obtained at any time during the day or night.

34. PAYMENTS

Payment shall be made upon submission of invoices on a monthly basis, by the first day of the month, for all work performed during the previous month. Invoices are to be supported by records of "Time and Material", with the approval signature of the Contract Administrator (or designee). Material prices shall be subject to verification. A copy of paid receipts for material/equipment used or installed for each job performed shall be submitted with invoice only when material purchased for a specific job is of a major cost and when such record is requested by the Director, Office of Procurement.

The Contractor shall be required to adhere to the following procedure for requesting payments from the Montgomery County Department of Transportation:

- a. The sample format in attachment "G" or one similar to it shall be used.
- b. The estimate shall typed on company letterhead.
- c. The original and four copies shall be submitted directly to Mr. Adrian Q. Labor., Capital Projects Manager, 100 Edison Park Drive, 4th floor, Gaithersburg, Maryland, 20878.
- d. The Contractors name, MCDOT CIP Project number, project name, and estimate number shall appear on the top of each page of the estimate; including the signature page.
- e. Signature page shall include total amount due on the estimate.
- f. Estimates shall list all items as they appear in the contract documents including change orders.
- g. Field orders shall appear on the estimates separate from contract items and change orders and shall have no retention withheld.
- h. A 10% retainage shall be withheld from each monthly payment request. The total retainage should be included in the final payment request and will be paid upon completion of the project and acceptance of the work by the County.
- i. Should you have any questions, contact Adrian Q. Labor, Capital Projects Manager at 240-777 8725

35. PERFORMANCE BOND

No contract shall exist until the County receives a duly executed Performance Bond (or Certified or Treasurers Check or Irrevocable Letter of Credit) prepared on an approved form in the amount of \$250,000.00. The bond must be made payable to Montgomery County, as security for the faithful performance of the contract and having as surety thereon such surety company or companies as are acceptable to the County and as are authorized to transact business in the State of Maryland. In the event the Performance Bond is not delivered within ten (10) days of Notice of Award then the offer may be ruled null and void and the award made to the next lowest responsive bidder. The County reserves the right of approval of any instrument offered as a Performance Bond.

The Performance Security will provide assurance of faithful performance and discharge of all duties and responsibilities attendant thereto required by law or as provided herein by the Contractor of all ASPECTS, TERMS AND

CONDITIONS of the contract and shall be maintained in full force and effect until the termination of this agreement.

36. (This provision has been intentionally left blank)

37. PROTECTION OF EXISTING FACILITIES

The Contractor shall take all necessary precautions during the period of service to protect existing County facilities from damage by the Contractor, Contractor's employees, subcontractor or subcontractor's employees and shall repair or replace, at the Contractor's own expense, any damaged property caused by the Contractor, Contractor's employees, subcontractor or subcontractor's employees.

38. PURCHASE OF GOODS BY NON-PROFIT ORGANIZATIONS

Pursuant to the requirements set forth in the Montgomery County Code, Chapter 11B-49, the Contractor agrees to extend the same terms, conditions, and prices for the goods provided by the Contractor pursuant to this contract to those Non-Profit organizations which may need the goods in order to perform a contract with the County. Non-Profit Organizations are defined as those organizations that are exempt from taxation under Section 501(c) (3) of the Internal Revenue Code but are not defined as a "public entity" under subsection (n) of Chapter 11B-1 of the Montgomery County Code.

39. PURCHASE ORDERS/JOB RELEASES

Prior to the commencement of work, THE DIRECTOR, OFFICE OF PROCUREMENT or authorized representative, shall authorize each project (job). Such authorization shall be in the form of a Purchase Order or Agency Job Release Number, as appropriate. The authorization shall include a general description of the required work, special instructions, estimated value (from Estimate to Complete), and the name of the individual designated as the Contract Administrator.

40. QUANTITIES

It is estimated that yearly expenditures under this contract will approximate the quantities listed on the Quotation Sheet. Under the terms of this Invitation for Bids, however, the resultant contract shall be considered a "requirements-type" contract only. No guarantee of purchases of any specific yearly quantity or total dollar amount is made. In addition, all purchases are contingent upon the appropriation and encumbrance of fiscal funding.

41. SAFETY STANDARDS

The vehicles/equipment, to include components, furnished under these specifications shall comply with all applicable Federal and Maryland State Standards.

42. SERVICE

The Contractor must be able to provide a qualified local service facility offering a fixed cost annual maintenance agreement (parts and labor) for on-site repairs. The cost of such Annual Maintenance, the location of the service facility, average response time, and contact person is to be included in the appropriate spaces on the Solicitation, Bid, and Award Sheets.

43. SITE INSPECTION

Each bidder is encouraged to visit each facility in order to become familiar with actual site conditions. Failure to visit each facility and to become completely knowledgeable of the requirement of work shall in no way relieve them of all provisions contained in the Invitation for Bids. Site inspections may be arranged by calling Adrian Q. Labor, Capital Projects Manager at 240-777 8725

44. TRAVEL TIME

No payment for travel time to or from a job site shall be charged. Charges begin when the Contractor arrives at each job site and end when the Contractor leaves each job site. The Project Coordinator or Contract Administrator will verify time records.

45. WARRANTY

The manufacturer shall provide, with the bid submission, a detailed listing of items that will be covered under the provision of warranty. The terms of warranty shall include period of warranty both in mileage and time. In

addition, the manufacturer is to provide a list of the number of dealers as indicated on the Bid Cover Sheet, other than the selling dealer, within the stated miles radius of Rockville, Maryland that will provide priority warranty repair.

46. LABOR AND MATERIAL PAYMENT BOND

The Contract is not valid until and unless the County receives a duly executed Labor and Material Payment Bond (Certified or Treasurer's Check or Irrevocable Letter of Credit) that is in an approved form, in the amount of 95% of the Total Base Bid, and is made payable to Montgomery County, as security that guarantees payment to suppliers, and subcontractor of the prime contractor of the Contract and having as surety thereon such surety company or companies as are acceptable to the County and as are authorized to transact business in the State of Maryland. The Contractor must maintain the Labor and Material Payment Bond in full force and effect until the termination of the Contract. The county has the right to approve, disapprove or require changes to any instrument offered as a Labor and Material Payment Bond. If the County does not approve the Labor and Performance Payment Bond, the Contractor has until the close of business ten (10) calendar days from the date of disapproval to furnish an acceptable Labor and Material Payment Bond. If not corrected, the County has the option to rescind the recommended award and to commence negotiations with the next highest rated offeror. The Labor and Material Payment Bond must provide assurance of the Contractor's guarantee payment to its suppliers and subcontractors of the prime contractor.

47. PROFESSIONAL SERVICES

The Contractor is required to provide the professional services necessary to perform the work on this project. Professional Services will not be measured for payment but the cost of the services shall be considered incidental to the pertinent item of work.

48. CERTIFICATION OF PAYMENT TO SUBCONTRACTORS AND SUPPLIERS

The Contractor at the time of request for semi-final payment of retention under a contract covered hereunder shall certify in writing that he has made payment from proceeds of prior payments, and that he will make timely payment from the proceeds of the final payment then due him, to his subcontractors and suppliers in accordance with his contractual arrangements with them in conformance with Section 9-112 of the Real Property Article of the Annotated Code of Maryland (1974).

49. LIQUADTED DAMAGES

The Contractor is hereby advised that liquidated damages in the amount of **Five Hundred (\$500) Dollars per Calendar Day** will be assessed for unauthorized extensions beyond the contracted time of completion.

50. NON-PRE-PRICED ITEMS

Quotes for non pre-priced items related to any task issued will be based on **RS Means, meanscostwork.com Data.**

SECTION 010000 – UNIT QUANTITY WORK ITEMS

PART 1 - GENERAL

1.1 1.1 UNIT QUANTITIES SPECIFIED

- A. Initially, Contract Sum will be deemed to include, for all Unit Price Work, amount equal to sum of established unit prices for each separately identified item of Unit Price Work times estimated quantity of each item as indicated in the Bid Form and/or Schedule of Values.
- B. Estimated quantities of items of Unit Price Work are not guaranteed and are solely for purpose of comparison of Bids and determining initial Contract Sum. Owner reserves right to increase or decrease quantities at same unit cost, as required by job conditions. Review and approval of actual quantities and classifications of Unit Price Work performed by Contractor will be by the Engineer.
- C. The Engineer shall have right under Contract to make increases and decreases in quantities and changes in plans, as may be necessary to ensure completion of contemplated Work.

1.2 1.2 PAYMENT

- A) Progress payments on account of Unit Price Work will be based on number of units completed.
- B) The Engineer will review and approve actual quantities and determine classification of Unit Price Work performed by Contractor. The Engineer will review Contractor's preliminary determinations on such matters before rendering written decision thereon (by recommendation of Application for Payment or otherwise). The Engineer's written decisions thereon will be final and binding upon Owner and Contractor, unless within ten days after date of any such decision, either Owner or Contractor delivers to the other party to their Agreement, and to the Engineer, written notice of intention to appeal such decision.
- C) Each unit price will be deemed to include the amount considered by the Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

1.3 1.3 DEFECT ASSESSMENT

- A) Replace the Work, or portions of the Work, not conforming to specified requirements.
- B) If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer.

2. The defective Work will be partially repaired in accordance with the instructions of the Engineer, and the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer.
 3. The individual Specification Sections may modify these options or may identify a specific formula or percentage sum/price reduction.
- C) The authority of the Engineer to assess the defect and to identify payment adjustment is final.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 DESCRIPTION OF UNIT QUANTITY WORK ITEMS

- D) Unless otherwise described on the Drawings or elsewhere in the Specifications, Unit Quantity Work noted on the Bid Form, or in the Schedule of Values, shall include the following:

1. General Conditions:
 - a. Setting up and maintaining all necessary general conditions, insurance, temporary protection and facilities, and maintenance of traffic provisions required by state laws and city ordinances. This Work also includes the general mobilization and demobilization of equipment required for completion of the Work as per Contract Documents and in accordance with material manufacturer's recommendations or work ordered by the Engineer. This Work item shall not include any overhead or profit for unit quantity or lump sum contract work included, or incidental, to other work items.
 - b. This Work shall include all coordination and procurement of all necessary building permits, excluding the actual cost of Building Permits. This Work also includes the cost of a municipal consultant, if required, to expedite the procurement of permits. Actual cost of building permit will be separately reimbursed to Contractor by Owner via change order.
2. Fan Repairs/Replacement (Bid Items A.1):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace fans in their entirety or sub-components (listed below) as required to repair the fan.
3. Replace Belts (Bid Items A.1.1):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace fan belts in their entirety.
 - b. Unit of Measurement: Each.
 - c. Per fan in the following size categories:
 - 1) Up to 10 HP

- 2) 15 to 20 HP.
 - 3) 25 to 30 HP.
 - 4) 35 to 40 HP.
 - 5) 45 to 60 HP.
- b.
4. **Replace Motors (Bid Items A.1.2):**
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace fan motors in their entirety.
 - b. Unit of Measurement: Each.
 - c. Per fan in the following size categories:
 - 1) Up to 10 HP.
 - 2) 15 to 20 HP.
 - 3) 25 to 30 HP.
 - 4) 35 to 40 HP.
 - 5) 45 to 60 HP.
- c.
5. **Replace Fans (Bid Item A.1.3):**
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace fans in their entirety.
 - b. Unit of Measurement: **Each**.
 - c. Per fan in the following **size** categories:
 - 1) Up to 10 HP.
 - 2) 15 to 20 HP.
 - 3) 25 to 30 HP.
 - 4) 35 to 40 HP.
 - 5) 45 to 60 HP.
- d.
6. **Replace Starter/Disconnect (Bid Item A.1.4):**
 - a. This Work includes **all** labor, materials, **equipment** and incidentals necessary to replace fan starter/disconnects in their **entirety**.
 - b. Unit of Measurement: Each.
 - c. Per fan in the following size categories:
 - 1) Up to 10 HP.
 - 2) 15 to 20 HP.
 - 3) 25 to 30 HP.
 - 4) 35 to 40 HP.
 - 5) 45 to 60 HP.
7. **Replace VFDs (Bid Item A.1.5):**
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace fan VFDs in their entirety.
 - b. Unit of Measurement: **Each**.
 - c. Per fan in the following **size** categories:
 - 1) Up to 10 HP.

- 2) 15 to 20 HP.
 - 3) 25 to 30 HP.
 - 4) 35 to 40 HP.
 - 5) 45 to 60 HP.
8. Replace CO/NO2 Monitoring & Control (Bid Items A.2)
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace CO/NO2 Monitoring & Control in its entirety or sub-components (listed below) as required to repair the system as listed as follows:
 9. Replace CO Detector/Transmitter (Bid Items A.2.1):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace CO Detector/Transmitter in its entirety.
 - b. Unit of Measurement: Each.
 - 1) Electro-chemical based, wired, 50' radius.
 - e.
 10. Replace NO2 detector/transmitter (Bid Item A.2.2):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace NO2 Detector/Transmitter in its entirety.
 - b. Unit of Measurement: Each.
 - 1) Electro-chemical based, wired, 50' radius.
 - f.
 11. Replace Monitor/Controller (Bid Item A.2.3):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace Monitor/Controller in its entirety.
 - b. Unit of Measurement: Each.
 - 1) 3 zone, 96 transmitters, output signals to relays or BMS
 12. Replace Remote Annunciator (Bid Item A.2.4):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace Remote Annunciator in its entirety.
 - b. Unit of Measurement: Each.
 - 1) Audible/Visual Alarm.
 13. Replace Factory Calibrated Cartridge (Bid Item A.2.5):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace Factory Calibrated Cartridge in its entirety.
 - b. Unit of Measurement: Each.
 - 1) CO/NO2 detector cartridge.
 - g.
 14. Replace Power Transformer (Bid Item A.2.6):

- a. This Work includes all labor, materials, equipment and incidentals necessary to replace Factory Calibrated Cartridge in its entirety.
 - b. Unit of Measurement: Each.
 - 1) 120V to 24V **transformer**.
 - h.
15. **Testing, Adjusting & Balancing (TAB) (Bid Item A.3):**
- a. This Work includes all labor, materials, equipment and incidentals **necessary** to verify DDC system components and operation, Test, Adjust & Balance garage ventilation air systems in their entirety or a sub-component as listed below:
16. **TAB (Bid Item A.3.1):**
- a. This Work includes all labor, materials, equipment and incidentals necessary to verify DDC system components and operation, Test, Adjust & Balance garage ventilation air systems in their entirety or a sub-component as listed below:
 - b. Unit of Measurement: Each
 - c. Per fan in the following size categories:
 - 1) Fractional to 10 HP by certified balancing contractor.
 - 2) 15 to 20 HP by certified balancing contractor.
 - 3) 25 to 30 HP by certified balancing contractor.
 - 4) 35 to 40 HP by certified balancing contractor.
 - 5) 45 to 60 HP by certified balancing contractor.
17. **HVAC Cleaning (Bid Item A.4):**
- a. This Work includes all labor, materials, equipment and incidentals **necessary** to clean garage ventilation air systems in their entirety or partially as listed below:
18. **Clean Ductwork (Bid Item A.4.1):**
- a. This Work includes all labor, materials, equipment and incidentals **necessary** to clean ductwork in its entirety or partially as listed below:
 - b. Unit of Measurement: Square Foot
 - 1) Clean ductwork by contractor certified in air system cleaning.
19. **Clean Louvers (Bid Item A.4.2):**
- a. This Work includes all labor, materials, equipment and incidentals necessary to clean louvers in their entirety or partially as listed below:
 - b. Unit of Measurement: Square Foot
 - 1) Clean louvers by contractor certified in **air system** cleaning.
20. **Clean Air Shaft Walls, Floors, Ceiling (Bid Item A.4.3):**
- a. This Work includes all labor, materials, equipment and incidentals necessary to clean air shafts in their entirety or partially as listed below:
 - b. **Unit of Measurement: Square Foot**

- 1) Clean air shaft walls, floors, and ceilings by contractor certified in air system cleaning.
21. Measurement and Reporting of Fan Motor Starting Current (Bid Item B.1.1):
 - a. This Work includes all labor, materials, equipment, data logger, and incidentals necessary to measure the starting currents as listed below:
 - b. Unit of Measurement: Each.
 - c. Per fan in the following size categories:
 - 1) Up to 10 HP.
 - 2) 15 to 20 HP.
 - 3) 25 to 30 HP.
 - 4) 35 to 40 HP.
 - 5) 45 to 60 HP.
 22. DDC System Validation, Documentation & Programming Modifications (Bid Item B.1.2):
 - i.
 - a. This Work includes all labor, materials, equipment and incidentals necessary to validate and document the existing DDC system program logic. Modify CO/NO2 Monitoring & Control system by sensor and component (dampers, actuators, fans and motor starters) in its entirety or sub-components as required to repair or upgrade the system:
 - b. Unit of Measurement: System / Node
 23. Garage Exhaust System Validation and Documentation (Bid Item B.1.3):
 - j.
 - a. This Work includes all labor, materials, equipment and incidentals necessary to validate and document the proper operation and functionality of the entire DDC based CO/NO2 Monitoring & Control system. Verify system commands, actuator/damper response, fan response, and annunciation for the entire system:
 - b. Unit of Measurement: System / Node
 24. Garage Exhaust DDC System Demonstration and Training (Bid Item B.1.4):
 - k.
 - a. This Work includes all labor, materials, equipment and incidentals necessary to demonstrate and train the proper system operation to the owner and his facility staff.
 - b. Base extent of training on scope and complexity of DDC system indicated and training requirements indicated. Provide extent of training required to satisfy requirements even if more than minimum training requirements are indicated.
 - c. Unit of Measurement: System
 25. Complete System Identification (Bid Item B.1.5):
 - l.
 - a. This Work includes all labor, materials, equipment and incidentals necessary to validate, document, identify and update the existing garage exhaust identification system by component (controller, sensor, actuator, fan, and starter) as follows:
 - 1) Control Equipment, Instruments, and Control Devices: Engraved tags.

- 2) Equipment Warning Labels: Acrylic label with pressure-sensitive adhesive back and peel-off protective jacket.
 - b. Unit of Measurement: Each ID tag
 - 2.
26. Replace Electrical Conduit and Wiring (Bid Item B.2.1):
 - a. This Work includes all labor, materials, **equipment** and incidentals **necessary** to remove existing conduit / wiring, and then **provide** and install new conduit and wiring as follows:
 - 1) Intermediate metal conduit, ¾" diameter, to 10' high, including 2 terminations, 2 elbows, 11 beam clamps, and 11 couplings per 100 LF.
 - 2) Intermediate metal conduit, 1" diameter, to 10' high, including 2 terminations, 2 elbows, 11 beam clamps, and 11 couplings per 100 LF.
 - 3) Intermediate metal conduit, 1-1/2" diameter, to 10' high, including 2 terminations, 2 elbows, 11 beam clamps, and 11 couplings per 100 LF.
 - 4) Intermediate metal conduit, 2-1/2" diameter, to 10' high, including 2 terminations, 2 elbows, 11 beam clamps, and 11 couplings per 100 LF.
 - 5) Wire, copper solid, 600V, #12, type THW, in raceway.
 - 6) Wire, copper solid, 600V, #10, type THW, in raceway.
 - 7) Wire, copper solid, 600V, #8, type THW, in raceway.
 - 8) Wire, copper solid, 600V, #6, type THW, in raceway.
 - 9) Low Voltage Control Cable, copper twisted, 18 AWG, type CMG, in raceway.
 - 10) Low Voltage Control Cable, copper twisted, 16 AWG, type CMG, in raceway.
 - 11) Class 1, Control Circuit Conductors, stranded copper, type THHN/THWN in raceway.
 - 12) Class 2, Control Circuit Conductors, stranded copper, type THHN/THWN in raceway.
 - 13) Class 3, Control Circuit Conductors, stranded copper, type THHN/THWN in raceway.
 - b. Unit of Measurement as follows:
 - 1) Conduit: Linear Foot.
 - 2) Wire: 100 Linear Foot.
27. Replace Motor Starter Fuses (Bid Item B.2.2):
 - a. This Work includes all labor, materials, equipment and incidentals necessary to replace motor starter primary cartridge fuse set in its entirety.
 - b. Unit of Measurement: Each set of fuses.
28. Replace Power Transformer (Bid Item B.2.3):
 - a. This Work includes all labor, materials, **equipment** and incidentals **necessary** to replace motor starter thermal overload set **in its entirety**.
 - b. Unit of Measurement: Each set of OL's.
29. Other work not listed above but listed on the Bid Form or Schedule of Values, shall be performed in accordance with the details and notes on the Drawings and related

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Specifications. The Work shall include all labor, materials, equipment, and incidentals necessary to complete the Work as shown on the Drawings as directed by the **Engineer**.

30. Payment for the Work **shall** be made on the unit basis noted.

END OF SECTION 010000

SECTION 010100 – SUMMARY OF WORK

PART 4 - GENERAL

4.1 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.

4.2 SECTION INCLUDES

- A. Contract description.
- B. Contractor use of site and premises.
- C. Future work.
- D. Work sequence.
- E. Owner occupancy.

4.3 CONTRACT DESCRIPTION

- A. Contract Type: Stipulated price and unit prices.
- B. Agreement Form: As agreed upon between Owner and Contractor.
- C. Intent of Drawings and Specifications: The intent of the Drawings and Specifications is to describe the Work which the Contractor undertakes to do, in full compliance with the Contract, and it is understood that the Contractor will furnish all materials, machinery, equipment, tools, supplies, transportation, labor, and all other incidentals necessary to the satisfactory prosecution and completion of the Work. The Drawings and Specifications are complementary, and what is called for by either is as binding as if called for by both.
- D. The Special Conditions shall control where in conflict **with** the Standard Specifications. However, such portions of the Standard Specifications not in conflict with, or not rendered meaningless by, the Special Provisions shall remain in full force and effect and be binding on the parties hereto.
- E. In the event the Contractor discovers any error or discrepancy **in** the Contract Documents, **he** shall immediately call upon the Engineer for his decision. The Engineer shall then make such corrections and interpretations as may be deemed necessary for the fulfillment of the **intent** of the

Specifications, Special Provisions, Drawings and other Contract Documents, as construed by him and his decision shall be final.

4.4 SCOPE OF WORK

- A. Work under this Contract includes the repairs to County garages using details, materials and methods as shown on the Drawings, noted in the Specifications, and listed on **the** Bid Form or Schedule of Values.

4.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
1. Owner occupancy.
 2. Work by others and work by Owner.
 3. Access by the general public.
- B. Existing emergency building exits shall be usable all times during construction.
- C. Driveways, Walkways and Entrances: Keep driveways, loading areas and entrances **servicing** premises **clear** and available to Owner, Owner's employees and emergency vehicles at all times. Do not use these areas for parking or storage of materials **unless** otherwise allowed by Owner.
1. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- D. Construction Operations: Limit to areas noted on Drawings or as directed by the Engineer or owner.

4.6 ALTERATIONS, CANCELLATIONS AND DEDUCTIONS

- A. In the event, **in** the sole judgment of the **Engineer** or his representative, a change becomes necessary in the best interest of the project, **due** to circumstances not known at the time the Contract was entered **into** or arising **thereafter**, the Engineer may, during the course of the Work, alter the Scope of Work, add such work as may be necessary and increase or decrease the quantities of Work to be performed in accordance with such changes, including addition **to**, **the** deduction from, or cancellation of, any one or more of the unit price items or lump sum items. Such changes shall not be considered as a waiver of any conditions of **the** Contract nor invalidate any of the provision thereof.
- B. Where the added Work and materials do not appear as specific items in the Contract, accompanied by unit prices, and which, of themselves, or in conjunction with other changes, constitute a major change, and the parties cannot agree on the compensation to be paid for said work and materials,

the Work may be designated by the Engineer as Extra Work and paid for as specified in paragraph 1.7 of these Specifications.

- C. All alterations, cancellations and deductions shall be authorized in writing by the Engineer before work is stated, subject to the approval of the Owner. Such authorizations shall set up the items of work involved and the method of payment for each item.
- D. Claims for Extra Work which have not been authorized in writing by the Engineer and approved by the Owner will be rejected and the Contractor shall not be entitled to payment for the Work.

4.7 EXTRA WORK

- A. If, during the course of construction, it becomes necessary to have work performed of a nature or scope related to, but not clearly covered by the Contract, the Contractor shall perform the work at the request of the Engineer. The Engineer shall advise the Contractor of the character and extent of such work in such sufficient detail as to enable the Contractor and the Owner to mutually agree upon terms for performing the contemplated additional work.
- B. The Engineer may, during an emergency, require the performance of Extra Work by oral direction in order to save life or property. Such oral direction shall be promptly confirmed in writing by the Engineer. The Contractor shall perform the emergency work immediately upon receipt of oral direction from the Engineer and shall not delay performance thereof pending agreement between the Contractor and the Owner as to price or prices and basis for payment.

4.8 UNAUTHORIZED WORK

- A. Work performed which is not provided for in the Contract, and work done beyond limits shown on the Plans or as directed, or Extra Work done without written authorization will be considered as unauthorized, shall be at the expense of the Contractor and will not be measured or paid for by the Owner. Work so done may be ordered removed and replaced at the Contractor's expenses, at the sole discretion of the Engineer.

4.9 WORK SEQUENCE

- A. Construct Work in stages to accommodate Owner's occupancy requirements during the construction period. Coordinate construction schedule and operations with Engineer and Owner. Contractor's bid for the Work shall be based on a projected phasing sequence to accommodate the Owner's occupancy requirements.

4.10 OWNER OCCUPANCY

- A. The Owner will occupy the garage during the entire period of construction. No more than 42 parking spaces may be blocked off for construction purposes during any phase of work. Vehicular access to all levels of the garage must be maintained continuously every day.

- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy. All work must be performed between the hours of 8:30 A.M and 4:30 P.M.

4.11 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- C. Noise, Vibration and Odors: Coordinate operations that may result in high levels of noise and vibration, odors or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- D. Safety and Health Standards Compliance: The Contractor shall comply (and shall ensure that firms acting as agents or subcontractors to the prime Contractor also comply) with all applicable OSHA Safety and Health Standards for Construction (29CFR1926) and OSHA General Industry Occupational Safety and Health Standards (29CFR1910). Additionally, the Contractor shall comply with all applicable site safety and health requirements. The Owner will provide guidance/consultation regarding specific site requirements.
 - 1. Special Emphasis Standards: While the Contractor is responsible for compliance with all applicable OSHA Safety and Health Standards, special emphasis will be placed upon the following:
 - a. Provide daily monitoring of carbon monoxide in accordance with OSHA and EPA requirements when internal combustion equipment is being used inside the garage. The Contractor shall maintain a log showing daily measured levels which shall be made available to the Engineer and presented at each construction progress meeting. The Contractor shall provide necessary ventilation equipment in order to meet OSHA and EPA requirements.
 - b. Provide dust barriers around work and storage areas and at all openings to interior spaces, storage areas and sensitive machinery or equipment. Dust barriers shall be secured without damage to doors, frames, any other existing materials from the floor to the ceiling where practical and be designed to prevent construction dust and debris from entering the building interior. Dust barriers shall be defined by orange

construction fencing and appropriate safety signage where accessible to pedestrians. Building components affected by general work procedures or work generated dust shall be cleaned or repaired as required to restore the component to its pre-construction condition. Provide fans to collect dust and filter air in the work areas inside of the garage.

- c. Provide filter fabric on all garage fans. **Filter** fabric must be changed at least once per week whenever dust generating work takes place during that week. Filter fabric on fans inside work areas must be changed twice per week. Contractor must clean all the fans at end of the project and have associated bearings lubricated.

- E. Nonsmoking Campus: Smoking is not permitted anywhere on the property.

- F. **Controlled Substances:** Use of tobacco products and other controlled substances on the property is not permitted.

- G. **Employee Identification:** Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

- H. **Employee Screening:** Comply with Owner's requirements for dug and background screening of Contractor personnel working on Project site.

4.12 RESTORATION AND CLEAN-UP

- A. During the construction period, the Contractor shall, on a daily basis, place all of his waste materials and "non-broomable" debris into containers.

- B. Contractor is responsible to assure that filtration of concrete materials occurs appropriately prior to entering the garage drainage system. Drainage clogged as a result of work shall be remedied immediately by the Contractor at no expense to the Owner. If necessary, concrete runoff and clean solutions shall be treated prior to entering drainage per EPA guidelines. If there is a sump and its condition differs significantly at the end of the project from its condition during the pre-construction survey, the Contractor shall be responsible for any additional charges beyond regular service charges to clean the sump.

- C. Upon completion of the Work and before acceptance and final payment is made, the Work shall be cleaned of all rubbish, excess materials, false work, temporary structures and equipment; and all parts of the Work shall be left in a neat, presentable condition, satisfactory to the Owner. This Work shall be considered incidental to the overall project and no additional compensation will be allowed.

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PART 5 - PRODUCTS (Not Used)

PART 6 - EXECUTION (Not Used)

END OF SECTION 010100

SECTION 010350 – MODIFICATION PROCEDURES

PART 7 - GENERAL

7.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

7.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 2. Division 01 Section "Submittals" for requirements for the Contractor's Construction Schedule.
 - 3. Division 01 Section "Application for Payment" for administrative procedures governing applications for payment.
 - 4. Division 01 Section "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

7.3 MINOR CHANGES IN THE WORK

- A. Supplemental instructions authorizing minor changes in the work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Engineer on AIA Form G710, Architect's Supplemental Instructions.

7.4 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the work that will require adjustment to the Contract Sum or Contract Time will be issued by the Engineer, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by the Engineer are for information only. Do not consider them an instruction either to stop work in process or to execute the proposed change.
 - 2. Unless otherwise indicated in the proposal request, within 20 days of receipt of the proposed request, submit to the Engineer for the Owner's review an estimate of cost unnecessary to execute the proposed change.

- a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable **taxes**, delivery charges, equipment rental and amounts of trade discounts.
 - c. Include a statement indicating **the effect** the proposed change in the work will have on the Contract **Time**.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by **submitting** a request for a change to the Engineer.
1. Include a statement outlining the 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 Contract Time.
 2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 3. Indicate applicable **taxes**, delivery charges, equipment rental and amounts of trade discounts.
 4. Comply with requirements in Section "Product Substitutions" if the proposed **change** in the work requires the substitution of one product or system for a product or **system specified**.
- C. Proposal Request Form: **Use** AIA Document G709 for Change Order Proposal Requests.

7.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Engineer may issue a Construction Change Directive on AIA Form G714, instructing **the Contractor** to proceed with a change in the work, for subsequent inclusion in a **Change Order**.
1. **The Construction Change Directive** will contain a complete description of the change in the work and designate the method to be followed to determine change in the Contract Sum or 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 the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

7.6 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a **Change Order Proposal Request**, the Engineer will issue a Change Order for signatures of the Owner and Contractor on AIA Form G701, as provided in the **Conditions** of the Contract.

PART 8 - PRODUCTS (Not Used)

PART 9 - EXECUTION (Not Used)

END OF SECTION 010350

SECTION 010400 – PROJECT COORDINATION

PART 10 - GENERAL

10.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

10.2 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for project coordination, including, but not necessarily limited to:
 - 1. Coordination.
 - 2. Administrative and supervisory personnel.
 - 3. General installation provisions.
 - 4. Cleaning and protection.
- B. Field engineering is included in Section "Field Engineering".
- C. Progress meetings, coordination meetings and pre-installation conferences are included in Section "Project Meetings".
- D. Requirements for the Contractor's Construction Schedule are included in Section "Submittals".

10.3 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different Sections of the specifications that are dependent upon each other for proper installation, connection and operation.
 - 1. Where installation of one part of the work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports and attendance at meetings.

- C. **Administrative Procedures.** Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project close-out activities.

10.4 SUBMITTALS

- A. **Coordination Drawings:** Prepare and submit coordination drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
1. Show the interrelationship of components shown on separate shop drawings.
 2. Indicate required installation sequences.
 3. Comply with requirements contained in Section "Submittals".
 4. Refer to Division 13 Section "Basic Mechanical Requirements" and Division 16 Section "Basic Electrical Requirements" for specific coordination drawing requirements for mechanical and electrical installations.
- B. **Staff Names:** Within 15 days of Notice-to-Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
1. Post copies of the list in the project meeting room, the temporary field office and each temporary telephone.

PART 11 - PRODUCTS (Not Used)

PART 12 - EXECUTION

12.1 GENERAL INSTALLATION PROVISIONS

- A. **Inspection of Conditions:** Require the Installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. **Manufacturer's Instructions:** Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.

- C. Inspect materials or equipment **immediately** upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.
- F. Recheck **measurements** and dimensions before starting each installation.
- G. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, submit, to the Engineer for approval, proposed mounting heights based on standard mounting heights recognized within the industry for the particular application indicated and coordinated with all other installed equipment and system.

12.2 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction **as** frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure **operability** without damaging effects.
- C. Limiting Exposures: Supervise construction activities 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. Where applicable, such exposures include, but are not limited to, the following:
 - 1. **Excessive** static or dynamic loading.
 - 2. **Excessive** internal or external pressures.
 - 3. **Excessively** high or low **temperatures**.
 - 4. **Thermal** shock.
 - 5. Excessive high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.

REFURBISHMENT OF PARKING GARAGE'S STORM, SANITARY, AND
WASHDOWN SYSTEMS: PIPES VALVES, ACTUATORS WITH
INTEGRATED ELECTRIC/PNEUMATIC CONTROL PACKAGES
MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION
DIVISION OF PARKING MANAGEMENT

IFB #1086044

10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 010400

SECTION 010450 – CUTTING AND PATCHING

PART 13 - GENERAL

13.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

13.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.
 - 1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 and Division 16 Sections for other requirements and limitations applicable to cutting and patching **mechanical** and electrical installations.
- C. Demolition of selected portions of the building for alterations is **included** in Section "Selective Demolition".

13.3 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following **information**, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it is to be **performed**; indicate why it cannot be avoided.
 - 2. Describe anticipated results **in terms of changes to existing construction**; include changes to structural elements and operating components as well as changes **in** the building's appearance and other significant **visual** elements.
 - 3. List products to be used and firms or entities that will perform **work**.
 - 4. Indicate dates when cutting and patching is to be performed.
 - 5. List utilities that will be disturbed or **affected**, including those that **will** be relocated and those that will be temporarily out-of-**service**. Indicate how long **service** will be disrupted.
 - 6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original **structure**.

7. Approval by the Engineer to proceed with cutting and patching does not waive the Engineer's right to later require complete removal and replacement of a part of the work found to be unsatisfactory.

13.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Structural decking.
 - g. Stair systems.
 - h. Miscellaneous structural metals.
 - i. Equipment supports.
 - j. Piping, ductwork, vessels and equipment.
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Owner's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.
 1. If possible, retain the original installer or fabricator to cut and patch the following categories of exposed work, or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:
 - a. Processed concrete finishes.
 - b. Ornamental metal.
 - c. Exterior coating system.
 - d. Painted walls.
 - e. Plaza deck paving system.
 - f. HVAC enclosures, cabinets or covers.
 - g. Parking deck membrane system.

PART 14 - PRODUCTS

14.1 MATERIALS

- A. Use materials that **are** identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual **effect**. Use materials whose installed performance will equal or surpass that of existing materials.

PART 15 - EXECUTION

15.1 INSPECTION

- A. Before cutting **existing** surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be preformed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

15.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect **existing** construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations.
- C. Avoid **interference** with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting **existing** pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

15.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and **complete** without delay.
 - 1. Cut **existing** construction to provide for installation of other components or performance of **other** construction activities and the subsequent fitting and patching required to restore **surfaces** to their original condition.
- B. Cutting: Cut existing construction using **methods** least likely to damage elements to be retained or adjoining construction. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.

1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a carborundum saw or diamond core drill.
 4. Comply with requirements of applicable Sections of Division 2 where cutting and patching requires excavating and backfilling.
 5. By-pass utility services, such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.
 4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

15.4 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 010450

SECTION 010500 – **FIELD ENGINEERING**

PART 16 - GENERAL

16.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

16.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:
 - 1. Survey work.
 - 2. Civil engineering services.
 - 3. Concrete formwork and shoring engineering services.

16.3 SUBMITTALS

- A. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying that the location and elevation of improvements comply with the Contract Documents.
- B. Final Survey: Submit 5 copies of the final property survey.
- C. Project Record Documents: Submit a record of work performed and record survey data as required under provisions of Sections "Submittals" and "Project Closeout".

16.4 QUALITY ASSURANCE

- A. Surveyor: Engage a land surveyor registered in the jurisdiction where the project is located to perform surveying services required.
- B. Engineer: Engage a **professional engineer** of the discipline **required**, **registered** in the jurisdiction in which **the project is located**, to perform required engineering services.

PART 17 - PRODUCTS (Not Used)

PART 18 - EXECUTION

18.1 EXAMINATION

- A. The Owner will identify **existing** control points and property line corner stakes.
- B. Verify layout information shown on the drawings, in relation to the survey and existing benchmarks, before proceeding to layout the work. Locate all existing slab edges, openings, depressions, changes in slopes, curbs, etc. prior to beginning demolition. Locate all rails, posts, parking wheelstops, etc. supported by existing slab to facilitate replacement on repaired slab. Locate and protect existing **benchmarks** and control points. Preserve permanent **reference** points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- C. Existing Utilities and Equipment: **The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of utilities and other construction.**

18.2 PERFORMANCE

- A. Working from **lines** and levels established by the survey, **establish benchmarks and markers** to set lines and levels at each stage of construction and elsewhere as needed to properly locate each element of the project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale drawings to determine dimensions.
 - 1. Advise entities engaged in **construction** activities of marked lines and levels provided for their use.
 - 2. As construction proceeds, check every major element for line, level and plumb.
- B. Surveyor's Log: Maintain a **surveyor's log** of control and other survey work. Make this **log** available for reference.
 - 1. Record deviations from required lines and levels, and advise the Engineer when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 - 2. On completion of work requiring field engineering **services**, prepare a certified survey showing dimensions, locations, angles and elevations of construction and site work.

- C. **Building Renovations:** Locate and lay out building renovations, including slab overlay repairs, utility slopes and invert elevations by instrumentation and similar appropriate means.
- D. **Building Lines and Levels:** Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical work.
- E. **Existing Utilities:** Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by, construction. Coordinate with local authorities having jurisdiction.
- F. **Final Survey:** Before Substantial Completion, prepare a final survey showing significant features (real property) for the project. Include on the survey a certification, signed by the surveyor, to the effect that principal metes, bounds, lines and levels of the project are accurately positioned as shown on the survey.

END OF SECTION 010500

SECTION 010950 – REFERENCE STANDARDS AND DEFINITIONS

PART 19 - GENERAL

19.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

19.2 SUMMARY

- A. General: Basic Contract definitions are included in the **General** Conditions.
- B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Where terms, such as "shown", "noted", "scheduled", and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the **Engineer**", "requested by the **Engineer**", and similar phrases.
- D. Approve: The term "approved", where used in conjunction with the Engineer's action on the Contractor's submittals, applications and requests, is limited to the Engineer's duties and responsibilities as stated in General and Supplementary Conditions.
- E. Regulation: The term "regulations" includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the work.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations".
- G. Install: The term "install" is used to describe operations at project site, including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations".
- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use".
- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor, for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced" when used with the term "Installer" means having a minimum of 5 previous projects similar in size and scope of this project, being familiar with the precautions required, and having complied with requirements of the authority having jurisdiction.
2. **Trades: Use of titles**, such as "carpentry", is not intended to imply that certain construction activities **must be performed** by accredited or unionized individuals of a corresponding **generic name**, such as "carpenter". It also does not imply that requirements specified apply **exclusively** to tradespersons of the corresponding generic name.

19.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. **Specification Format:** These Specifications are organized into divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERSPEC numbering system.
- B. **Specification Content:** This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words and phrases when used in particular situations or circumstances. These conventions are explained as follows:
 1. **Abbreviated Language:** Language used in Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the full context of the Contract Documents so indicates.
 2. **Imperative and streamlined language** is used generally in the Specifications. **Requirements** expressed in the imperative mood are to be performed by the Contractor. At certain locations in the test, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - a. The words "shall be" shall be included by **inference** wherever a colon (:) is used within a sentence or phrase.

19.4 INDUSTRY STANDARDS

- A. **Applicability of Standards:** Except where 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**. Such standards **are made** a part of the Contract Documents by reference.
- B. **Publication Dates:** Where the date of issue of a referenced standard is not specified, comply with **the standard in effect** as of date of **Contract Documents**.
- C. **Conflicting Requirements:** Where compliance with two or more standards is specified, and the standards establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Engineer for a **decision** before proceeding.

1. 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. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.
 - D. Copies of Standards: Each entity engaged in construction on the project is required to be familiar with industry standards applicable to the entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
 - E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.
- 19.5 GOVERNING REGULATIONS/AUTHORITIES
- A. Contact authorities having jurisdiction directly for information and decisions having a bearing on the work.
- 19.6 SUBMITTALS
- A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 20 - PRODUCTS (Not Used)

PART 21 - EXECUTION (Not Used)

END OF SECTION 010950

SECTION 012000 – PROJECT MEETINGS

PART 22 - GENERAL

22.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

22.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to:
 - 1. Pre-Construction Conference.
 - 2. Progress Meetings.

22.3 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a Pre-Construction Conference and Organizational Meeting at the project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Engineer and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of **significance** that could affect **progress**, including such topics as:
 - 1. **Tentative construction schedule.**
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of shop drawings, product **data and** samples.
 - 8. Preparation of record documents.
 - 9. Use of the premises.
 - 10. Office, work and **storage** areas.
 - 11. Equipment deliveries and priorities.
 - 12. Safety procedures.

13. First aid.
14. Security.
15. Housekeeping.
16. Working hours.

22.4 PROGRESS MEETINGS

- A. Conduct progress meetings at the project site at two-week intervals. Notify the Owner and Engineer of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. **Attendees:** In addition to representatives of the Owner and Engineer, each subcontractor, supplier or other **entity** concerned with current progress or **involved** in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the project and authorized to conclude matters relating to progress.
- C. **Agenda:** Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.
 1. **Contractor's Construction Schedule:** Review progress **since** the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind 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.
 2. Review the present and future needs of each entity present, including such items as:
 - a. **Interface requirements.**
 - b. **Time.**
 - c. Sequences.
 - d. Deliveries.
 - e. Off-site fabrication problems.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and services.
 - i. Hours of work.
 - j. Hazards and risks.
 - k. Housekeeping.
 - l. Quality and work standards.
 - m. Change Orders.
 - n. Documentation of information for payment requests.
- D. **Reporting:** No later than 3 days **after** each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief **summary**, in narrative **form**, of progress since the previous meeting and report.

1. **Schedule Updating:** Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 23 - PRODUCTS (Not Used)

PART 24 - EXECUTION (Not Used)

END OF SECTION 012000

SECTION 012900 - PAYMENT PROCEDURES

PART 25 - GENERAL

25.1 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.

25.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Unit Quantity Work Items" for administrative requirements governing the use of unit prices.
 - 4. Division 01 Section "Submittals" for administrative requirements governing the preparation and submittal of Contractor's construction schedule.

25.3 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.

25.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.

-
- c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Engineer at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- 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 Engineer.
 - c. Engineer'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. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. 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.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by

- measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
 10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

25.5 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 Engineer and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- 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.
- C. Payment Application Times: Submit Application for Payment to Engineer by the 10th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer 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.
- F. 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.
- G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. 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. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. 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.
 5. Waiver Forms: Submit executed waivers of lien on **forms**, acceptable to Owner.
- J. 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. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if **not** final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- K. Application for Payment at Substantial Completion: After **Engineer** 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.
- L. 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, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.

REFURBISHMENT OF PARKING GARAGE'S STORM, SANITARY, AND
WASHDOWN SYSTEMS: PIPES VALVES, ACTUATORS WITH
INTEGRATED ELECTRIC/PNEUMATIC CONTROL PACKAGES
MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION
DIVISION OF PARKING MANAGEMENT

IFB #1086044

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 26 - PRODUCTS (Not Used)

PART 27 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 012900 - PAYMENT PROCEDURES

PART 28 - GENERAL

28.1 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.

28.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Unit Quantity Work Items" for administrative requirements governing the use of unit prices.
 - 4. Division 01 Section "Submittals" for administrative requirements governing the preparation and submittal of Contractor's construction schedule.

28.3 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.

28.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.

- c. Items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Engineer at **earliest** possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- 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 Engineer.
 - c. Engineer'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. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. 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.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by

- measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
 10. Each item in the schedule of values and Applications for Payment **shall be complete**. **Include total cost and proportionate share of general overhead and profit for each item.**
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 11. Schedule Updating: **Update** and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a **change** in the Contract Sum.

28.5 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 Engineer and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- 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.
- C. Payment Application Times: Submit Application for Payment to Engineer by the 10th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer 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.
- F. **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.
- G. **Transmittal:** Submit three signed and notarized **original** copies of **each** Application for Payment to Engineer by a method ensuring receipt within **24** hours. One copy **shall** include **waivers** of lien and similar attachments if required.
1. **Transmit** each copy with a transmittal form listing attachments and recording appropriate **information** about application.
- H. **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. When **an** application shows completion of an item, **submit** conditional final or full waivers.
 3. **Owner reserves the right** to designate which **entities** involved in the Work must submit **waivers**.
 4. **Waiver Forms:** Submit **executed waivers** of lien on forms acceptable to Owner.
- I. **Waivers of Mechanic's Lien:** With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit **partial** waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, **submit** conditional final or full waivers.
 3. **Owner reserves the right** to designate which **entities** involved in the Work must submit **waivers**.

4. 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.
 5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- J. 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. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (**preliminary** if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction **conference**.
 13. Certificates of insurance and **insurance** policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
- K. Application for Payment at Substantial Completion: **After Engineer** 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**.
- L. 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, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 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 29 - PRODUCTS (Not Used)

PART 30 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013000 – SUBMITTALS

PART 31 - GENERAL

31.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

31.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the work, including:

- 1. Contractor's construction schedule.
- 2. Submittal schedule.
- 3. Daily construction reports.
- 4. Shop Drawings.
- 5. Product data.
- 6. Samples.

- B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

- 1. Permits.
- 2. Applications for payment.
- 3. Performance and payment bonds.
- 4. Insurance certificates.
- 5. List of subcontractors.

- C. The Schedule of Values submittal is included in Section "Applications for Payment".

- D. Inspection and test reports are included in Section "Quality Control Services".

31.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

- 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
 - a. Submittals submitted without the Contractor's approval stamp, where specified in the General Conditions to be reviewed and approved by the Contractor, will be returned without review.
 - b. Allow three weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 - c. If an intermediate submittal is necessary, process the same as the initial submittal.
 - d. Allow two weeks for processing each resubmittal.
 - e. No extension of contract time will be authorized because of failure to transmit submittals or resubmittals to the Engineer sufficiently in advance of the work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4"x5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Number and title of appropriate specification section.
 - i. Drawing number and detail references, as appropriate.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.
1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor

variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

31.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. **Bar-Chart Schedule:** Prepare a fully developed, horizontal bar-chart type Contractor's Construction Schedule. Submit within 30 days of the date established for "Commencement of the Work".
1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the work as indicated in the "Schedule of Values".
 2. Within each time bar, indicate completion percentage in 10 percent increments. As work progresses, place a contrasting mark in each bar to indicate actual completion.
 3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
 4. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work.
 5. Coordinate the Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
 6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Engineer's procedures necessary for certification of Substantial Completion.
- B. **Phasing:** Provide notations on the schedule to show how the sequence of the work is affected by requirements for phased completion to permit partial occupancy by the Owner prior to Substantial Completion.
- C. **Work Stages:** Indicate important stages of construction for each major portion of the work, including testing and installation.
- D. **Area Separations:** Provide a separate time bar to identify each major construction area for each major portion of the work. Indicate where each element in an area must be sequenced or integrated with other activities.
- E. **Cost Correlation:** At the head of the schedule, provide a two item cost correlation line, indicating "pre-calculated" and "actual" costs. On the line, show dollar-volume of work performed as of the dates used for preparation of payment requests.
1. Refer to Section "Applications for Payment" for cost reporting and payment procedures.
- F. **Distribution:** Following response to the initial submittal, print and distribute copies to the Engineer, Owner, subcontractors and other parties required to comply with scheduled dates. Post copies in the project meeting room and temporary field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.
- G. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

31.5 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule.
1. Coordinate submittal schedule with the list of subcontracts, schedule of values and list of products as well as the Contractor's Construction Schedule.
 2. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
 - a. Schedule date for the first submittal.
 - b. Related Section number.
 - c. Submittal category.
 - d. Name of subcontractor.
 - e. Description of the part of the work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date of the Engineer's final release or approval.
- B. Distribution: Following response to initial submittal, print and distribute copies to the Engineer, Owner, subcontractors and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.
1. When revisions **are** made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

31.6 DAILY CONSTRUCTION REPORTS

- A. Prepare a Daily Construction Report, recording the following information concerning events at the site, and submit duplicate copies to the Engineer at weekly intervals:
1. List of subcontractors at the site.
 2. Approximate count of personnel at the site.
 3. High and low temperatures, general weather conditions.
 4. Accidents and unusual events.

5. Meetings and significant decisions.
6. Stoppages, delays, shortages, losses.
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and start-ups.
13. Partial completions, occupancies.
14. Substantial Completions authorized.

31.7 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the project is not considered Shop Drawings.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
 1. Dimensions.
 2. Identification of products and materials included.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.
 5. Notation of dimensions established by field measurement.
 6. Sheet Size: Except for templates, patterns and similar full-size drawings, submit Shop Drawings on sheets at least 8½"x11", but no larger than 36"x48".
 7. Initial Submittal and Resubmittal: Submit two correctable translucent reproducible print and four blue- or black-line prints for the Engineer's review. Upon completion of review, the Engineer will return one reproducible print and one blue- or black-line print to the Contractor; one reproducible and one print to the Owner and retain two prints for his use.
 8. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
- C. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.
 1. Preparation of coordination drawings is specified in Section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
 2. Submit coordination drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

31.8 PRODUCT DATA

- A. Collect Product Data into single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings".
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with recognized trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 - g. Structural load capacities, if applicable.
 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Preliminary Submittal: Submit a preliminary two copies (**minimum**) of Product Data where selection of **options** is required.
 4. Submittals: Submit six copies of each required submittal. The **Engineer** will retain two copies and will return two copies to the Contractor and two copies to the Owner marked with action taken and corrections or modifications required.
 5. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until an approved copy of Product Data applicable is in the installer's possession.
 - b. Do not permit use of unmarked copies of Product Data in connection with construction.

31.9 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets and swatches showing color, texture and pattern.
1. Mount, display or package Samples in the **manner** specified to facilitate review of qualities indicated. Include the following:
 - a. Generic description of the Sample.

- b. Sample source.
 - c. Product name or name of manufacturer.
 - d. Compliance with recognized standards.
 - e. Availability and delivery time.
 2. Submit Samples for review of kind, color, pattern and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3) that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
 3. Preliminary Submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
 - a. Preliminary submittals will be reviewed and returned with the Engineer's mark indicating selection and other action.
 4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit four sets; one will be returned marked with the action taken.
 5. Maintain sets of Samples, as returned, at the project site for quality comparisons throughout the course of construction.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers and others as required for performance of the work. Show distribution on transmittal forms.
1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the work will be judged.
 - a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

31.10 ENGINEER'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.
1. Compliance with specified characteristics is the Contractor's responsibility.
- B. **Action Stamp:** The Engineer will distribute the submittal to design professional responsible for review of the submittal information who will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
1. **Final Unrestricted Release:** Where submittals are marked "Approved", that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 2. **Final-But-Restricted Release:** When submittals are marked "Approved as Noted", that part of the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 3. **Returned for Resubmittal:** When submittal is marked "Disapproved", do not proceed with that part of the work covered by the submittal, including purchase, fabrication delivery or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat, if necessary, to obtain a different action mark.
 - a. Do not permit submittals marked "Disapproved" to be used at the project site or elsewhere where work is in progress.
 4. **Other Action:** Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required" or "Reviewed for Information".

PART 32 - PRODUCTS (Not Used)

PART 33 - EXECUTION (Not Used)

END OF SECTION 013000

SECTION 014000 – QUALITY CONTROL SERVICES

PART 34 - GENERAL

34.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

34.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities and the Contractor. They do not include contract enforcement activities performed by the Engineer.
- C. Inspection and testing services are **required** to verify compliance with requirements specified or indicated. These services do not **relieve** the Contractor of responsibility for **compliance** with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
 - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, test and **related** actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the Engineer, Owner or authorities having jurisdiction are not limited by provisions of this Section.

34.3 RESPONSIBILITIES

- A. Contractor Responsibilities: The Contractor shall provide inspections, tests and **similar quality** control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified **entity**; these services include those specified to be performed by an independent agency and not **by the** Contractor. Costs for these services shall be included in the Contract **Sum**.

1. The **Contractor** shall employ and pay an independent agency to perform specified quality control services.
 2. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.
 - a. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the work and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
 3. Retesting: Where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements requiring revisions to, or replacement of, construction, the revised or replaced construction shall be retested by the inspection agency which performed the original inspection.
 - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
 4. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to:
 - a. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 - c. Providing facilities for storage and curing of test samples and delivery of samples to testing laboratories.
 - d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - e. Security and protection of samples and test equipment at the project site.
 - f. Maintaining at the job site, and providing access to, up-to-date record copies of Contract Documents, Addendums, Change Orders, Directives, Correspondence, Approved Shop Drawings, Samples and any other information which affects the work required to be inspected by the agency.
 - g. Providing to the agency, one copy of Contract Documents, Addendums, Change Orders, Directives, Correspondence or Approved Shop Drawings which affects the work required to be inspected by the agency regardless of who pays the agency.
- B. **Owner Responsibilities:** The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.

1. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.
- C. **Duties of the Testing Agency:** The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Engineer and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the work.
 3. The agency shall not perform any duties of the Contractor.
- D. **Coordination:** The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

34.4 SUBMITTALS

- A. The independent testing agency shall submit a certified written report of each inspection, test or similar service to the Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certificate written report of each inspection, test or similar service through the Contractor, in duplicate.
1. Submit additional copies of each written report directly to the Owner and to the governing authority, when the authority so directs.
 2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample taking and testing.
 - k. Comments or professional opinion as to whether inspected or testing work complies with Contract Document requirements.
 - l. Name and signature of laboratory inspector.

- m. Recommendations on retesting.
- n. Name, signature and seal of registered professional engineer responsible for certification of results.

34.5 QUALITY ASSURANCE

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
 - 1. Each independent inspection and testing agency engaged on the project shall be authorized by authorities having jurisdiction to operate in the state in which the project is located.
 - 2. The work of each agency shall be performed under the direction and control of a professional Engineer registered in the project's jurisdiction.

PART 35 - PRODUCTS (Not Used)

PART 36 - EXECUTION

36.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching".
- B. Protect construction exposed by or for quality control service activities and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 014000

SECTION 015000 – TEMPORARY FACILITIES

PART 37 - GENERAL

37.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

37.2 SUMMARY

- A. This Section specifies **requirements for** temporary services and facilities, including utilities, construction and support facilities, **security** and protection.
- B. Temporary utilities required include, but are not limited to:
 - 1. Water **service** and distribution.
 - 2. Temporary electric power and **light**.
 - 3. Telephone service.
- C. Temporary construction and support facilities required include, but are not limited to:
 - 1. Temporary heat.
 - 2. Field offices and storage sheds.
 - 3. Sanitary facilities, including **drinking water**.
 - 4. Dewatering facilities and drains.
 - 5. Temporary enclosures.
 - 6. **Hoists** and temporary elevator use.
 - 7. **Temporary project identification signs** and bulletin boards.
 - 8. Waste disposal services.
 - 9. Rodent and pest control.
 - 10. Construction aids and miscellaneous services and **facilities**.
- D. Security and protection facilities required include, but are not limited to:
 - 1. Temporary fire **protection**.
 - 2. Barricades, warning **signs, lights**.
 - 3. Sidewalk bridge or enclosure **fence** for the site.
 - 4. Environmental protection.

37.3 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within 15 days of the date established for commencement of the work.

37.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including, but not limited to:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department and rescue squad rules.
 - 5. Environmental protection regulations.
 - 6. The Owner's regulations and policies.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities".
 - 1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.
 - 2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

37.5 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions or public nuisances to develop or persist on the site.

PART 38 - PRODUCTS

38.1 MATERIALS

- A. General: Provide new materials, if acceptable to the **Engineer**; undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood:
 - 1. For job-built temporary offices, shops and sheds within the construction area, provide UL labeled, fire-treated lumber and plywood for framing, sheathing and siding.
 - 2. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thicknesses indicated.
 - 3. For fences and vision barriers, provide exterior type, minimum $\frac{3}{8}$ " thick plywood.
 - 4. For safety barriers, sidewalk bridges and similar uses, provide minimum $\frac{5}{8}$ " thick exterior plywood.
- C. Paint:
 - 1. For job-built temporary offices, shops, sheds, fences and other exposed lumber and plywood, provide exterior grade acrylic-latex emulsion over exterior primer.
 - 2. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire-retardant tarpaulins.
- E. Water: Provide potable water approved by local health authorities.
- F. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1½" I.D. for line posts and 2½" I.D. for corner posts.

38.2 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the **Engineer**; undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for intended use.
- B. Water Hoses: Provide $\frac{3}{4}$ " heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

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- D. **Electrical Power Cords:** Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
 - E. **Lamps and Light Fixtures:** Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
 - F. **Heating Units:** Provide temporary heating units, if required, that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
 - G. **Temporary Offices:** Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
 - H. **Temporary Toilet Units:** Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
 - I. **First Aid Supplies:** Comply with governing regulations.
 - J. **Fire Extinguishers:** Provide hand-carried, portable UL-rate, class "ABC" **dry** chemical extinguishers, or a combination of extinguishers of NFPA recommended **classes** for the exposures.
 - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 39 - EXECUTION

39.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities in areas acceptable to the Owner where they will serve the project adequately and result in minimum interference with performance of the **work**. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove **until** facilities are no longer needed, or are replaced by authorized use of completed **permanent** facilities.

39.2 TEMPORARY UTILITY INSTALLATION

- A. **General:** Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder

with matching, compatible materials and equipment; comply with the company's recommendations.

1. Arrange with the company and **existing** users for a **time** when service can be interrupted, where necessary, to make connections for temporary services.
 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 3. Obtain easements to bring temporary utilities to the **site**, where the **Owner's** easements cannot be used for that purpose.
 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Engineer, and will not be accepted as a basis of claims for a Change Order.
- B. **Water Service:** Install water service and distribution piping of **sizes** and pressures adequate for construction.
1. **Sterilization:** Sterilize temporary water piping prior to use.
- C. **Temporary Electric Power Service:** Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
1. **Power Distribution System:** **Install** wiring where least exposed to damage. Where permitted, wiring circuits **not exceeding** 125 volts, AC 20 ampere rating and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for **surveillance**.
 2. **Emergency Power System:** Provide a temporary emergency power system to operate emergency egress lighting and other equipment during disruptions to the normal power supply as required by the local authorities.
- D. **Temporary Lighting:** Provide temporary lighting with local switching.
1. **Install** and operate temporary **lighting** that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations, traffic conditions and emergency egress.
- E. **Temporary Telephones:** Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants.
- F. **Sewers and Drainage:** If sewers **are available**, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.
1. **Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants** that might clog sewers or pollute waterways before discharge. **Treat** effluent

- to achieve **alkalinity** level acceptable to the officials having authority for the system receiving the discharge.
2. Connect temporary sewers to the **system** as directed by the Owner or the officials having authority for that system.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- G. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.
- H. Provide temporary ventilation **system** to remove dust and fumes from construction area while providing fresh **air** to maintain a **safe** environment for the construction personnel and building occupants.

39.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, sanitary facilities and other **temporary** construction and support facilities for easy access in areas acceptable to the Owner.
1. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Provide incombustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.
- C. **Temporary Heat:** Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the **ambient** condition required and minimize consumption of **energy**.
- D. **Heating Facilities:** Provide vented self-contained LP **gas** or **fuel** oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open flame or **salamander**-type heating units is prohibited.
- E. **Field Offices:** Provide insulated, **weathertight** temporary offices **of** sufficient size to accommodate required office personnel at the project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as required for Contractor's operations.
- F. **Storage and Fabrication Sheds:** Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully-enclosed spaces within the building or elsewhere on the site at locations approved by **the** Owner.

- G. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the project's needs in areas approved by the Owner.
1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.
 2. Toilets. Use of the Owner's existing toilet facilities will not be permitted.
- H. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
- I. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
- J. Drinking Water Facilities: Provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.
1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55° F (7 to 13° C).
- K. Food and Beverage Facilities: Provide adequate safe and clean areas within staging or construction areas for the construction personnel's storage and consumption of food and beverages.
1. Food and beverage vending machines may be installed at the Contractor's expense in areas approved by the Owner.
 2. All areas designated as food and beverage facilities must be kept clean and all trash removed daily.
- L. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.
- M. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities and as noted on the drawings.
1. Where heat is needed, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Install tarpaulins securely with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.

4. Where temporary wood or plywood enclosure exceeds 100 square feet **in area**, use UL-labeled fire-retardant treated material for framing and main sheathing.
- N. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- O. Temporary Elevator Use: Do not use elevators for construction activities or access unless otherwise authorized by the Owner.
- P. Project Identification and Temporary Signs: Prepare project signs of adequate size to maintain traffic control and emergency egress. Install signs where indicated to inform the public and persons utilizing the project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.
1. Project Identification Signs: Project identification signs are not permitted.
 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
 3. Traffic Control: Provide adequate signage to maintain a safe temporary traffic pattern in occupied areas of the garage as noted on the drawings. Cover permanent traffic markings as required to avoid conflicting directions.
 4. Emergency Egress: Provide signs to clearly denote temporary **emergency egress** paths during construction.
- Q. Temporary Exterior Lighting: Install exterior yard and sign lights so that signs are visible when work is being performed.
- R. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80° F. Handle hazardous, dangerous or unsanitary waste materials **separately** from other waste by containerizing properly. Dispose of material in a lawful manner.
- S. Stairs: Existing stairs shall not be used for transportation of construction material. Construction personnel may use the stairs for access between levels only when use of ramps is unfeasible and approval is given by the Owner. The Contractor shall keep the stairs continuously clean of dirt and debris.
- T. Ramps: Existing ramps shall be used for transportation of construction materials, personnel, equipment and debris. Follow the traffic patterns posted and yield the right-of-way to the public vehicles and pedestrians in the garage. Immediately clean up any spillage of material or debris.
- U. Construction Aids: Scaffolding, platforms, swing stages, ramps, waste chutes and similar construction aids required for construction shall be designed by the Contractor to meet all applicable codes and shall be constructed in a **safe** manner in locations acceptable to the Owner.

39.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as **available**, do not change over from use of temporary security and protection facilities to permanent **facilities** until Substantial Completion, or longer as requested by the **Engineer**.
- B. **Temporary Fire Protection:** If construction requires the temporary disruption of permanent fire protection facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".
 - 1. Locate fire extinguishers where convenient and **effective** for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - 2. Store combustible materials in containers in fire-safe locations.
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
 - 4. Provide supervision of welding operations, combustion-type temporary heating units and similar sources of fire ignition.
- C. **Permanent Fire Protection:** At the **earliest** feasible date in **each area** of the project, **restore** use of the permanent fire protection facility, including connected services.
- D. **Barricades, Warning Signs and Lights:** Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- E. **Enclosure Fence:** When excavation or demolition begins, install an enclosure fence **with lockable** entrance gates. Locate where indicated or enclose the portion of the site determined sufficient to accommodate construction operations. **Install** in a manner that will prevent vehicles, people, dogs and other animals from easily entering **the site**, except by the entrance gates.
 - 1. Provide open-mesh, chain-link fencing or plywood partition as noted on the drawing. Maintain the enclosure walls erected for demolition as specified in Section 02070 for use through all construction activities.
- F. **Security Enclosure and Lockup:** **Install** substantial temporary enclosure of partially completed areas of **construction**. Provide **locking** entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security. Arrange security enclosures to **maintain** adequate emergency egress paths as required by the Owner and/or **governing** authority.
 - 1. **Storage:** Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to **minimize** the opportunity for theft and vandalism.

- G. **Environmental Protection:** Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that are acceptable to the Owner and that will **minimize** complaints from persons or firms near the site.

39.5 OPERATION, TERMINATION AND REMOVAL

- A. **Supervision:** Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. **Maintenance:** Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 2. **Protection:** Prevent water-filled piping from freezing. Protect from damage during construction operations.
- C. **Termination and Removal:** Unless the Engineer requests that it be maintained longer, **remove** each temporary facility when the need has ended, or when replaced by authorized use of permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of project identification signs.
 2. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including, but not limited to:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts that haven subject to unusual operating conditions.
 - c. Replace lamps that are burned out or noticeably **dimmed** by substantial hours of use.

END OF SECTION 015000

SECTION 016000 – MATERIALS AND EQUIPMENT

PART 40 - GENERAL

40.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

40.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the project.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals".
- C. **Standards:** Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.
- D. Administrative procedures for handling requests for substitutions **made** after award of the contract are included under Section "Product Substitutions".

40.3 DEFINITIONS

- A. Definitions used in this article **are not intended** to change the meaning of other terms used in the Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories" and similar terms. Such terms are **self-explanatory** and have **well** recognized **meanings** in the construction industry.
 - 1. "Products" are items purchased for incorporation in the work, whether purchased for the project or taken from previously purchased stock. The term "product" includes the terms "material", "equipment", "system" and terms of similar intent.
 - a. "Named Products" are items identified by **manufacturer's** product name, including make or model designation, indicated in the manufacturer's published product literature that is current as of the date of the Contract Documents.
 - b. "Foreign Products", as designated from "domestic products", are items **substantially** manufactured (50 percent or more of value) outside of the United States and its possessions; or produced or supplied by entities **substantially** owned (more than 50 percent) by persons who are not citizens of nor living within the United States and its possessions.

2. "Materials" are products **that** are substantially shaped, cut, worked, mixed, finished or otherwise fabricated, processed or installed to form a part of the work.
3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

40.4 SUBMITTALS

- A. Product List Schedule: Prepare a schedule showing products specified in a tabular form acceptable to the Engineer. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.
 1. Coordinate the product list schedule with the Contractor's Construction Schedule and the Schedule of Submittals.
 2. Form: Prepare the product listing schedule with information on each item tabulated under the following column headings:
 - a. Related Specification Section number.
 - b. Generic name used in Contract Documents.
 - c. Proprietary name, model number and **similar** designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 3. Initial Submittal: Within 30 days after date of **commencement** of the work, submit 3 copies of an initial product list schedule. Provide a written **explanation** for omissions of data and for known variations **from** contract requirements.
 - a. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the contract period.
 4. Completed Schedule: Within 60 days after date of **commencement** of the work, **submit** 3 copies of the completed product list schedule. Provide a written **explanation** for **omissions** of data and for known variations from contract requirements.
 5. Engineer's Action: The Engineer will respond in writing to the Contractor within 2 weeks of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of this requirement that products **comply** with Contract Documents. The Engineer's response will include the following:
 - a. A list of unacceptable product selections, **containing** a brief explanation of reasons for this action.

40.5 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

40.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage at the 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 the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
 - 4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
 - 5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 - 6. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 41 - PRODUCTS

41.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
 1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing relations, not by previous project experience. Procedures governing product selection include the following:
 1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
 2. Semi-Proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
 - a. Where products or manufacturers are specified by name, accompanied by the term "or equal" or "or approved equal", comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the work, but do not restrict the Contractor to use of these products only, the Contract may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with contract requirements.
 5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

- a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
6. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
7. Visual Matching: Where Specifications require matching an established Sample, the Engineer's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
8. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, pattern and texture from the product line selected.

PART 42 - EXECUTION

42.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 016000

SECTION 160600 – GENERAL ELECTRICAL REQUIREMENTS, MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Provide all materials, labor, equipment and services necessary to modify, furnish and install all electrical items noted in this specification or on the construction drawings.

1.3 RELATED WORK

- A. The following work is related to this Section:
 - 1. Selective Demolition Section 020700
 - 2. Concrete Repairs Section 033500
- B. Coordinate all work specified in this Division with the work of all other trades required for project.
- C. Locate, identify and protect other services passing through demolition area and serving other areas outside the demolition limits.

1.4 SYSTEM DESCRIPTION

- A. Prior to submitting Bid for the work specified in this Division, review Contract Documents, including as they related to the work of all other trades required for the project. All fees and costs necessary to work electrical modifications into the project shall be included in the Bid. No subsequent extras will be allowed for materials and labor not included by Bidder for electrical work due to lack of familiarity with Contract Documents, including as they related to the work of all other trades.
- B. Drawings are generally diagrammatic and indicative of the work to be installed. Do not scale drawings; determine from field measurements.
- C. Visit the site prior to Bidding. Review existing field conditions for location of panels, fixtures and other electrical work. Notify the Engineer immediately, and confirm in writing, of any conflicts.

- D. Electrical circuits within the slab may not necessarily only serve the electrical system within the parking garage. These circuits are included in the scope of this work and must be traced and relocated with the other circuits.
- E. The Contractor shall install and connect all equipment and materials in accordance with the best engineering practice and, unless otherwise shown or specified, follow the manufacturer's instructions and recommendations and furnish and install all required auxiliary items complete.
- F. It is not possible to indicate all offsets or fittings which may be required. Plan accordingly, furnishing such offsets and fittings as may be required to install the work without interferences with other items.
- G. Permits: Take out all necessary permits, arrange for all required inspections and pay all fees and expenses associated with performing electrical work.

1.5 QUALITY ASSURANCE

- A. Workmanship, equipment, materials and testing shall conform to the requirements of the latest specifications of:
 - 1. American National Standards Institute (ANSI).
 - 2. American Society for Testing and Materials (ASTM).
 - 3. National Fire Protection Association (NFPA).
 - 4. Underwriters' Laboratories, Inc. (UL).
 - 5. National Electric Code (NEC).
 - 6. All local, state and federal rules and regulations.
 - 7. Public utilities within the jurisdiction.
- B. If any change in the drawings and specifications is required to comply with local regulations, notify Engineer at least 5 days before Bids are to be submitted. After entering into contract, Contractor will be held to complete all work necessary to meet local requirements without extra expense to Owner.
- C. Complete testing as required by local jurisdictions or to verify the system is functioning properly.
- D. All equipment installed shall be new and shall conform in all respects to the latest approval standards of IEEE, ANSI, NEMA and Underwriters' Laboratories, Inc. (unless indicated otherwise).
- E. The Contractor shall notify the Owner when the project is approximately 75% complete in order to schedule a pre-final review of construction. Final review shall be scheduled at 100% completion. All punch list items must be accomplished prior to final acceptance.

1.6 SUBMITTALS

- A. Submit shop drawings and manufacturer's catalog sheets. Include:

1. Switch and fixture layout.
 2. Panel modifications and circuitry.
- B. Submit a schedule outlining operations as coordinated with other trades.
- C. At completion of construction, submit all testing and inspection certificates.

1.7 DELIVERY AND STORAGE

- A. Deliver materials to project in good condition. Store materials off-ground and protected from elements.

1.8 EXISTING CONDITIONS

- A. Verify **existing** field conditions for location of panels, fixtures, circuitry and other electrical work.
- B. Verify dimensions in the field prior to beginning work. Verify calling heights or other architectural and structural conditions before installing any work.
- C. Notify **Engineer**, in **writing**, of any **difference** which may be found **before** proceeding with work.
- D. Maintain a minimum clearance of 6'-8" **between** top of slab and all overhead work at the lowest **point**, including fittings and fixtures.

1.9 WARRANTY

- A. Furnish, to the Owner, a written guarantee **against** defects in materials, workmanship for all equipment and materials furnished and for **entire** workmanship of installation for period of one year from date of acceptance of the work.
- B. Repair all **defects in workmanship** or material provided under this Section during the guarantee period and **without expense** to Owner.

1.10 BASIS OF PAYMENT

- A. All quantities **shall be paid** based on the unit of measure specified in Section 01026, Unit Prices. Where no unit **price is specified**, it shall be paid based on lump sum agreed to under the conditions of the Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Raceways, Boxes and Conduits:

1. Outdoors (in Garage) Wiring Methods: Using the following wiring methods:

- a. Exposed: Rigid or intermediate metal conduit.
- b. Concealed: Rigid or intermediate metal conduit.
- c. Boxes and Enclosures: NEMA Type 3R or Type 4.

B. Wire and Cable: All conductors shall be copper, **minimum #10**, with 600 volt type "THHN-THWN" insulation. Conductors shall be stranded.

C. ELECTRICAL IDENTIFICATION

1. Conductor Color Coding: Provide color coding for feeders and branch circuit conductors as follows:

2.	<u>208/120 Volts</u>	<u>Phase</u>
	<u>480/277 Volts</u>	
3.	Black	A
	Yellow	
4.	Red	B
	Brown	
5.	Blue	C
	Orange	
6.	White	Neutral
	Gray	
7.	Green	Ground
	Green	
8.		

D. Grounding: All circuits shall contain an insulated ground conductor.

E. Panel Boards: Panel board shall be equal to Square D Type NEHB, unless otherwise noted.

PART 3 - EXECUTION

3.1 GENERAL

A. Inspect areas to receive the work and report immediately, in writing to the Engineer as required in the General Conditions, any deficiencies which render it unsuitable for proper execution of this

work. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner. Commencement of work implies acceptance of related work.

- B. Coordinate with related work.

3.2 PREPARATION/INSTALLATION

- A. Schedule work so as to coordinate with other contractors.
- B. Provide temporary services for lighting and power equipment (drills, saws, etc.). Verify temporary requirements with General Contractor. Temporary lighting and power shall meet OSHA requirements and local code.
- C. Unless specifically noted on the plans, remove all lighting, switches and associated circuitry. Circuitry to be removed shall be conductors and any exposed raceways, including all raceway that becomes exposed when removal of walls, ceilings and deteriorated concrete. Not all devices to be removed are shown on plans.

Fixtures to be reused shall be clean before inspection. The lamp fixtures having defective lamps with lamps furnished by Owner.

Unless specifically noted on the plans, all circuitry, equipment, devices, etc., not noted as existing to remain or to be relocated, shall be new. Remove all devices and circuitry not being reused.

- D. Install circuitry to occupy a minimum of space. Install parallel and close to walls, ceilings, columns or other members.
- E. Where possible, locate all runs in areas which are out of direct public view.
- F. Support Devices.
1. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements and any additional local codes.
 2. Coordinate with the building structural system and with other electrical installations.
- G. Grounding: Ground electrical systems and equipment in accordance with NEC, except where grounding in excess of NEC requirements is indicated.
- H. Panel Boards: Panel board circuiting shall meet code requirements. Circuiting changes must be approved by the Owner.
- I. All abandoned conduit in sound concrete shall have the conductors removed and be grouted solid over the length of the conduit. Refer to Section 03350.
- J. Cleanup: At completion of work under this Contract, remove from site and dispose of all rubbish and discarded materials and restore disturbed facilities and surfaces.

3.3 FINAL TESTING

- A. At the time of final inspection and tests, all connections at panel boards, devices and equipment and all splices must be completed. Each branch circuit and its respective connected equipment must test free of short circuits.

END OF SECTION 160600

SECTION 016310 – PRODUCT SUBSTITUTIONS

PART 43 - GENERAL

43.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

43.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for substitutions made after award of the contract.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals".
- C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.
- D. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment".

43.3 DEFINITIONS

- A. Definitions used in this article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment and methods of construction required by Contract Documents proposed by the Contractor after award of the contract are considered requests for "substitutions". The following are not considered substitutions:
 - 1. Substitutions requested by bidders during the bidding period, and accepted prior to award of contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to Contract Documents requested by the Owner or Engineer. Specified options of products and construction methods included in Contract Documents.
 - 3. The Contractor's determination of, and compliance with, governing regulations and orders issued by governing authorities.

43.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution **will** be considered if received within 60 days after commencement of the work. Requests received more than 60 days after commencement of the work may be considered or rejected at the discretion of the Engineer.
1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
 2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related specification Section and drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate.
 - a. Product data, including drawings and descriptions of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the work specified. Significant qualities may include elements, such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall contract time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary **because of the failure of the substitution to perform** adequately.
 3. **Engineer's Action:** Within two weeks of receipt of the request for substitution, **the** Engineer will request additional information or documentation necessary for evaluation of the request. Within 3 weeks of receipt of the request, or 2 weeks of receipt of the additional information or documentation, whichever is later, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form a Change Order.

PART 44 - PRODUCTS

44.1 SUBSTITUTIONS

- A. **Conditions:** The Contractor's **substitution** request will be received and considered by **the Engineer** when **one or more** of the following conditions are satisfied, as determined by the **Engineer**;

otherwise requests **will** be returned without action, except to record noncompliance with these requirements.

1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the contract time. The request will not be considered if the product or method cannot be provided as a **result** of failure to pursue the work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by a governing agency, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a **manner** that is compatible with other materials, and where the Contractor certifies that **the substitution** will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that **the proposed substitution** can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor **certifies** that the proposed substitution provides the required warranty.
- B. The Contractor's submittal and Engineer's acceptance of shop drawings, product data or samples that relate to construction activities no complying with the Contract Documents does not constitute an acceptable or valid request for substitution, **nor** does it constitute approval.

PART 45 - **EXECUTION** (Not Used)

END OF SECTION 016310

SECTION 017000 – PROJECT CLOSEOUT

PART 46 - GENERAL

46.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

46.2 SUMMARY

- A. This Section specifies administrative and procedure requirements for project closeout, including, but not limited to:
1. Substantial completion procedures.
 2. Final completion procedures.
 3. Submittal of warranties.
 4. Final cleaning.
 5. Repair of the Work.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 02 through 16.
- C. Related Requirements:
1. Section 017823 “Operation and Maintenance Data” for operation and maintenance manual requirements.
 2. Section 017200 “Project Record Documents” for submitting Record Drawings, Record Specifications and Record Product Data.

46.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the work is not complete.

2. Advise Owner of pending insurance **change-over** requirements.
 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 4. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage surveys and similar final record information.
 5. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 6. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials and similar items, and deliver to location designed by Owner. Label with manufacturer's name and model number.
 7. Submit testing, adjusting and balancing records.
 8. Submit changeover information related to Owner's occupancy, use, operation and maintenance.
 9. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
 10. Complete start-up testing of systems and instruction of the Owner's operating and maintenance personnel.
 11. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
 12. Perform preventative maintenance on equipment used prior to Substantial Completion.
 13. Instruct Owner's personnel in operation, adjustment and maintenance of products, equipment and systems.
 14. Participate with Owner in conducting inspection and walk-through with local emergency responders.
 15. Complete final clean-up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Engineer will repeat inspection when requested and assured that the work has been substantially completed.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.
- 46.4 FINAL COMPLETION PROCEDURES
- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the work.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
8. Submit final project photographs damage or settlement survey and similar final record information.

B. Re-Inspection Procedure: The Engineer will re-inspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of re-inspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled, but are requested for final acceptance.
2. If necessary, re-inspection will be repeated.

46.5 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Owner 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 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.
 1. Submit by email to Owner.
- 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 8½ by 11-inch 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 the 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 47 - PRODUCTS (Not Used)

PART 48 - EXECUTION

48.1 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities".
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 1. Compete the following **cleaning** operations before requesting **inspection** for Certification of Substantial Completion:
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced **finishes** to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave **concrete** floors broom clean. Vacuum carpeted surfaces.
 - d. Wipe surfaces of mechanical and electrical **equipment**. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light **fixtures** and lamps.
 - e. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth even-textured surface.
 - f. Remove tools, construction equipment, machinery and surplus **material** from Project site.

- g. Remove snow and ice to provide safe access to building.
 - h. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - i. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers and grills.
 - j. Clean ducts, blower and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
 - k. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
- 1. Where extra materials or value remaining after completion of associated work have become the Owner's property, arrange for disposition of these materials as directed.

48.2 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. Repair 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 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 impeded 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 017000

SECTION 017200 – PROJECT RECORD DOCUMENTS

PART 49 - GENERAL

49.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

49.2 SUMMARY

- A. This Section **specifies** administrative and procedure requirements for Project Record Documents.
- B. Project Record Documents required include:
 - 1. Marked-up copies of Contract Drawings.
 - 2. Marked-up copies of Shop Drawings.
 - 3. Newly prepared drawings.
 - 4. Marked-up copies of specifications, addenda and change orders.
 - 5. Marked-up product data submittals.
 - 6. Record samples.
 - 7. Field records for variable and concealed conditions.
 - 8. Record information on work that is recorded only **schematically**.
- C. Specific record copy requirements that expand requirements of this Section are included in the individual sections of Divisions 02 through 16.
- D. General project closeout requirements are included in Section 017000 "Project Closeout".
- E. General requirements for submittal of Project Record Documents are included in Section 013000 "Submittals".
- F. Maintenance of Documents and Samples: Store record documents and samples in the field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and samples available at all times for inspection by the Engineer.

49.3 RECORD DRAWINGS

- A. Mark-Up Procedure: During the construction period, maintain a set of blue- or **black-line white-**prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

1. Mark these drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to:
 - a. Dimensional changes to the drawings.
 - b. Revisions to details shown on the drawings.
 - c. Locations and depths of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.
 - g. Duct size and routing.
 - h. Locations of concealed internal utilities.
 - i. Changes made by Change Order.
 - j. Details not on original Contract Drawings.
 - k. Locations and quantities of concrete repairs.

- B. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are **marked**, show cross-reference on Contract Drawings location.
 1. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for difference categories of the work at the same location.
 2. Mark important additional **information** which was either shown schematically or omitted from original drawings.
 3. Note construction change directive **numbers**, alternate numbers, Change Order numbers and similar identification.
 4. Responsibility for Mark-Up: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor or **similar** entity, is required to prepare the mark-up on record drawings.
 - a. Accurately record information in an understandable drawing technique.
 - b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

- C. Record Digital Data Files: **Immediately** before inspection for Certificate of Substantial Completion, **review** marked-up record prints with Engineer. When authorized, prepare full sets of corrected digital data files of the Contract Drawings, as follows:
 1. **Format**: One set in the same digital data software program, version and operating **system** as the original Contract Drawings and one set in PDF format.
 2. Incorporate changes and additional information previously **marked** on record prints. Delete, redraw and add details and notations where applicable.
 3. Refer instances of uncertainty to Engineer for resolution.
 4. Engineer will furnish Contractor with one set of digital data files of the Contract Drawings for **use in recording** information.

- a. **Engineer** will provide data file layer information. Record markups in separate layers.
 5. Organize digital data information into separate **electronic** files that correspond to each sheet of the Contract Drawings. Name each file with the sheet as follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS".
 - d. Name of Engineer.
 - e. Name of Contractor.
 6. Submit record digital data files **in** both formats on a **digital** storage media.
- D. Newly Prepared Record Drawings: Prepare new drawings **instead** of following procedures specified for preparation of record drawings where new drawings are required by a Change Order issued as a result of acceptance of an alternate, substitution or other modification, and the Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show the actual installation.
1. **Consult** with the Engineer for the proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. When completed and accepted, integrate newly prepared drawings with procedures **specified** for **organizing**, copying, binding **and** submittal of record drawings.

49.4 RECORD SPECIFICATIONS

- A. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
1. Mark the specifications to indicate the actual installation where the **installation varies** substantially from that indicated in specifications and modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options and information on concealed installations that would be difficult to identify or measure and record **later**.
 - a. In each **specification** section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
 - b. Record the name of the manufacturer, supplier and installer, and **other information** necessary to provide a record of selections made and to document **coordination** with record product data submittals and maintenance materials.
 - c. Note related record product data, where applicable. For each principal product specified, indicate whether record product data has been submitted in maintenance manual instead of submitted as record product data.
 2. Upon completion of **mark-up**, submit record specifications to the Engineer for Owner's records.

49.5 RECORD PRODUCT DATA

- A. During the construction period, maintain one copy of each Product Data Submittal for Project Record Document purposes.
1. Mark product data to indicate the actual product installation where the installation varies substantially from that indicated in product data submitted. Include significant changes in the product delivered to the site and change in manufacturer's instructions and recommendations for installation.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Note related Change Orders and mark-up of record drawings, where applicable.
 4. Upon completion of mark-up, submit a complete set of record product data to the Engineer for the Owner's records.
 5. Where record product data is required as part of maintenance manuals, submit marked-up product data as an insert in the manual instead of submittal as record product data.

49.6 RECORD SAMPLE SUBMITTAL

- A. Immediately prior to date of Substantial Completion, the Contractor shall meet with the Engineer and, if desired, the Owner's personnel at the site to determine which of the samples maintained during the construction period shall be transmitted to the Owner for record purposes. Comply with the Engineer's instructions for packaging, identification marking and delivery to Owner's sample storage space. Dispose of other samples in manner specified for disposal of surplus and waste materials.

49.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to other specification sections for miscellaneous recordkeeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Architect for the Owner's records.
1. Categories of requirements resulting in miscellaneous records include, but are not limited to, the following:
 - a. Field records on excavations and foundations.
 - b. Field records on underground construction and similar work.
 - c. Survey showing locations and elevations of underground lines.
 - d. Invert elevations of drainage piping.
 - e. Surveys establishing building lines and levels.
 - f. Authorized measurements utilizing unit prices or allowances.
 - g. Records of plant treatment.
 - h. Ambient and substrate condition tests.
 - i. Certifications received in lieu of labels on bulk products.
 - j. Batch mixing and bulk delivery records.

- k. Testing and qualification of tradesmen.
- l. Documented qualification of installation firms.
- m. Load and performance testing.
- n. Inspections and certifications by governing authorities.
- o. Leakage and water-penetration tests.
- p. Final inspection and correction procedures.

PART 50 - PRODUCTS (Not Used)

PART 51 - EXECUTION

51.1 RECORDING

- A. Post changes and modifications to the documents as they occur. Do not wait until the end of the project. The Engineer will periodically review record documents to assure compliance with this requirement.

END OF SECTION 017200

SECTION 017400 – WARRANTIES AND BONDS

PART 52 - GENERAL

52.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

52.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for **terms** of the Contractor's special warranty of workmanship and materials.
 - 2. General closeout requirements are included in Section "Project Closeout".
 - 3. Specific requirements for warranties for the work and products **and installations** that are specified to be warranted, are included in the individual Sections of Divisions 02 through 16.
 - 4. Certifications and other commitments **and agreements** for continuing **services** to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to **countersign** special warranties with the Contractor.

52.3 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are **written warranties** required by or incorporated in the Contract Documents, either to extend time **limits provided by standard** warranties or to provide **greater** rights for the Owner.

52.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights or remedies.
 - 1. **Rejection of Warranties:** The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept work for the project where a special warranty, certification or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

52.5 SUBMITTALS

- A. Submit written warranties to the Engineer prior to the date **certified** for Substantial Completion. If the Engineer's certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the work, or a designated portion of the work, submit written warranties upon request of the Engineer.
 - 1. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within fifteen (15) days of completion of that designed portion of the work.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Engineer for approval prior to final execution.

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1. Refer to individual Sections of Divisions 03 through 16 for specific content requirements and particular requirements for submittal of special warranties.
 - C. Form of Submittal: At final completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the project manual.
 - D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½" by 11" paper.
 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the project or installation, including the name of the product, and the name, address and telephone number of the installer.
 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the project title or name, and the name of the Contractor.
 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 53 - PRODUCTS (Not Used)

PART 54 - EXECUTION

54.1 SCHEDULE OF WARRANTIES

- A. Provide schedule of warranties as specified below:
 1. The General Contractor shall provide a 5 year warranty for all work performed under Contract to conform with the specifications, applicable codes and industry standards in addition to specific warranties for individual products. This warranty shall provide for labor and materials necessary to replace, or repair, any work performed under this contract.
 2. Concrete (Division 03): The Contractor shall provide a single source materials and performance warranty for all concrete work performed to conform with the Contract Documents, applicable codes and industry standards and against premature deterioration for a period of 5 years.
 3. Epoxy Injection (Division 03): The Contractor shall provide a single source materials and performance warranty that the epoxy resin injection system will not tear or fail for a period of three years.
 4. Waterproofing (Division 07):
 - a. Section 079500 – Expansion Joint Systems: The Contractor shall provide a single source materials and performance warranty that the installed expansion joint system,

- including related work in the slab, will not leak water or debond from adjacent concrete for a period of 5 years.
- b. Section 071000 – Deck Coating and Sealants: The Contractor shall provide a single source materials and performance warranty that the installed sealants and/or deck coating system or surface sealer, including related work, will not allow water beneath the system, will not debond from the structural slab, crack or prematurely deteriorate for a period of 5 years.

END OF SECTION 017400

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 55 - GENERAL

55.1 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.

55.2 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 013000 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

55.3 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**.

55.4 CLOSEOUT SUBMITTALS

- A. Submit operation and **m**aintenance 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. Engineer and Owner 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 by email to Engineer and Owner. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Engineer and Owner 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 15 days before commencing demonstration and training. Engineer and Owner will return copy with comments.
 - 1. Correct or revise each manual to comply with Engineer and Owner's comments. Submit copies of each corrected manual within 15 days of receipt of comments and prior to commencing demonstration and training.
- E. Comply with Section 017000 "Project Closeout" for schedule for submitting operation and maintenance documentation.

55.5 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 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.

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- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. 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 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.

55.6 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."

55.7 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.

55.8 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 **I**nstructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, **s**upplier, and manufacturer to **m**aintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
 2. Shutdown instructions for each type of **e**mergency.
 3. Operating instructions for conditions outside normal operating **l**imits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

55.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. **S**ystems and Equipment Operation Manual: **A**ssemble 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. **E**ngage 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 **m**anual for use by Owner's operating personnel.
- B. **C**ontent: In addition to requirements in this Section, include operation data required in individual **S**pecification Sections and the following information:
1. System, **s**ubsystem, 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.

55.10 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.

55.11 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 56 - PRODUCTS (Not Used)

PART 57 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 020700 – SELECTIVE DEMOLITION

PART 58 - GENERAL

58.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

58.2 SUMMARY

- A. This Section specifies the selective removal and subsequent offsite disposal of the following:
 - 1. Isolated areas of damaged concrete as noted on the drawings to be repaired.
 - 2. Portions of existing building indicated on drawings and as required to accommodate new construction.
 - 3. Removal and protection of **existing** fixtures, materials and equipment items.
- B. Removal work specified elsewhere:
 - 1. Membrane and insulation removal is specified in Division 07.
 - 2. Cutting non-structural masonry walls for piping, ducts and conduits is included with the work of the respective mechanical and electrical specification sections in Divisions 15 and 16.

58.3 SUBMITTALS

- A. General: Submit the following **in** accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping and continuation of utility services as required, together with details for dust and noise control protection.
 - 1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 - 2. Coordinate with Owner's continuing occupation of portions of existing building and with Owner's partial occupancy of completed work.
 - 3. Contractor shall review, with the Owner and Engineer, the types of equipment which he proposed to use during operations and obtain Owner's approval for such use.

- C. Photographs of existing conditions of structure surfaces, equipment and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.
- D. Shoring plans, details and calculations, signed and sealed by a professional **engineer** registered in the project's jurisdiction for all shoring required for construction.

58.4 JOB CONDITIONS

- A. Occupancy: Owner will occupy portions of the building immediately adjacent to and above areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility **for** actual condition of items or structures to be demolished.
 - 1. Examine areas and conditions under which the work is to occur. Notify the Engineer immediately, in writing, of any conditions detrimental to the proper and timely completion of this work.
 - 2. Proceed with the work only after **unsatisfactory** conditions have been acceptably remedied.
 - 3. Conditions existing at time of inspection **for** bidding purposes will be maintained by Owner insofar as practicable. However, **minor variations** within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- C. Partial Demolition and Removal: **Items** indicated to be removed, but of salvageable value to Contractor, **may** be removed from structure as work progresses. Transport salvaged items from site as they **are** removed.
 - 1. Storage or sale of removed items on **site** will not be permitted.
- D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to **selective** demolition work.
 - 1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to occupied portions of building.
 - 2. Erect temporary covered passageways as required by authorities **having** jurisdiction.
 - 3. Provide interior and exterior shoring, bracing or support to prevent movement, settlement or collapse of structure or **element** to be demolished and adjacent facilities **or** work to remain.
 - 4. Protect from damage existing finish **work**, signs, windows, doors, **plantings**, parking equipment, etc. that is to remain in place **during** demolition operations.
 - 5. Protect floors with suitable coverings when necessary.
 - 6. Construct temporary insulated dustproof partitions where required to separate areas where noisy **or** extensive dirt or dust operations are performed. Equip partitions **with** dustproof doors **and** security locks.

7. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 8. Remove protections at completion of work.
 9. Protect adjoining properties, public thoroughfares, sidewalks and utilities from damage due to demolition operations.
 10. Take adequate precautions to prevent unauthorized personnel from entering the job site.
- E. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
- F. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 2. Protect vehicles and their occupants within or adjacent to the building from hazards or damages. Provide clean and unobstructed driveways
- G. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
- H. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
1. Do not interrupt utilities service occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
 2. Maintain fire protection services during selective demolition operations.
- I. Environmental Controls: Use water sprinkling, temporary enclosures and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
1. Do not use water when it may create hazardous or objectionable conditions, such as ice, flooding and pollution.
 2. Provide necessary protection to prevent airborne construction material, debris, fumes, etc. from entering adjacent building, air intakes, etc.
 3. Provide necessary ventilation systems, independent of building systems, to remove dust and fumes from work area.

PART 59 - PRODUCTS (Not Used)

PART 60 - EXECUTION

60.1 PREPARATION

- A. General: Provide interior and exterior shoring, bracing or support to prevent movement, settlement or collapse of areas to be demolished and adjacent facilities to remain.
1. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
 2. Cover and protect furniture, equipment and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.
 3. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
 - a. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of minimum 4-inch studs, ½-inch painted plywood on occupied side, ½-inch fire-retardant plywood on demolition side. Fill partition cavity with sound-deadening insulation.
 - b. Provide weatherproof closures for exterior openings resulting from demolition work.
 4. Locate, identify, stub off and disconnect utility services that are not indicated to remain.
 - a. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during changeover.

60.2 DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.
1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctions with construction to remain using power-driven masonry saw or hand tools.
 2. The Contractor shall size and locate demolition equipment throughout structure and promptly remove debris in a manner to avoid imposing excessive loads on supporting walls, floors or framing.
 3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
 4. Perform demolition using procedures and equipment which will avoid spalling, cracking or other damage to existing concrete or finishes.

- B. If unanticipated mechanical, electrical or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.
- C. Perform selective partial demolition of delaminated or spalled areas of the concrete structure to prepare the areas for repair in accordance with the drawings and the following Article 3.3

60.3 DELAMINATED CONCRETE SURFACE PREPARATION

- A. Location and Marking of Work Areas:
 - 1. The Contractor shall locate floor slab surface delaminations by sounding the surface with a hammer or rod, or dragging a chain. The Contractor shall sound all floor slabs. Delaminated areas once located by the Contractor will be further sounded to define their limits. These limits or "boundaries" shall be marked with chalk or paint.
 - 2. Beam, joist, wall, curb, column and ceiling delaminations shall be located by sounding the appropriate member with a hammer or rod. Cracks, usually horizontal in orientation along beam faces and vertical in orientation near corners of columns, are reliable indicators of delaminated concrete. Delaminated areas once located by the Contractor will be further sounded to define their limits. These limits or "boundaries" shall be marked with chalk or paint.
 - 3. Prior to concrete removal, these marked limits shall be reviewed and approved by the Engineer. The limits shall be relocated if directed by the Engineer to minimize the area of demolition.
- B. Concrete Removal and Surface Preparation:
 - 1. The depth of cover over reinforcing steel at delaminated, spalled and unsound concrete areas shall be determined by removing the delaminated concrete and/or the use of metal-detection equipment. Damaged concrete areas shall then have their marked boundaries sawcut to a depth of ½ inch into the concrete except where the depth of the cut needs to be reduced to avoid damaging the existing reinforcing. At beams, joists, columns, curbs and edges of slabs and walls, the sawcut shall be extended around the intersecting surfaces of the members where the damage occurs at the edge of a member. A diamond blade saw or grinder with abrasive disk suitable for cutting concrete is acceptable for performing this work. All edges shall be straight and patch areas square or rectangular shaped. The edge cut at the delamination boundary shall be dressed perpendicular to the member face. It shall also be of uniform depth for the entire length of the cut.
 - 2. All concrete shall be removed from within the marked boundary to a minimum depth of ¾ inch using maximum 15-pound chipping hammers equipped with chisel point bits. If delaminations exist beyond the minimum removal depth or beyond the marked boundary, the Engineer shall be notified and then, after the approval of the Engineer or his representative, chipping shall continue until all unsound and delaminated concrete has been removed.

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3. Where reinforcing bars (or mesh) are exposed by concrete removal, extra caution shall be exercised to avoid damaging the reinforcement during removal operations. Concrete removal of $\frac{3}{4}$ inch minimum around and beyond the perimeter of the bar for the entire exposed length is required. Optionally, mesh may be removed and new mesh spliced with existing. Removing and replacing the mesh is incidental to cost of concrete demolition and placement.
 4. If rust is present on reinforcing bars where they enter sound concrete, then additional removal of concrete along the reinforcement is required. Such additional removal shall continue until grey reinforcement is exposed. If rust persists beyond the removal limits, the Engineer shall be advised and will direct further removals.
- C. Inspection of the Surfaces and Exposed Reinforcing:
1. After removals are completed, but prior to final cleaning, the cavity and all exposed reinforcement shall be inspected by the Engineer. The inspection shall include sounding the exposed concrete to determine completeness of delamination removals, examination of dressed edges to verify depth and vertical edge of cut, and uniformity of excavation to insure compliance with minimum limits specified.
 2. The Engineer shall inspect all reinforcement exposed within this cavity for defects due to corrosion or for damage resulting from Contractor's removal operations. Replacement of defective or damaged reinforcement shall be performed in accordance with the drawings.
- D. Cleaning and Securing of Reinforcing:
1. Where noted on the drawings, all exposed steel shall be cleaned and epoxy coated in accordance with Section 03300.
 2. Loose reinforcing steel shall be secured by either tying loose top reinforcing bars to partially bonded reinforcing bars or drilling supplemental anchors into the existing floor and installing tie downs. Lead anchors are not permitted. Securing loose reinforcement is incidental to surface preparation and no extras will be allowed for this work.
- E. Final Preparation:
1. Cavity surfaces will be examined by the Engineer prior to concrete placement.
 2. All concrete bonding surfaces shall be abrasive-blasted prior to concrete placement and prior to applying epoxy coating to reinforcing steel, if required.
 3. The cavity shall then be cleaned with high-pressure water.
 4. Air-blasting is required as final step to remove debris.
 5. The concrete surfaces against which the repair material is to be placed shall be moistened to saturated-surface-dry condition immediately prior to the placement of the material
- 60.4 DISPOSAL OF DEMOLISHED MATERIALS
- A. Remove, from building site, debris, rubbish and other materials resulting from demolition operations. Transport and legally dispose off site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.
2. Burning of removed materials is not permitted on project site.

60.5 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections not required for subsequent construction activities and leave interior areas broom clean.
 1. Repair demolition performed in **excess** of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.
 2. Clean adjacent facilities of dust, dirt and debris resulting from demolition operations.

END OF SECTION 020700

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 61 - GENERAL

61.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

61.2 SUMMARY

- A. This Section specifies non-specialty cast-in place concrete, including mix design, placement procedures and finishes.
- B. This Section also specifies formwork and reinforcing for both non-specialty cast-in-place concrete and specialty repair concretes.
- C. Specialty repair concretes are specified in other Division 03 specifications.

61.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcing and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, epoxy coating and others as requested by Engineer.
- C. Shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI SP-66 (88), "ACI Detailing Manual", showing bar schedules, stirrup spacing, diagrams of bent bars and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. Include locations of construction joints and additional reinforcing for construction joints.
- D. Shop drawings and calculations for formwork, prepared, signed and sealed by a registered Professional Engineer, for fabrication and erection of forms for specific finished concrete surfaces. Show form construction, including jointing, special form joint or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually. Formwork, shoring and reshoring shop drawings and calculations must bear the seal and signature of an engineer registered in the jurisdiction where the project is located.

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1. Engineer's review is to **confirm** that the base building information shown is in general conformance with the Contract Documents. Design of formwork for structural stability and efficiency is Contractor's responsibility.
 - E. Samples of materials as requested by Engineer, including **names**, sources and descriptions, as follows:
 1. Reglets.
 2. Epoxy coated welded wire fabric.
 - F. Concrete **mix** designs.
 - G. Laboratory test reports for concrete materials and mix design test.
 - H. Materials **certificates** in lieu of materials laboratory test reports when permitted by Engineer. Materials **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. Provide the Engineer with written certification from the coating manufacture that the coating resin for steel reinforcement has been approved by the National Bureau of Standards.
 - I. Minutes of Pre-Construction **Conference**.

61.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified.
 1. ACI 318, "Building Code Requirements for Reinforced Concrete".
 2. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
 3. ACI 301, "Specifications for Structural Concrete for Buildings".
 4. ACI 347, "Recommended Practice for Concrete Formwork".
 5. Structural Properties of Steel Formwork: American Iron and Steel Institute (AISI), "Specification for the Design of Light Gauge Cold-Formed Steel Structural Members".
 6. ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures", as published by the American Concrete Institute.
 7. CRSI "Guidelines for Inspection and Acceptance of Epoxy Coated Reinforcing Bars at the Jobsite".
 8. Standards of the American Society for Testing and Materials (ASTM), as cited.
- B. Concrete Testing Service: **The Contractor shall engage a testing** laboratory acceptable to the Owner to perform material evaluation tests and quality control.
- C. Field Inspection Service: The Contractor shall engage an inspection agency acceptable to the Owner to inspect formwork and reinforcement placement prior to concrete placement.

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- D. Materials and installed work may require testing and retesting at any time during progress of work. Contractor shall cooperate with the laboratory to facilitate the execution of testing services.
- E. The expense of any and all re-inspection, re-testing, redesign and/or replacement of work that is required due to failure of concrete to meet all Contract Documents' requirements shall be borne by the Contractor.
- F. Pre-Construction Conference: Conduct conference at project site to comply with requirements of Division 1 Section "Project Meetings" and the following:
1. At least 14 days prior to submittal of design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing and certifications. Request that representatives of each entity directly concerned with cast-in-place concrete attend conference, including, but not limited to, the following:
 - a. Contractor's superintendent.
 - b. Laboratory responsible for concrete design mixes.
 - c. Laboratory responsible for filed quality control.
 - d. Ready-mix concrete producer.
 - e. Concrete subcontractor.
 - f. Primary admixture manufacturers.
 - g. Concrete pumping subcontractor.
 - h. Engineer and Owner's representative.
 2. Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within 5 days of the meeting.
 3. For projects which include the use of lightweight concrete, the minutes shall include a statement by the lightweight concrete aggregate manufacturer and the admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these specifications.
- G. Materials and installed work may be reviewed by the Engineer at any time during the progress of the work. Allow free access to facilities for this purpose. Provide 24 hours notice to Engineer to inspect completed forms prior to placement of concrete.

PART 62 - PRODUCTS

62.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds with a **maximum** VOC of 305 mg/l that will not bond with, stain or adversely effect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removal or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1½ inches to exposed surface.

62.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed with epoxy coating, ASTM A 775.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric, epoxy coated.
- D. Fibrous Reinforcement: **Engineered** polypropylene fibers designed for secondary **reinforcement** of concrete slabs.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "PSI Fiberstrand 100", by Euclid Chemical Co.
 - b. "Fibermesh", by Fibermesh, Inc.
 - c. "Forta Ultramet", by Forta Corp.
 - d. "Grace Fibers", by W.R. Grace & Co.
- E. Supports for Reinforcement:
 - 1. Provide stainless steel or plastic tipped supports for reinforcement in contact with formwork, including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place. Use wire bar-type supports complying with CRSI recommendations.
 - 2. Supports, including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing in place shall be manufactured from a dielectric material, or wire bar supports shall be coated with dielectric material, such as epoxy or vinyl, compatible with concrete.
 - 3. Supports for welded wire fabric shall be placed at 2'-0" maximum spacing. Supports for bars shall be placed at 4'-0" maximum spacing. Supports shall be placed a maximum of 6 inches from ends of the reinforcement.
- F. Epoxy Coating for Mild Reinforcement:

1. Shop-applied epoxy coating for mild steel reinforcement shall conform to ASTM A 775-81. Brown or red coatings are not permitted. Provide **one** of the following epoxy coatings for new mild steel reinforcement and steel accessories as noted on the drawings and specifications:
 - a. "Scotchkote 413", by 3M Company.
 - b. Or Approved Equal.
 2. Use patching material recommended by the epoxy powder manufacturer, compatible with the epoxy coating and inert in concrete. Provide one of the following materials:
 - a. "Scotchkote 323R", by 3M Company.
 - b. Or Approved Equal.
- G. Field-Applied Epoxy Coating:
1. Field-applied epoxy coating materials for existing steel reinforcement and embedded items; provide one of the following epoxy coatings for existing steel reinforcement after abrasive-blasting to Near White Metal, as noted on the drawings and specifications:
 - a.
 - b. "MasterProduct P 8100AP" by BASF Construction Chemicals, LLC
 - c. "Armatec110 EpoCem" by Sika Corporation
 - d. Or Approved Equal.
- H. Tie Wire:
1. Tie wire shall be plastic or vinyl coated for all epoxy coated reinforcement.
- I. Delivery, Storage and Handling:
1. Deliver all reinforcement to the project site bundled, tagged and marked. Use metal tags indicating bar sizes, lengths and other information corresponding to markings shown on placement diagrams. Handle and store materials to prevent damage, rust or contamination. Store reinforcing steel on supports above ground level. Protect from weather.
 2. Epoxy coated reinforcement:
 - a. Comply with requirements of ASTM A 775, "Epoxy Coated Reinforcing Steel Bars", and CRSI "Guidelines for Inspection and Acceptance of Epoxy Coated Reinforcing Bars at the Job Site".
 - b. Provide adequately padded contact areas on all systems used for handling epoxy coated bars.
 - c. Pad all bundling bands and lift all bundles with a strong back, multiple supports or platform bridge so as to prevent bar-to-bar abrasion due to **sags** in the bar bundle.
 - d. Do not drop or drag bars or bundles.
 - e. Adequately support bars or bundles during transit to prevent **damage** to the coating.
 - f. Store bars on wooden cribbing.

- g. If bars are to be stored on site for more than one month before placement, cover bars with opaque polyethylene sheeting, properly secured. Do not store bars at the job site unprotected over the winter.

J. **Basis of Payment:**

- 1. State in the Bid Form the in-place unit cost per foot for furnishing and placing epoxy coated mild steel Grade 60 reinforcement.
- 2. Epoxy coating existing steel is incidental to cost of concrete demolition and placement.

62.3 **CONCRETE MATERIALS**

A. **Portland Cement:** ASTM C 150, Type I.

- 1. Use one brand of cement throughout project unless otherwise acceptable to Engineer.

B. **Normal Weight Aggregates:** ASTM C 33 and as herein specified. Provide aggregates from a single source for exposed concrete.

- 1. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
- 2. Local aggregates not complying with ASTM C 33, but that special tests or actual service have shown to produce concrete of adequate strength and durability may be used when acceptable to Engineer.

C. **Lightweight Aggregates:** ASTM C 330.

D. **Water:** Drinkable.

E. **Admixtures, General:** Provide admixtures for concrete that contain not more than 0.05 percent chloride ions.

F. **Air-Entraining Admixture:** ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Conair", by Cormix.
 - b. "Air-Mix", by Euclid Chemical Co.
 - c. "Darex AEA" or "Daravair", by W.R. Grace & Co.
 - d. "MasterAir VR 10" or "MicroAir AE 200", by Master Builders, Inc.
 - e. "Sika AER", by Sika Corp.

G. **Water-Reducing Admixture:** ASTM C 494, Type A.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a.
 - b. "Eucon WR-75", by Euclid Chemical Co.
 - c. "WRDA 64", by W.R. Grace & Co.
 - d. "MasterPozzolith" or "MasterPolyheed", by Master Builders, Inc.
 - e. "Plastocrete 161", by Sika Corp.

- H. High-Range, Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or G.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "A-H Super P", by Anti-Hydro Co., Inc.
 - b. "Eucon 37", by Euclid Chemical Co.
 - c. "MasterRheobuild 1000", by Master Builders, Inc.
 - d. "Sikament 686", by Sika Corp.

- I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type R or C.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Q-Set", by Dayton Superior Corp.
 - b. "Accelguard 80", by Euclid Chemical Co.
 - c. "Daraset", by W.R. Grace & Co.
 - d. "MasterSet FP 20", by Master Builders, Inc.

- J. Corrosion Inhibitor: ASTM C 494, Type C, containing no chloride ions. Use a calcium nitrate based corrosion inhibitor.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "DCI-S", by W.R. Grace & Co.

- K. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are **not** permitted.

- L. Certification: Written conformance to the requirements and the chloride-ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.

62.4 CONCRETE ACCESSORIES

- A. Delivery, Storage and Handling

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1. Deliver concrete accessories to the project site bundled or packaged, tagged and marked indicating the product, size, manufacturer and other identifying information.
 2. Store materials at the site in such a way to maintain them dry, undamaged and clean.
- B. Reglets: Unless noted otherwise in Division 7 Specification Sections, where resilient or elastomeric sheeting flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217 inch thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- C. Granular Base: Evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs-on-grade.
- D. Vapor Retarder: Provide vapor retarder cover over prepared base material where indicated below slabs-on-grade. Use only materials that are resistant to deterioration when tested in accordance with ASTM E 154, as follows:
1. Polyethylene sheet not less than 8 mils thick.
- E. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- F. Moisture-Retaining Cover: **One of the following**, complying with ASTM C 171.
1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- G. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
1. Available Products: Subject to compliance with requirements, products that **may** be incorporated in the work include, but are not limited to, the following:
 - a. "Cure & Seal 309 J18", by Dayton Superior Corp.
 - b. "Aqua-Cure VOX", by Euclid Chemical Co.
 - c. "Dress & Seal", by L&M Construction Chemicals, Inc.
 - d. "MasterSeal", by Master Builders, Inc.
 - e. "VOCOMP-20", by W.R. Meadows, Inc.
- H. Chemical Bond Anchor Bolts:
1. Provide sizes and types of bolts as indicated on the drawings. Bolts to be **stainless steel** or hot-dipped galvanized, unless noted.
 2. Provide one of the following embedded anchor systems:
 - a. "HILTI HIT RE500 Epoxy Adhesive Anchor System", by Hilti, Inc. Fastening Systems.
 - b. "Epcon Epoxy Anchoring System", by ITW Ramset/Red Head.
 - c. Or Approved Equal.

I. **Anchors Bolts:**

1. Provide sizes as shown on drawings.
2. ASTM F1554 Grade 36.

J. **Expansion Bolts:**

1. Provide sizes as shown on drawings.
2. All anchors and associated hardware to be stainless steel or hot-dipped galvanized.
3. Approved expansion anchor systems:
 - a. "Kwik Bolt II", by Hilti.
 - b. Or Approved Equal.

K. **Reinforcing Steel Chemical Anchorage System:**

1. "HILTI HIT RE500 Epoxy Adhesive Anchor System", by Hilti, Inc. Fastening Systems.
2. "Epcon Epoxy Anchoring System", by ITW Ramset/Red Head.
3. Engineer Approved Equal.

L. **Permanent Compressible Joint Filler:**

1. Joint filler in slabs and curbs as indicated on the drawings. Acceptable products are:
 - a. "Ceramar Flexible Foam E.J. Filler", by W.R. Meadows, **Elgin, IL**.
 - b. Or Approved Equal.
2. Joint **filler** used vertically to isolate walls from columns or other walls, white molded polystyrene beadboard type, as indicated on the drawings.

M. **Temporary Compressible Joint Filler:**

1. Joint filler in slabs, curbs and walls which must be removed prior to joint sealant installation as indicated on the drawings. Acceptable products are:
 - a. White molded polystyrene beadboard.
 - b. Or Approved Equal.

62.5 **PROPORTIONING AND DESIGN OF MIXES**

- 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. If trial batch method used, use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

- B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.
- C. Design **mixes** to provide normal weight concrete with the properties as indicated on the drawings and schedules:
- D. Lightweight Concrete: Proportion mix as specified. Design mix to produce strength and modulus of elasticity as noted on drawings, with a dry weight of **not** more than 115 lbs. after 28 days. Limit shrinkage to 0.03 percent at 28 days.
- E. Adjustment to Concrete Mixes: Mix design adjustments **may** be requested by **Contractor** when characteristics of materials, job conditions, weather, test results or other circumstances warranted, as accepted by Engineer. Laboratory test data for revised **mix** design and strength results must be submitted to and accepted by Engineer before using in work.
- F. The total water soluble chloride ion content of the mix, including all constituents and admixtures, shall not exceed 0.15 percent by weight of cement.
- G. Slump **Limits**: Proportion and design **mixes** to result in concrete slump at point of placement as follows:
 - 1. Ramps, Slabs and Sloping Surfaces: Not more than **3 inches**.
 - 2. Concrete Containing HRWR Admixture (Superplasticizer): Not more than 6 inches after addition of NRWR to site-verified 2-inch± to 1-inch slump concrete.
 - 3. For concrete consolidated by vibrating screeds, the slump at point of discharge shall not exceed 4 inches.
 - 4. Other Concrete: Not more than 4 inches.

62.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete as required for placement and workability.
- B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50° F.
- C. Use high-range water reducing admixture (HRWR) in pumped concrete, architectural concrete, parking structure slabs, concrete required to be watertight and concrete with water/cement ratios below 0.50.
- D. Use air-entraining admixture in all 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 1½% within following limits:
 - a. 5.5 percent 1½-inch **max. aggregate**.
 - b. 6.0 percent 1-inch **max. aggregate**.

- c. 6.5 percent $\frac{3}{4}$ -inch max. aggregate.
 - d. 7.0 percent $\frac{1}{2}$ -inch max. aggregate.
- E. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.
- F. Use calcium nitrate based corrosion inhibitor at a rate of 2.0 gallons per cubic yard of concrete. The water in the corrosion inhibitor shall be included in the calculations for the water/cement ratio of the concrete **mix**.

62.7 CONCRETE MIXING

- A. **Job-Site Mixing:** Mix materials for concrete in appropriate drum-type batch machine mixer. For mixers of one cu. yd. or smaller capacity, continue mixing at least 1½ minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1½ **minutes** of mixing time by 15 seconds for each additional cu. yd. or fraction thereof.
- B. Provide batch tickets for each batch discharged and used in work, indicating project identification name and number, date, **mix** type, mix time, quantity and amount of water introduced.
- C. **Ready-Mix Concrete:** Comply with requirements of ASTM C 94 and as specified.
1. **When** air temperature is between 85° F and 90° F, reduce **mixing** and delivery time from 1½ hours to 75 minutes, and when air temperature is above 90° F, reduce mixing and delivery time to 60 minutes.

PART 63 - EXECUTION

63.1 GENERAL

- A. Inspect area to receive **the** work and report immediately in writing to the Engineer, as required in the General Conditions, **any** unacceptable conditions. Starting work constitutes acceptance of conditions.
- B. Coordinate the installation of joint **materials** and vapor retarders **with** placement of forms and reinforcing steel.

63.2 FORMS

- A. **General:** The Contractor shall **design, erect, support, brace** and maintain formwork to support vertical and 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 complying with 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 leakage of cement paste.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. 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.
- D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of 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 concrete is placed. Retighten forms and bracing before concrete placement as required to prevent mortar leaks and maintain proper alignment.

63.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. **General**: Following leveling and tamping of granular base for slabs-on-grade, place vapor retarder/barrier sheeting with longest dimension parallel with direction of pour.
- B. Lap **joints** 6 inches and seal vapor barrier joints with **manufacturers'** recommended mastic and pressure-sensitive tape.

63.4 PLACING REINFORCEMENT

- A. **General**: Comply with Concrete Reinforcing Steel Institute's **recommended** practice for "Placing Reinforcing Bars", for details and methods of reinforcement **placement** and supports and as herein specified.

1. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other **materials** that reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement. Locate and support reinforcing by **metal** chairs, runners, bolsters, spacers and hangers as approved by Engineer.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed **concrete** surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- F. Provide standard reinforcement splices as shown on the drawings or by lapping ends, placing bars in contact and tying tightly with wire. Comply with requirements of ACI 318 for **minimum** lap of spliced bars.

63.5 EXISTING REINFORCEMENT

- A. Where noted on the drawings, existing reinforcing and miscellaneous metal to remain shall be cleaned of rust and laitance to Near White Metal and epoxy coated in accordance with epoxy coating manufacturer recommendations.
 1. Epoxy cure time must be extended as directed by the Engineer during code weather application.
 2. Epoxy must be properly cured prior to concrete placement. **Epoxy** must not be tacky.
 3. When directed by Engineer, remove epoxy spillage from adjacent concrete surfaces.

63.6 EPOXY COATING INSPECTION AND REPAIR

- A. Uncoated ends of bars must be coated **at the job site**.
- B. Repair is required on **damaged** areas of **coating** larger than $\frac{1}{4}$ inch by $\frac{1}{4}$ inch.
- C. If more **than** 2 percent of the **total coating** on bar is damaged, bar shall be repaired or replaced.
- D. Repair damaged epoxy coating as **Engineer** directs and in accordance with ASTM A 775-81 by cleaning and field-applying epoxy **coating** using **materials** and methods recommended by the epoxy power manufacturer.
- E. **Inspection and acceptance of epoxy** coated reinforcement will be per CRSI "Guidelines for Inspection and Acceptance of **Epoxy Coated Reinforcing Bars** at the Job Site".

63.7 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Engineer.
- B. Provide keyways at least **1½ inches deep** in construction joints in walls and slabs and between walls and footings. Acceptable bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated. Do not continue reinforcement through sides of strip placements.
- D. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.
 - 1. Joint filler and sealant materials are specified in Division 7 Sections of these specifications.
- E. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts ⅛ inch wide by ¼ slab depth or inserts ¼ inch wide by ¼ of slab depth, unless otherwise noted.
 - 1. Form contraction joints by inserting pre-molded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 - 3. If joint pattern not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
 - 4. Joint sealant material is specified in Division 7 Sections of these specifications.

63.8 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto. All embedded items used for attachment of formwork to concrete and other miscellaneous items shall be epoxy coated.
- B. The Contractor shall be responsible for controlling the proper placing of all embedded pipe, conduit and other fixtures. ACI 318, Article 6.3, shall apply to all cases of embedded fixtures. Minimum cover requirements for reinforcing shall apply to all embedded items unless shown otherwise on the drawings.

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- C. Use suitable templates to accurately set and support against displacement all bolts, inserts, sleeves or other embedded items.
 - D. Install reglets to receive top edge of foundation sheet waterproofing and to receive thru-wall flashings in outer face of concrete frame at exterior walls, where flashing is show at lintels, relieving angles and other conditions.
 - E. Forms for Slabs: Set edge forms, bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

63.9 PREPARATION OF FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, non-residual, low-VOC, form-coating compound before reinforcement is placed.
- B. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- C. Remove form coating and residue from reinforcement or surfaces not requiring form coating.
- D. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.

63.10 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.
- B. General: Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete" and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or derbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 3. Maintain reinforcing in proper position during concrete placement.
- F. Cold-Weather Placing: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions or low temperatures.
- G. When air temperature has fallen to **or is expected** to fall below 40° F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50° F and not more than 80° F at point of placement.
1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 2. Do not use calcium chloride, salt and other materials containing antifreeze **agents** or **chemical** accelerators unless otherwise accepted in mix designs.
- H. Hot-Weather Placing: When hot weather conditions exist that would seriously impair **quality** and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90° F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.
- 63.11 FINISH OF FORMED SURFACES
- A. Rough Form Finish: For formed concrete surfaces not **exposed** to view in the **finish work** or concealed by other construction. This is the concrete **surface** having texture imparted by form-

facing material used, with tie holes and defective areas repaired and patched and fins and other projects exceeding ¼ inch in height rubbed down or chipped off.

- B. **Smooth Form Finish:** For formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting or other similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. **Grout-Cleaned Finish:** Provide grout-cleaned finish to scheduled concrete surfaces that have received smooth form finish treatment.
 - 1. Combine one part portland cement to 1½ parts fine sand by volume and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to consistency of thick paint. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.
 - 2. Thoroughly wet concrete surfaces, apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- D. **Related Unformed Surfaces:** At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

63.12 MONOLITHIC SLAB FINISHES

- A. **Float Finish:** Apply float finish to monolithic slab surfaces to receive broom finish and other finishes as hereinafter specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing or sand-bed terrazzo, and as otherwise indicated.
 - 1. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Check and level surface plans to tolerances of Ff 18 – F1 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- B. **Non-Slip Broom Finish:** Apply non-slip broom finish to all concrete decks and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

63.13 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed **concrete** from premature **drying** and excessive cold or hot temperatures. In hot, dry and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Perform curing of concrete by curing and sealing compound, by **moist** curing, by moisture-**retaining** cover curing, and by combinations thereof, as herein specified.
- D. Provide moisture curing by following methods:
 - 1. Keep concrete surface continuously wet by **covering** with water.
 - 2. Use continuous water-fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges with **4 inch** lap over adjacent absorptive covers.
- E. Provide **moisture-retaining** cover **curing** as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 2. Inspect the concrete surface at the beginning and end of each work day. If the surface appears to be dry, remove the cover, apply water to the surface and replace the cover.
- F. Curing Formed Surfaces: Cure **formed** concrete surfaces, including underside of beams, supported slabs and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- G. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping and other flat surfaces, by application of appropriate curing method.

63.14 SHORES AND SUPPORTS

- A. General: Comply with ACI 347 for shoring and reshoring in multi-story construction, and as herein specified.
- B. Shore floor **directly** under floor or roof being placed, so that loads from **construction** above will transfer directly to these **shores**. Space shoring in stories below this level in such **a** manner that no floor or **member** will be **excessively** loaded or will induce tensile stress in **concrete** members

where no reinforcing steel is provided. **Extend** shores beyond minimums to ensure proper distribution of loads throughout structure.

- C. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.
- D. **Keep** reshores in place until concrete has attained its required 28-day compressive strength and heavy loads due to construction operations have been removed.

63.15 REMOVAL OF FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns and similar parts of the work, may be removed after cumulatively curing at not less than 50° F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs and other structural elements, may not be removed until concrete has attained at least 75 percent of design minimum compressive strength. Determine compressive strength of in-place concrete by testing lab-cured specimens representative of concrete location or members. Reshore concrete immediately after removal of formwork.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

63.16 REUSE OF FORMS

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed,, delaminated or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance and tighten forms to close joints. Align **and** secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, **except** as acceptable to Architect.

63.17 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: **Fill** in holes and openings left in concrete structures for passage of work by other trades, **unless** otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners intersections and terminations slightly rounded.

63.18 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms when acceptable to Architect.
1. Cut out honeycomb, rock pockets, voids over $\frac{1}{4}$ inch in any dimension and holes left by tie rods and bolts, down to solid concrete but, in no case, to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.
 2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having required slope.
1. Repair finished unformed surfaces that contain defects that affect durability of concrete. Surface defects, as such, including crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets and other objectionable conditions.
 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to

sound concrete with clean, square cuts and expose reinforcing steel with at least $\frac{3}{4}$ inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

- D. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to $2\frac{1}{2}$ parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack before bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- E. Repair methods not specified above may be used, subject to acceptance of Engineer.

63.19 QUALITY CONTROL TESTING UNDER CONSTRUCTION

- A. General: The Contractor shall employ a **testing** laboratory to perform tests and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. Sampling Fresh Concrete: ASTM C 172, **except** modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - 3. Concrete Temperature: Test hourly when air temperature is 40° F and below, when 80° F and above, and each time a set of compression test specimens is made.
 - 4. Compression Test Specimen: ASTM C 31; one set of ten standard cylinders for each compressive strength test, unless otherwise directed. Mold and store four cylinders at the site under the same curing conditions as the concrete which they represent. Transport the remaining six cylinders to the laboratory for laboratory-cured test specimens.
 - 5. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds., plus additional sets for each 50 cu. yds. more than the first 25 cu. yds. of each concrete class placed in any one day; two field-cured specimens and two lab-cured specimens tested at 7 days, two field-cured specimens and two lab-cured specimens tested at **28 days**, and two specimens retained in reserve for later testing if required.
 - 6. When frequency of testing will provide fewer than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

- D. Test results will be reported in writing to Owner, Structural Engineer, Ready-Mix Producer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, data of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope or other nondestructive testing may be permitted but shall not be used as the sole basis for acceptance or rejection.
- F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 033000

SECTION 033500 – CONCRETE REPAIRS

PART 64 - GENERAL

64.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

64.2 WORK INCLUDED

- A. Provide labor, equipment, materials and supervision to install concrete patching as shown on the drawings and as hereinafter specified.
- B. Perform all work in strict accordance with all applicable laws and regulations of the building code and with all other authorities having jurisdiction, which shall take precedence over the requirements of the Specifications, except that where the requirements of the Specifications are more **exact**ing or stringent, they shall govern.
- C. Before **commencing** work, **examine** all adjoining work on which this work is dependent and report, in writing to the Owner or Engineer, any condition which prevents Contractor **from performing** the work. Starting work constitutes acceptance of adjoining work.
- D. Verify **exact sizes** and locations of all openings, pipe sleeves, **concrete** pads or curbs, etc. well in advance so that any required Engineer approved adjustments in **reinforcing** or locations **may be made** without interruption of the work schedule.
- E. **Install** all **materials** specified under other sections which are required to be built into the work covered by this section, such as anchors, ties, dovetail anchor slots, etc. Embedded items shall have been inspected and tests for mechanical operations, if any, **shall have been completed** and approved by the **Engineer** before placement of any concrete.
- F. Remove and reinstall **all electrical** conduit, **mechanical** conducts, light fixtures, mechanical equipment, etc. necessary for the proper **completion of** repairs. Remove and **discard** all abandoned conduit located in patching areas.

64.3 REFERENCE STANDARDS

- A. Conform to the latest edition of the following Codes and Standards:
 - 1. ACI 301, "Specification for **Structural Concrete for Buildings**", by the American Concrete Institute.

2. ACI 318, "Building Code Requirements for Reinforced Concrete", by the American Concrete Institute.
3. ACI 347, "Recommended Practice for Concrete Formwork", by the American Concrete Institute.
4. ACI 306, "Recommended Practice for Cold Weather Concreting", by the American Concrete Institute.
5. ACI 305, "Recommended Practice for Hot Weather Concreting", by the American Concrete Institute.
6. ACI 614, "Recommended Practice for Measuring, Mixing and Placing Concrete", by the American Concrete Institute.
7. Standards of the American Society for Testing and Materials (ASTM), as cited.
8. FHWA-RD-77-85, "Sampling and Testing for Chloride Ion in Concrete", by the Federal Highway Administration.
9. Any material or operation specified by reference to the published specifications of a manufacturer, the American Society for Testing and Materials (ASTM), the American Institute of Steel Construction (AISC), the American National Standards Institute (ANSI), the American Welding Society (AWS), the American Concrete Institute (ACI), the Concrete Reinforcing Steel Institute (CRSI) or other published standards shall comply with the requirements of the standard listed. In case of a conflict between the referenced specification and the project specifications or the Code, the more stringent specifications shall govern.

64.4 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Concreting: In accordance with ACI 306.
- B. Hot Weather Concreting: In accordance with ACI 305.
- C. Inclement Weather:
 1. Unless adequate protection is provided, concrete shall not be placed during rain, sleet or snow.
 2. Rain water shall not be allowed to increase mixing water or to damage the surface finish.

64.5 SCHEDULING

- A. Coordinate work with that of other trades to allow reasonable time to set sleeves, inserts and other accessories.
- B. Notify the Engineer and the Testing Agency at least 48 hours prior to placing any concrete.

64.6 EXPERIENCE AND QUALIFICATIONS

- A. The Contractor, or Restoration Subcontractors, shall have not less than two years experience in the field of structural concrete restoration work.

- B. Upon request from the Engineer, the Contractor shall submit a written description of construction ability, including equipment, facilities, personnel and a list of similar completed projects to the Engineer.

64.7 SUBMITTALS

- A. Submit all materials and methods for concrete curing to the Engineer for approval prior to beginning concreting work.

B. Design Mix:

1. For each strength and type of concrete, the Contractor shall be responsible for mix proportions and have a concrete design mix prepared by an independent testing laboratory. Latex and micro-silica modified concrete mix designs and high-early strength cement concrete mix design shall be reviewed and agreed to by the manufacturers. Proper proportions for the design mixes shall be in accordance with "Recommended Practice for Selecting Proportions for Normal Weight Concrete", ACI Standard 211 or according to ACI 318. The proper water-cement ratio shall be determined by preliminary test made in accordance with "Method of Making and Curing Concrete Compression and Flexure Tests Specimens in the Laboratory", ASTM C 192. Tests shall be conducted in accordance with "Method Test for Compressive Strength of Molded Concrete Cylinders", ASTM C 39. Each design mix shall be furnished to the Engineer and his approval must be obtained prior to commencing any concrete operations.
2. A site batched, latex modified, concrete mix design is provided in Paragraph 2.1.G. If a concrete mix other than suggested in Paragraph 2.1.G is used, then the Contractor shall be responsible for mix proportions and have a concrete design mix prepared by an independent testing laboratory in accordance with this Paragraph B. If Contractor chooses to utilize the suggested latex concrete mix, then the mix shall be submitted to the latex manufacturer for approval, and to an independent testing agency to determine expected slump and to confirm that the mix will meet design parameters based on local aggregate sources. Each approval must be submitted to the Engineer prior to commencing with concrete operations.

C. Mix designs are required for:

1. Patching materials for all structural members.

D. Submit to the Engineer mix designs for review of the concrete specified herein, including the following information:

- | | |
|--|------------|
| 1. Design mix method | ACI 318 |
| 2. Weight of material per cubic yard | ASTM C 29 |
| 3. Type of cement and manufacturer | ASTM C 172 |
| 4. Cement content, bags per cubic yard | |
| 5. Amount of superplasticizing agent | |
| 6. Water-cement ratio | |
| 7. Amount of air-entraining agent | ASTM C 231 |

8.	Volumetric air content – percent	ASTM C 173
9.	Sieve analysis and source, coarse aggregate	ASTM C 13, C 33, C 330
10.	Sieve analysis and source, fine aggregate	ASTM C 136, C 33, C 330
11.	Weight, hardened – pounds per cubic foot	ASTM C 138
12.	Slump range	ASTM C 143
13.	Seven-day compressive strength	AASTM C 31, C 39
14.	Twenty-eight day compressive strength	ASTM C 31, C 39

- E. The Contractor shall warrant by the submission of the design mix that such mix is totally representative of the concrete(s) that he intends to supply to meet the requirements of the Contract Documents. The Contractor shall submit new design mixes for review when any change in materials is required or needed.
- F. Upon request from Engineer, the Contractor shall submit certified cement mill test reports to the Engineer for each type and run of cement used in the work (ASTM C 150).
- G. Upon request from the Engineer, the Contractor shall submit certified laboratory chemical and analyses for aggregates and admixtures as deemed necessary.
- H. Contractor shall maintain plan drawing sepias or mylars locating all concrete repairs performed under this Section. Location, size of patches and quantities must be clearly noted on drawings. Added reinforcement shall be noted on these drawings. Separate drawing shall be maintained for each level and ceiling plan. Measurement of all repair areas and quantities shall be made upon completion of demolition and preparation work noted in Section 02070 and on the drawings. The drawings noting these quantities shall be submitted to the Engineer for verification and approval prior to application of patching materials.
- I. Contractor shall submit copy of drawing identifying current quantities with each payment request. Work being invoiced must be properly identified. These drawings shall be incorporated into record set required in Division 1.

64.8 STORAGE OF MATERIALS

- A. Store materials on platforms off ground; protect stored cement against elements. Handle and store aggregates separately in a manner to prevent intrusion of foreign material. Protect all material hereinafter specified until used. Any material which has deteriorated or which has been damaged shall not be used.

64.9 BASIS OF PAYMENT

- A. All patching materials shall be paid for on a unit of measurement basis as noted on the Bid Form. Estimated nominal depth of all patches is 3” unless otherwise noted on the drawings.

64.10 WARRANTIES

- A. Completed concrete repairs shall be guaranteed jointly and separately by the installation contractor and by material manufacturer against defects in material and application, for a period of five years from the date of substantial completion.
 - 1. Defects shall include cracking in and around the patch perimeter, scaling, delamination, spalling and rust staining from underlying reinforcing steel.
- B. All defects in concrete repair areas shall be repaired by replacing the defective concrete at no cost to the Owner. Repair work shall include removal and replacement of any coatings (elastomeric, traffic bearing, waterproofing, etc.), as required, at no cost to the Owner.

PART 65 - PRODUCTS

65.1 CONCRETE MATERIALS

- A. Portland Cement shall conform to ASTM "Standard Specifications for Portland Cement C150, Type I or III.
- B. Aggregates for concrete shall conform to ASTM Standard Specifications for Concrete Aggregate, ASTM C 33, Exposure 4S.
 - 1. Fine aggregate shall be natural sand, or sand prepared from stone or gravel. Grains shall be clean, hard, durable, uncoated and free from silt, loam and clay.
 - 2. Coarse aggregate shall be crushed stone, gravel or other approved inert materials of similar characteristics. Maximum size aggregate for shallow depth patches (3" or less) shall be nominal 3/8". See C33 size number 8 for gradation requirements. Maximum 3/4" size aggregate should be used on deeper patches to help reduce cracking.
 - 3. Aggregate be certified by the supplier to be non-reactive with alkalis when evaluated in accordance with Appendix A of ASTM C 33.
- C. Water is to be clean and potable.
- D. Ready-Mix Concrete:
 - 1. Ready-mix concrete shall conform to ASTM C 94. The mixing agitation shall begin within 30 minutes, and the concrete shall be discharged from the truck within 90 minutes after the water has been added to the concrete mix.
 - 2. Delivery tickets are to accompany each concrete truck and shall be kept in the job superintendent's file. Delivery tickets must indicate the following information or be subject to rejection:
 - a. Name of project.
 - b. Supplier of concrete.
 - c. Truck identity and ticket.

- d. Serial number.
 - e. Batching time.
 - f. Point of deposit.
 - g. Total amount of water.
 - h. Strength classification.
 - i. Number of cubic yards in load.
 - j. Date of delivery.
 - k. Brand of cement.
 - l. Cement content.
 - m. Weight of aggregate.
 - n. Admixture contents.
 - o. Name of contractor.
 - p. Name of driver.
 - q. Admixture volume.
 - r. Daily temperature.
3. Ready-mix concrete shall be certified by supplier, in writing to the Engineer, to conform to Contract Documents and design mix.
- E. Volumetric Batching/Continuous Mix:
1. Volumetric batching or continuous mixers shall conform to "Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing", ASTM C 685.
 2. Batch tickets are to accompany each batching operation and shall be kept in the job superintendent's file. Batch tickets must indicate the following information or be subject to rejection:
 - a. Name of product.
 - b. Supplier of concrete.
 - c. Mixer identity and ticket.
 - d. Serial number.
 - e. Batching time.
 - f. Point of deposit.
 - g. Strength classification.
 - h. Weight of aggregate.
 - i. Daily temperature.
 - j. Number of cubic yards produced.
 - k. Date of delivery.
 - l. Brand of cement.
 - m. Cement content.
 - n. Admixture contents.
 - o. Admixture volume.
 - p. Name of contractor.
 3. Batched concrete shall be certified by supplier, in writing to the Engineer, to conform to Contract Documents and design mix.

F. Site Batched Concrete for Slab Patching:

1. Latex or micro-silica modified concrete or high-early strength cement concrete shall be used for slab and curb patching.
2. Contractor may batch latex or micro-silica modified concrete or high-early cement concrete patch material on site. The concrete shall be mixed in a rotary mixer capable of producing sufficient concrete so that placement and finishing operations can proceed at a steady pace.
3. All components of the concrete mix must be proportioned by weight. Components shall be individually weighed using a calibrated scale sufficient for such purposes. Calibration certificate will be required.
4. All materials must be stored in dry conditions, protected from rain or runoff.
5. For each day Contractor site batches concrete, testing agency shall obtain from Contractor one sample each of coarse and fine aggregate and proceed to measure moisture content. Moisture content may be determined in the field or laboratory, but must be reported, in writing, to Engineer. Contractor to adjust mix accordingly.
6. Contractor to submit laboratory determined moisture content of coarse and fine aggregate to determine Saturated Surface Dry (SSD) condition.
7. Below is an allowable mix design for a latex modified concrete patch and overlay material:
8.
 9. **Mix Design for 1-Sack Mix** (Approximately 3 cubic feet)
 - 10.
 11. Cement Type 1 ASTM C 150 94 lbs.
 12. Sand ASTM C 33
174 lbs.
 13. Stone ASTM C 33
176 lbs.
 14. Size No. 8
 15. Latex-Dow Modified A
3.3 gal..
 16. Water Gallons
1.2 gal.
 17. A.E. 5½% ± 1½%
 18. W/C Ratio
Max. 0.40
 19. Or Approved Equivalent
- 20.

G. Concrete Properties:

1. Minimum strength for micro-silica concrete and latex modified concrete at 28 days shall be 4500 psi.
2. Minimum strength at 24 hours for high-early strength cement concrete shall be 4000 psi.
3. Unless otherwise noted on the drawings the maximum water-cementitious ratio, where cementitious refers to cement and micro-silica, if included, shall be:
 - a. For High-early Strength Cement Concrete: As specified by manufacturer.

-
- b. For all other concrete: 0.40
4. Latex mix shall contain a minimum of 3.5 gallons of latex (50 percent solids) per 94 pounds of cement.
 5. Micro-silica mix shall contain a minimum of 10 percent micro-silica by weight of cement.
 6. Unless otherwise specified by the admixture manufacturer and approved by the Engineer, the slump of concrete, as determined by "Method of Test for Slump of Portland Cement Concrete", ASTM C 143, shall be plus 1" or minus 1½" from the design mix slumps noted in Section 03300, Cast-in-Place Concrete, paragraph 2.6.F.
 7. Total air content in concrete as determined by "Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method", ASTM C 173, or "Air Content of Freshly Mixed Concrete by Pressure Method", ASTM C 231, shall be:
 - a. Micro-Silica Concrete: 6½% plus or minus 1% by volume.
 - b. Latex Concrete: 5½% plus or minus 1½% by volume.
 - c. High-early Strength Cement Concrete: As specified by manufacturer.
 8. Concrete temperatures, as placed, shall be between 55° and 80° F. Concrete shall be placed within 90 minutes of adding water to the mix.
 9. The total water soluble chloride ion content of the mix, including all constituents and admixtures, shall not exceed 0.15 percent by weight of cement.
 10. Where noted to be included in the concrete, calcium nitrate based corrosion inhibitor shall be added to the mix at a rate of 2.0 gallons per cubic yard of concrete. The water in the corrosion inhibitor shall be included in the calculation for the water-cementitious ratio of the concrete.

65.2 ADMIXTURES

- A. Admixtures may be used by the Contractor at no additional expense to the Owner in order to provide workability at low water-cement ratios, increased compressive strength, retarding or acceleration of the concrete, if approved in writing by the Engineer; however, the cement factor shall not be reduced and changes shall be made in the other mix proportions to insure the minimum strength requirements. No admixtures shall be added to the high-early strength cement concrete mix unless allowed by the cement manufacturer in writing.
- B. Air-entraining admixtures shall conform to ASTM C 260.
- C. Water-reducing admixture shall conform to ANSI/ASTM C 494.
- D. High-range water-reducing admixture (superplasticizer) shall conform to ASTM C 494, Type G or F.
- E. Water-reducing accelerator admixture shall conform to ASTM C 494, Type C or E. Accepted materials are:
 1. "Accelguard 80", by Euclid Chemical Co.
 2. "MasterSet FP 20", by Master Builders.

3. or Approved Equivalent.
- F. No calcium chloride shall be used. Chlorides in admixtures should not exceed 0.05% by weight of admixture.
- G. Latex emulsion shall be:
 - 1.
 2. "Styrofan 1186", by BASF, Chattanooga, TN.
 3. or Approved Equivalent.
- H. Micro-silica shall be:
 1. "Emsac", by Elkem Chemicals, Inc., Pittsburgh, PA
 2. "Force 10,000", by W.R. Grace Concrete Admixtures, Cambridge, MA
 3. or Approved Equivalent.
- I. Calcium nitrate-based corrosion inhibitor shall conform to ASTM C 494, Type C specifications, such as:
 1. "DCI-S", by W.R. Grace Co.
 2. or Approved Equivalent.

65.3 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC of 305 mg/l that will not bond with, stain or adversely effect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removal or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1½ inches to exposed surface.

65.4 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed with epoxy coating, ASTM A 775.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric, epoxy coated.
- D. Fibrous Reinforcement: Engineered polypropylene fibers designed for secondary reinforcement of concrete slabs.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "PSI Fiberstrand 100", by Euclid Chemical Co.
 - b. "Fibermesh", by Fibermesh, Inc.
 - c. "Forta Ultramet", by Forta Corp.
 - d. "Grace Fibers", by W.R. Grace & Co.
- E. Supports for Reinforcement:
1. Provide stainless steel or plastic tipped supports for reinforcement in contact with formwork, including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place. Use wire bar-type supports complying with CRSI recommendations.
 2. Supports, including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing in place shall be manufactured from a dielectric material, or wire bar supports shall be coated with dielectric material, such as epoxy or vinyl, compatible with concrete.
 3. Supports for welded wire fabric shall be placed at 2'-0" maximum spacing. Supports for bars shall be placed at 4'-0" maximum spacing. Supports shall be placed a maximum of 6 inches from ends of the reinforcement.
- F. Epoxy Coating for Mild Reinforcement:
1. Shop-applied epoxy coating for mild steel reinforcement shall conform to ASTM A 775-81. Brown or red coatings are not permitted. Provide one of the following epoxy coatings for new mild steel reinforcement and steel accessories as noted on the drawings and specifications:
 - a. "Scotchkote 413", by 3M Company.
 - b. Or Approved Equal.
 2. Use patching material recommended by the epoxy powder manufacturer, compatible with the epoxy coating and inert in concrete. Provide one of the following materials:
 - a. "Scotchkote 323R", by 3M Company.
 - b. Or Approved Equal.
- G. Field-Applied Epoxy Coating:
1. Field-applied epoxy coating materials for existing steel reinforcement and embedded items; provide one of the following epoxy coatings for existing steel reinforcement after abrasive-blasting to Near White Metal, as noted on the drawings and specifications:

- a.
- b. "MasterProduct P 8100AP" by BASF Construction Chemicals, LLC
- c. "Armatec110 EpoCem" by Sika Corporation
- d. Or Approved Equal.

H. Tie Wire:

1. Tie wire shall be plastic or vinyl coated for all epoxy coated reinforcement.

I. Delivery, Storage and Handling:

1. Deliver all reinforcement to the project site bundled, tagged and marked. Use metal tags indicating bar sizes, lengths and other information corresponding to markings shown on placement diagrams. Handle and store materials to prevent damage, rust or contamination. Store reinforcing steel on supports above ground level. Protect from weather.
2. Epoxy coated reinforcement:
 - a. Comply with requirements of ASTM A 775, "Epoxy Coated Reinforcing Steel Bars", and CRSI "Guidelines for Inspection and Acceptance of Epoxy Coated Reinforcing Bars at the Job Site".
 - b. Provide adequately padded contact areas on all systems used for handling epoxy coated bars.
 - c. Pad all bundling bands and lift all bundles with a strong back, multiple supports or platform bridge so as to prevent bar-to-bar abrasion due to sags in the bar bundle.
 - d. Do not drop or drag bars or bundles.
 - e. Adequately support bars or bundles during transit to prevent damage to the coating.
 - f. Store bars on wooden cribbing.
 - g. If bars are to be stored on site for more than one month before placement, cover bars with opaque polyethylene sheeting, properly secured. Do not store bars at the job site unprotected over the winter.

J. Basis of Payment:

1. State in the Bid Form the in-place unit cost per foot for furnishing and placing epoxy coated mild steel Grade 60 reinforcement.
2. Epoxy coating existing steel is incidental to cost of concrete demolition and placement.

65.5 RELATED MATERIALS

A. Trowel-applied mortar may be used for patching vertical and overhead surfaces as noted on the drawings shall be one of the following:

1. "Renderoc HB or HBA", by Fosroc, Inc., Plainview, NJ
2. "Sikatop 123 PLUS", by Sika, Lyndhurst, NJ
3. or Approved Equivalent.

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- B. Grout shall achieve 28-day strength of 6000 psi per ASTM C 109. Exposed grout color shall match surrounding concrete.
- C. Moisture-retaining cover shall be one of the following, complying with ANSI/ASTM C 171:
1. Waterproof paper over burlap.
 2. Polyethylene film over burlap.
 3. Polyethylene-coated burlap.
- D. Where noted to be provided, bonding grout, using same materials as repair material, shall be worked into the concrete surface with stiff brooms or brushes immediately prior to repair material placement. The slurry shall be applied evenly to a uniform minimum thickness of $1/16$ inch to $1/8$ inch throughout. Grout shall not be allowed to dry or dust prior to placement of the concrete material.
1. **Latex**, high-early strength and micro-silica bonding grout shall be proportioned by the manufacturer. Submit mix to Engineer.
 2. As a minimum, concrete bonding grout shall consist of equal parts of volume of sand and cement with sufficient water to achieve consistency of stiff pancake batter.
 3. Epoxy bonding material shall not be used without approval of the Engineer.

PART 66 - EXECUTION

66.1 JOINTS

- A. Construction of control joints in slabs passing through patches shall be tooled through the patch for continuity.

66.2 PLACING CONCRETE PATCHING MATERIALS

- A. Prior to concrete placement, all preparation, including inspection, must be completed.
- B. All concrete bonding surfaces must be abrasive blasted prior to concrete placement, except for hydro-demolished areas inspected and accepted by the Engineer as ready for concrete placement.
- C. Before placing concrete, formwork, if required, shall have been completed; foreign material shall have been removed, reinforcement shall have been secured in place and the entire preparation shall have been approved by the Engineer prior to placing concrete. Engineer shall be notified at least 24 hours prior to desired time of inspection.
- D. Joist and beam repairs may be formed on one side and bottom. Concrete must be packed behind all rebar. Unformed surface shall have steel troweled finish. Voids must be patched with trowel-applied mortar following abrasive blasting of bonding surfaces.

- E. Immediately prior to the placing of concrete, the Contractor shall thoroughly clean all cavities **and** forms of foreign matter and remove all wood spreaders. Convey concrete from mixer to destination as rapidly as practicable and by methods which will prevent segregation or loss of ingredients. Concrete shall be poured in one operation up to temporary bulkheads. If construction joints are permitted, new concrete shall not be placed until the contact surface of the concrete in place has been swept with a stiff brush or scraped to remove laitance and roughened. One hour prior to placing concrete, pre-wet bonding surface with a uniform spray application of water; puddles shall be blown clean. Surface shall be maintained in a surface-dry damp condition until the concrete is placed.
- F. All concrete shall be placed with the aid of mechanical vibrators of approved type. Enough vibration shall be used to cause all concrete to flow or settle readily into place. The vibrators shall be of the internal type. Form vibrators or vibrating screeds may also be employed. Vibrators must not be allowed to touch reinforcement embedded in partially set concrete nor used to lead concrete immediately prior to placement of concrete material.
1. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of the vibrator. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- G. Place concrete only when temperature is at least 40° F and rising. If these conditions are not met, refer to ACI 306, "Cold Weather Concreting".
- H. **When** concrete is placed under conditions of hot weather concreting or hot weather conditions **exist** at any time during the day of the pour, provide extra protection of the concrete against excessive placement temperatures and excessive drying throughout the placing and curing operations. Hot weather is defined as air temperature which exceeds 80° F or any combination of high temperature, low humidity and/or high wind velocity which caused a rate of evaporation in excess of 0.2 pounds per square feet per hour as determined by Figure 2.1.5 of ACI Report 305, "Hot Weather Concreting".
1. Cool the forms, reinforcement and the air by water fog spraying immediately before placing concrete.
 2. The placement temperature of the concrete shall be 55° to 80° F.
 3. Protect concrete during finishing operations by continuous fog spray between finishing operations. Excessive water on surface during finishing is not accepted.
- I. When bleed water has left the surface, apply a medium broom finish to **exposed** concrete surfaces not receiving a deck coating. Areas to receive a deck coating shall **have** a finished approved by the coating manufacturer. **Finish** shall be approved by the **Engineer**.
- J. Check and level surface plane to a tolerance not exceeding ¼ inch in 10 feet when tested with a 10-foot straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. No refloating is required.
- K. Maximum variation between slab surfaces at joints shall not **exceed** 1/16 inch.

-
- L. Concrete patches shall be edged to match existing condition (beam and column edges, etc.), unless noted.

66.3 CURING

- A. Concrete and concrete patching materials shall be cured according to the manufacturer's recommendations and according to the following minimum requirements:
 - 1. The surface shall be covered with a single layer of clean, wet burlap as soon as the surface will support it without deformation.
 - a. For conventional or micro-silica concrete, maintain burlap in saturated conditions for a minimum of ten days. A curing compound may then be applied to the concrete or the saturated burlap may continue to be used until the concrete has attained its required 28-day compressive strength.
 - b. For latex modified concrete and rapid set cement concrete, maintain burlap in saturated condition for a minimum of two days. Then allow the burlap to dry slowly for an additional 24 hours. Keep traffic off of the material until the concrete has been surface-dry for a minimum of two days.
 - 2. Curing time shall be extended, as the Engineer directs, when the curing temperature falls below 50° F.
- B. If shrinkage cracks appear in the concrete material prior to completion of the initial 72-hour curing period, the concrete shall be considered defective, and it shall be removed and replaced by the Contractor at no extra cost to the Owner.
- C. Curing compounds may not be used without prior approval of the Engineer.
- D. During the period of curing, the patch shall be protected from traffic; slab demolition from above or below shall be halted. During the period of initial concrete set, no traffic shall be permitted on the adjacent bays.
- E. Prior to reopening patches to traffic and loading, Contractor must confirm that patch concrete has attained a minimum compressive strength of 70% of the specified 28-day strength.

66.4 QUALITY CONTROL

- A. General: The Contractor shall employ a testing agency to perform the required testing and submit reports on the tests.
- B. Notify the Testing Agency of scheduled pour dates and notify the Testing Agency 48 hours in advance of placing concrete.
- C. Addition of water to concrete trucks at the site will not be permitted; however, initial adjustments to air and slump will be permitted by site added superplasticizer or air-entraining agents. Retest

of air content, slump, unit weight and recasting of cylinders will be required. Additional discharge time will not be permitted beyond the maximum 90 minutes.

- D. Sampling and testing for quality control during placement of concrete includes the following:
1. Sampling **Fresh** Concrete: ASTM C 172, **except** modified for slump to comply with ASTM C 94.
 2. Slump: ASTM C 143; one test for each concrete load at point of placement.
 3. Air Content: ASTM C 173, "Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method", for lightweight or normal weight concrete; or ASTM C 231, "Air Content of Freshly Mixed Concrete by the Pressure Method", for normal weight concrete; one test for each load delivered to the project. Also, sample concrete immediately following placement and screeding at the rate of one per every 5 trucks delivered to the project.
 4. Concrete Temperature: Test each load of concrete.
 5. Compression Test Specimen: ASTM C 31, one set of ten standard cylinders for each compressive strength test. Contractor may **use** 3"x6" cylinders for site batched concrete.
 6. Unit Weight: ASTM C 138, test each time air is measured.
 7. Compressive Strength Tests: ASTM C 39, one set of 6 cylinders for each concrete class placed in **any** one day, 2 field-cured specimens and 2 lab-cured specimens tested at 7 days, 2 field-cured specimens and 2 lab-cured specimens tested at 28 days, 2 lab-cured specimens retained in reserve for later testing, **if** required. An additional 10 cylinders shall be produced for each additional 10 cubic yards, or portion thereof, placed **after** the initial 10 cubic yards placed for each concrete class.
 8. Test results will be reported, in writing to Engineer and Contractor, on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, **name** of concrete testing agency, concrete supplier, Contractor's name, technician's **name**, weather data, concrete type and class, location of concrete batch in structure, **design** compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of **break** for both 7-day tests and 28-day tests.
- E. Sampling and testing for quality control during placement of trowel-applied mortar includes the following:
1. Concrete **Compressive** Strength:
 - a. Mold test cubes in accordance with ASTM C 109 as follows:
 - 1) Take minimum of six cubes for each 10 cubic feet, or fraction thereof, of each repair mortar placed in any one day. Use 2"x2" cubes.
 - 2) Additional two cubes shall be taken and field cured under conditions of cold weather concreting and when **directed** by Engineer.
 - b. **Cover** specimens properly, immediately **after** finishing. Protect molds from contact with sources of water for first 24 hours after molding.
 - c. Fabricate and cure **test** cubes per ASTM C 109, except as follows:

- 1) Do not remove specimens from molds before 24 hours.
- 2) To verify 7 and 28-day compressive strengths:
 - a) During first 24 hours after molding, store test specimens under conditions that maintain temperature immediately adjacent to specimens in range of 60 to 80° F and prevent loss of moisture from specimens.
 - b) Remove test specimens from molds at end of 24 hours and air dry in laboratory until moment of test.
- d. To verify compressive strength of test cubes required due to cold weather concreting conditions:
 - 1) Store test specimens on structure as **near to** point of sampling as possible and protect from elements in same manner as that given to portion of structure as specimen represents.
 - 2) Transport to test laboratory no more than 4 hours before testing. Remove molds from specimens immediately before testing.
- e. Compression Test:
 - 1) Test 3 cubes at 3 days.
 - 2) Test 3 cubes at 7 days.
 - 3) Test 3 cubes at 28 days.
 - 4) Hold 3 cubes in reserve for use as **Engineer** directs.
- f. Unless notified by **Engineer**, reserve cubes may be discarded without being testing after 60 days.
- g. Additional Tests:
 - 1) The testing **agency will** make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by **Engineer**. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.
 - 2) Additional compressive strength tests of at least two additional **compression** test specimens for each test may be made to verify that the concrete has attained sufficient early strength to allow removal of forms or shoring or resumption of traffic on the area. The Contractor shall pay for such tests unless the Contract Documents or written directive by the Owner note that early attainment of strength is required.
- h. The patched areas shall be sounded by the **Engineer** with a chain drag or hammer 7 days after concrete placement. The Contractor shall repair all hollowness detected by removing and replacing the patch or affected area at no extra cost to the Owner.

REFURBISHMENT OF PARKING GARAGE'S STORM, SANITARY, AND
WASHDOWN SYSTEMS: PIPES VALVES, ACTUATORS WITH
INTEGRATED ELECTRIC/PNEUMATIC CONTROL PACKAGES
MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION
DIVISION OF PARKING MANAGEMENT

IFB #1086044

END OF SECTION 033500

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 67 - GENERAL

67.1 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Grout.

67.2 ACTION SUBMITTALS

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

PART 68 - PRODUCTS

68.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

68.2 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 69 - EXECUTION

69.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. **Exception:** Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
 - 2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- C. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 8413 "Penetration Firestopping."

69.2 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. **Exterior Concrete Walls above Grade:**
 - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 and Larger: Cast-iron wall sleeves.
 - 2. **Concrete Slabs above Grade:**
 - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.
 - 3.

END OF SECTION 220517

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 70 - GENERAL

70.1 SUMMARY

A. Section Includes:

- 1.
2. **Bronze** ball valves.

B. Related Sections:

1. Section 22 0553 "Identification for Plumbing Piping and Equipment" for **valve** tags and schedules.
2. Section 22 1116 "Domestic Water Piping" for valves applicable only to this piping.

70.2 ACTION SUBMITTALS

- A. Product Data: For each type of **valve** indicated.

70.3 QUALITY ASSURANCE

- A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
- B. NSF Compliance: NSF 61 for **valve materials** for potable-**water** service.

PART 71 - PRODUCTS

71.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve **Pressure** and **Temperature Ratings**: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator **Types**:
- 1.

2. Handlever: For quarter-turn valves NPS 6 and smaller.

E. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Solder Joint: With sockets according to ASME B16.18.
3. Threaded: With threads according to ASME B1.20.1.

71.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

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.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - f.
2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.

PART 72 - EXECUTION

72.1 VALVE INSTALLATION

- A. Install **valves** with unions or flanges at each piece of equipment arranged to allow service, **maintenance**, and equipment removal without system shutdown.
- B. Locate **valves** for easy **access** and provide separate support where necessary.

- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

72.2 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

72.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: **Ball valves**.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Select valves, **except** wafer types, **with the** following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends **except** where solder-joint valve-end option is indicated in valve schedules below.
 - 2. joint valve-end option is indicated in valve schedules below.

72.4 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint **ends instead** of threaded ends.
 - 2. Ball Valves: Two piece, **full port**, bronze with stainless steel trim.

END OF SECTION 22 0523

SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING

PART 73 - GENERAL

73.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

73.2 SUMMARY

- A. Section Includes:
 - 1. Brass ball valves.
 - 2. Bronze ball valves.
 - 3. Steel ball valves.
 - 4. Iron ball valves.

73.3 DEFINITIONS

- A. CWP: Cold working pressure.

73.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. **Certification** that products comply with NSF 61 Annex G[**and NSF 372**].

73.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves **for shipping as follows**:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set **ball valves open to minimize** exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. **Maintain valve** end protection.

2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 74 - PRODUCTS

74.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
1. ASME B1.20.1 for threads for threaded end valves.
 2. ASME B16.1 for flanges on iron valves.
 3. ASME B16.5 for flanges on steel valves.
 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 5. ASME B16.18 for solder-joint connections.
 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G[and NSF 372] for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
1. Gear Actuator: For quarter-turn valves [NPS 4 (DN 100)] <Insert size> and larger.
 2. Handlever: For quarter-turn valves smaller than [NPS 4 (DN 100)] <Insert size>.
- H. Valves in Insulated Piping:
1. Include 2-inch (50-mm) stem extensions.
 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 3. Memory stops that are fully adjustable after insulation is applied.

74.2 BRASS BALL VALVES

A. Brass Ball Valves, One-Piece:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. **Description:**
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 400 psig (2760 kPa).
 - c. Body Design: One piece.
 - d. Body Material: Forged brass or bronze.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Brass or stainless steel.
 - h. Ball: Chrome-plated brass or stainless steel.
 - i. Port: Reduced.

B. Brass Ball Valves, Two-Piece with Full Port and Brass Trim:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. **Description:**
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: Two piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Full.

C. Brass Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. **Description:**
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: Two piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Full.

D. Brass Ball Valves, Two-Piece with Regular Port and Brass Trim:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: Two piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Regular.

E. Brass Ball Valves, Two-Piece with Regular Port and Stainless-Steel Trim:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: Two piece.
 - d. Body Material: Brass or bronze.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Regular.

F. Brass Ball Valves, Three-Piece with Full Port and Brass Trim:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: Three piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Full.

G. Brass Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: Three piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Full.

74.3 BRONZE BALL VALVES

A. Bronze Ball Valves, One-Piece with Bronze Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 400 psig (2760 kPa).
 - c. Body Design: One piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded.
 - f. Seats: PTFE.
 - g. Stem: Bronze.
 - h. Ball: Chrome-plated brass.
 - i. Port: Reduced.

B. Bronze Ball Valves, One-Piece with Stainless-Steel Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig (4140 kPa).
 - c. Body Design: One piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Reduced.

C. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Two piece.
- d. Body Material: Bronze.
- e. Ends: Threaded and soldered.
- f. Seats: PTFE.
- g. Stem: Bronze or brass.
- h. Ball: Chrome-plated brass.
- i. Port: Full.

D. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Two piece.
- d. Body Material: Bronze.
- e. Ends: Threaded or soldered.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Full.

E. Bronze Ball Valves, Two-Piece with Regular Port and Bronze or Brass Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Two piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE.
- g. Stem: Bronze or brass.
- h. Ball: Chrome-plated brass.
- i. Port: Regular.

F. Bronze Ball Valves, Two-Piece with Regular Port and Stainless-Steel Trim:

1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Two piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Regular.

G. Bronze Ball Valves, Three-Piece with Full Port and Bronze or Brass Trim:

- 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- 2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Three piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE.
- g. Stem: Bronze or brass.
- h. Ball: Chrome-plated brass.
- i. Port: Full.

H. Bronze Ball Valves, Three-Piece with Full Port and Stainless-Steel Trim:

- 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- 2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Three piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Full.

I. Bronze Ball Valves, Three-Piece with Regular Port and Bronze Trim:

- 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)
- 2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Three piece
- d. Body Material: Bronze
- e. Ends: Threaded or soldered.
- f. Seats: PTFE.
- g. Stem: Bronze.
- h. Ball: Chrome-plated brass.
- i. Port: Regular.

J. Bronze Ball Valves, Three-Piece with Regular Port and Stainless-Steel Trim:

- 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- 2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Three piece.
- d. Body Material: Bronze.
- e. Ends: Threaded or soldered.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Regular.

K. Bronze Ball Valves, Two-Piece, Safety-Exhaust:

- 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- 2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: Two piece.
- d. Body Material: Bronze, ASTM B 584, Alloy C844.
- e. Ends: Threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Chrome-plated brass, with exhaust vent opening for pneumatic applications.
- i. Port: Full.

74.4 STEEL BALL VALVES

A. Steel Ball Valves with Full Port, Class 150:

- 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- 2. Description:

- a. Standard: MSS SP-72.
- b. CWP Rating: 285 psig (1964 kPa).
- c. Body Design: Split body.
- d. Body Material: Carbon steel, ASTM A 216, Type WCB.
- e. Ends: Flanged or threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Full.

B. Steel Ball Valves with Regular Port, Class 150:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. **Description:**

- a. Standard: MSS SP-72.
- b. CWP Rating: 285 psig (1964 kPa).
- c. Body Design: Uni-body.
- d. Body Material: Carbon steel, ASTM A 216, Type WCB.
- e. Ends: Flanged or threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Regular.

74.5 IRON BALL VALVES

A. Iron Ball Valves, Class 125:

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. **Description:**

- a. Standard: MSS SP-72.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Split body.
- d. Body Material: ASTM A 126, gray iron.
- e. Ends: Flanged or threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel.
- i. Port: Full.

PART 75 - EXECUTION

75.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

75.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

75.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.
4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.

75.4 LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 PSIG (1035 kPa) OR LESS)

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze[**and Brass**] Valves: May be provided with solder-joint ends instead of threaded ends.
2. Brass ball valves, one piece.
3. Bronze ball valves, one piece with [brunze] [stainless-steel] trim.
4. Brass ball valves, two-piece with [full] [regular] port and [brunze] [stainless-steel] trim.
5. Bronze ball valves, two-piece with [full] [regular] port and [brunze or brunze] [stainless-steel] trim.
6. Brass ball valves, three-piece with full port and [brunze] [stainless-steel] trim.
7. Bronze ball valve, three-piece with full port and [brunze or brunze] [stainless-steel] trim.
8. Bronze ball valves, two-piece with regular port and [brunze] [stainless-steel] trim.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Steel and Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
2. Steel ball valves, Class 150 with [full] [regular] port.
3. Iron ball valves, Class 150.

75.5 HIGH-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 TO 200 PSIG (1035 TO 1380 kPa))

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze[**and Brass**] Valves: May be provided with solder-joint ends instead of threaded ends.
2. Brass ball valve.
3. Bronze ball valve, one piece with [brunze] [stainless-steel] trim.
4. Brass ball valves, two-piece with [full] [regular] port and [brunze] [stainless-steel] trim.
5. Bronze ball valves, two-piece with [full] [regular] port and [brunze or brunze] [stainless-steel] trim.
6. Brass ball valves, three-piece with full port and [brunze] [stainless-steel] trim.
7. Bronze ball valves, three-piece with full port and [brunze or brunze] [stainless-steel] trim.
8. Bronze ball valves, two-piece with regular port and [brunze] [stainless-steel] trim.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Steel and Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
2. Steel ball valves, Class 150 with [full] [regular] port.
3. Iron ball valves, Class 150.

75.6 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze[**and Brass**] Valves: May be provided with solder-joint ends instead of threaded ends.
2. Brass ball valve, one piece.
3. Bronze ball valve, one piece with [bronze] [stainless-steel] trim.
4. Brass ball valves, two-piece with [full] [regular] port and [brass] [stainless-steel] trim.
5. Bronze ball valves, two-piece with [full] [regular] port and [bronze or brass] [stainless-steel] trim.
6. Brass ball valves, **three-piece** with full port and [brass] [stainless-steel] trim.
7. Bronze ball valves, **three-piece** with full port and [bronze or brass] [stainless-steel] trim.
8. Bronze ball valves, **two-piece** with regular port and [bronze] [stainless-steel] trim.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Steel and Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
2. Steel ball valves, Class 150 with [full] [regular] port.
3. Iron ball valves, Class 150.

END OF SECTION 220523.12

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 76 - GENERAL

76.1 SUMMARY

- A. Section Includes:
1. Metal pipe hangers and supports.
 2. Fastener systems.

76.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses **within** limits and under conditions indicated according to ASCE/SEI 7.
1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

76.3 ACTION SUBMITTALS

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

PART 77 - PRODUCTS

77.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel or stainless steel.

77.2 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, **zinc**-coated or stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, **tension**, and shear capacities appropriate for supported loads and building **materials** where used.

77.3 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, **dry**, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 78 - EXECUTION

78.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Fastener System Installation:
 1. Install powder-actuated **fasteners** for use in lightweight concrete or concrete slabs **less than** 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete **after** concrete is placed and completely cured. **Install** fasteners according to manufacturer's written instructions.

- C. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- D. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- E. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- F. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

78.2 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim **excess** length of continuous-thread hanger and support rods to 1-1/2 inches.

78.3 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply **paint** by brush or spray to provide a **minimum dry film thickness** of 2.0 mils.
- B. Touchup: **Cleaning** and touchup painting of field welds, bolted connections, and abraded areas of shop paint on **miscellaneous metal** are specified in Section 09 9113 "Exterior Painting."
- C. Galvanized Surfaces: **Clean** welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

78.4 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

- C. Use nonmetallic coatings on **attachments** for electrolytic protection where attachments are in direct contact with copper tubing.
- D. Use **carbon-steel** pipe hangers and attachments for **general service** applications.
- E. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): **For** suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
- G. Vertical-Piping Clamps: Unless **otherwise** indicated and except **as** specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend

END OF SECTION 220529

SECTION 220533 - HEAT TRACING FOR PLUMBING PIPING

PART 79 - GENERAL

79.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

79.2 SUMMARY

- A. Section includes plumbing piping heat tracing for freeze prevention with the following electric heating cables:
 - 1. Self-regulating, parallel resistance.

79.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
 - 2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.
- B. Shop Drawings: For electric heating cable.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include diagrams for power, signal, and control wiring.

79.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For special warranty.

79.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.

79.6 WARRANTY

- A. **Special Warranty:** Manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.
1. **Warranty Period:** Five years from date of Substantial Completion.

PART 80 - PRODUCTS

80.1 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. Chromalox, Inc.
 2. Easy Heat; a brand of EGS Electrical Group LLC; an division of Emerson Industrial Automation.
 3. Raychem; Pentair Thermal Management.
- B. Comply with IEEE 515.1.
- C. **Heating Element:** Pair of parallel No. 16 AWG, tinned, stranded copper bus wires embedded in crosslinked conductive polymer core, which varies heat output in response to temperature along its length. Terminate with waterproof, factory-assembled, nonheating leads with connectors at one end, and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.
- D. **Electrical Insulating Jacket:** Flame-retardant polyolefin.
- E. **Cable Cover:** Stainless-steel braid and polyolefin outer jacket with ultraviolet inhibitor.
- F. **Maximum Operating Temperature (Power On):** 150 deg F (65 deg C).
- G. **Maximum Exposure Temperature (Power Off):** 185 deg F (85 deg C).
- H. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- I. **Capacities and Characteristics:**
1. **Maximum Heat Output:** 3 W/ft. (9.8 W/m) 5 W/ft. (16.4 W/m) (26 W/m) (32.8 W/m) (39.4 W/m)
 2. **Piping Diameter:** (DN).
 3. **Number of Parallel Cables:** 1.

4. Spiral Wrap Pitch: (mm).
5. Electrical Characteristics for Single-Circuit Connection:
 - a. Volts: .
 - b. Phase: .
 - c. Hertz: 60
 - d. Full-Load Amperes: .
 - e. Minimum Circuit Ampacity: .
 - f. Maximum Overcurrent Protection: .

80.2 CONTROLS

A. Pipe-Mounted Thermostats for Freeze Protection:

1. **Remote** bulb unit with adjustable temperature range from 30 to 50 deg F (minus 1 to plus 10 deg C) temperature range.
2. **Snap action**; open-on-rise, single-pole switch with minimum current rating adequate for connected cable.
3. Remote bulb on capillary, **resistance** temperature device, or **thermistor** for **directly sensing** pipe-wall temperature.
4. Corrosion-**resistant**, waterproof control enclosure.

80.3 ACCESSORIES

- A. Cable Installation Accessories: Fiberglass tape, heat-conductive putty, cable ties, silicone end seals and splice kits, and installation clips all **furnished** by manufacturer, or as recommended in writing by manufacturer.
- B. Warning Labels: Refer to Section 220553 "Identification for Plumbing Piping and Equipment."
- C. Warning Tape: Continuously printed "Electrical Tracing"; vinyl, at least 3 mils (0.08 mm) **thick**, and with pressure-**sensitive**, permanent, waterproof, self-adhesive back.
 1. Width for **Markers** on Pipes with OD, Including **Insulation**, Less Than 6 Inches (150 mm): 3/4 inch (19 mm) minimum.
 2. Width for **Markers** on Pipes with OD, Including **Insulation**, 6 Inches (150 mm) or Larger: 1-1/2 inches (38 mm) minimum.

PART 81 - EXECUTION

81.1 EXAMINATION

- A. Examine **surfaces** and substrates to receive electric heating cables for compliance with requirements for installation **tolerances** and other conditions affecting performance.
 - 1. Ensure surfaces and pipes in contact with electric heating cables are free of burrs and sharp protrusions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

81.2 INSTALLATION

- A. Install electric heating cable across expansion, construction, and control joints according to manufacturer's written instructions; use cable-protection conduit and slack cable to allow movement without damage to cable.
- B. Electric Heating-Cable Installation for Freeze Protection for Piping:
 - 1. **Install** electric heating cables after piping has **been** tested and before insulation **is installed**.
 - 2. Install electric heating cables according to IEEE 515.1.
 - 3. Install insulation over piping with electric cables according to Section 220719 "Plumbing Piping Insulation."
 - 4. Install warning tape on piping insulation where piping is equipped with electric heating cables.
- C. Set field-adjustable switches and circuit-breaker trip ranges.

81.3 CONNECTIONS

- A. Ground equipment according to **Section 260526** "Grounding and Bonding for Electrical Systems."
- B. Connect **wiring** according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

81.4 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service:** Engage a factory-authorized service representative to test and inspect components, **assemblies**, and equipment installations, including connections.

- B. Perform the following **tests** and inspections with the assistance of a factory-authorized service representative:
 - 1. Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
 - 2. Test cables for electrical continuity and insulation integrity before energizing.
 - 3. Test cables to verify rating and power input. **Energize** and measure voltage and current simultaneously.
- C. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounted cables.
- D. Cables will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

81.5 PROTECTION

- A. Protect installed heating cables, including nonheating leads, from damage during construction.
- B. Remove and replace damaged heat-tracing cables.

END OF SECTION 220533

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 82 - GENERAL

82.1 SUMMARY

- A. Section Includes:
 - 1. Pipe labels.

82.2 ACTION SUBMITTAL

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

PART 83 - PRODUCTS

83.1 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Pipe Label Contents: Include identification of piping **service** and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

PART 84 - EXECUTION

84.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

84.2 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
- B. Pipe Label Color Schedule:
1. Domestic Water Piping:
 - a. Background Color: White.
 - b. Letter Color: Blue.
 2. Storm Drainage Piping:
 - a. Background Color: White.
 - b. Letter Color: Green.

END OF SECTION 220553

SECTION 221116 - DOMESTIC WATER PIPING

PART 85 - GENERAL

85.1 SUMMARY

- A. Section includes aboveground domestic water pipes, tubes, and fittings inside buildings.

85.2 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

PART 86 - PRODUCTS

86.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G. Plastic piping components shall be marked with "NSF-pw."

86.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.

4. Solder-joint or **threaded** ends.

86.3 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 1. Standard: ASSE 1079.
 2. Pressure Rating: 150 psig minimum at 180 deg F.
 3. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Nipples:
 1. Standard: IAPMO PS 66.
 2. Electroplated steel nipple complying with ASTM F 1545.
 3. Pressure Rating and Temperature: 300 psig at 225 deg F.
 4. End Connections: Male threaded or grooved.
 5. Lining: Inert and noncorrosive, propylene.

PART 87 - EXECUTION

87.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. **Install** shutoff valve **immediately** upstream of each dielectric fitting.
- C. Install domestic water piping level and plumb.
- D. **Install** piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. **Install piping** to permit valve servicing.
- F. **Install** nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless **otherwise** indicated.
- G. Install piping free of sags and bends.

- H. Install fittings for changes in direction and branch connections.

87.2 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

87.3 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples and unions.

87.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 22 0529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

87.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

87.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 22 0553 "Identification for Plumbing Piping and Equipment."

87.7 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) **Roughing-in** Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) **Final** Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. **Reinspection**: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that **they** are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
 - B. Domestic **water** piping will be **considered** defective if it does **not pass** tests and inspections.
 - C. Prepare test and inspection reports.

87.8 ADJUSTING

- A. Perform the following adjustments before operation:
 1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Check plumbing specialties and verify proper **settings**, adjustments, and operation.

87.9 CLEANING

- A. Clean and disinfect potable **domestic water** piping as follows:
 1. Purge **new** piping and parts of **existing** piping that **have** been altered, extended, **or** repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping **system** with clean, potable water until dirty water does not appear at outlets.

- b. Submit water samples **in** sterile bottles to authorities having jurisdiction.
- B. Prepare and submit reports of purging and disinfecting **activities**. Include copies of water-sample approvals from authorities **having** jurisdiction.
- C. Clean interior of domestic water piping system. Remove dirt and debris **as** work progresses.

87.10 PIPING SCHEDULE

- A. Transition and special **fittings** with pressure ratings at least equal to piping rating may be used in applications below **unless** otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping, NPS 2, shall be one of the following:
 - 1. Hard copper tube, ASTM B 88, Type L cast- or wrought-copper, solder-joint **fittings**; and soldered joints.

END OF SECTION 221116

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 88 - GENERAL

88.1 SUMMARY

- A. Section Includes:
 - 1. Hose bibs.

88.2 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 89 - PRODUCTS

89.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61 Annex G.

89.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig **unless** otherwise indicated.

89.3 HOSE BIBBS

- A. Hose Bibbs (HB-1) Ball-Valve-Type, Hose-End Valves:
 - 1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
 - 2. Pressure Rating: 400-psig minimum CWP.
 - 3. Size: NPS 3/4.
 - 4. Body: Copper alloy.
 - 5. Ball: Chrome-plated brass.
 - 6. Seats and Seals: Replaceable.
 - 7. Handle: Vinyl-covered steel.
 - 8. Inlet: Threaded or solder joint.
 - 9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

10.

PART 90 - EXECUTION

90.1 FIELD QUALITY CONTROL

- A. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- B. Prepare test and inspection reports.

END OF SECTION 221119

SECTION 221413 - FACILITY STORM DRAINAGE PIPING

PART 91 - GENERAL

91.1 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

91.2 PERFORMANCE REQUIREMENTS

A. Component and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Storm Drainage Piping: 10-foot head of water.
2. Storm Drainage, Forec-Main Piping: 50 psig.

91.3 ACTION SUBMITTALS

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

91.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 92 - PRODUCTS

92.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

92.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings:

1. Class: ASTM A 74, Service class.

-
- B. Gaskets: ASTM C 564, rubber.

92.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings:

1. Standard: ASTM A 888.

- B. Heavy-Duty, Hubless-Piping Couplings:

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. ANACO-Husky.
- b. MIFAB, Inc.
- c. Mission Rubber Company; a division of MCP Industries, Inc.

2. Standards: ASTM C 1277 and ASTM C 1540.

3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

92.4 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

- B. Copper Drainage Fittings: ASME B16.23, cast-copper fittings or ASME B16.29, wrought-copper, solder-joint fittings.

- C. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.

1. **Flange Gasket Materials:** ASME B16.21, full-face, flat, nonmetallic, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

2. **Flange Bolts and Nuts:** ASME B18.2.1, carbon steel unless otherwise indicated.

- D. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

92.5 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:

1. **General Requirements:** Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.

2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified-piping-system fitting.
3. Shielded, Nonpressure Transition Couplings:
 - a. 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) Cascade Waterworks Mfg. Co.
 - 2) Mission Rubber Company; a division of MCP Industries, Inc.
 - b. Standard: ASTM C 1460.
 - c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

PART 93 - EXECUTION

93.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations from layout are approved on coordination drawings.
- B. Install piping indicated to be **exposed** and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- C. Install piping at indicated slopes.
- D. Install piping free of sags and bends.
- E. Install fittings for changes in direction and branch connections.
- F. Make **changes** in direction for storm drainage piping using appropriate branches, **bends**, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- G. Install storm drainage piping at the following minimum slopes unless otherwise indicated:
 1. **Horizontal Storm-Drainage Piping**: 1 percent downward in direction of flow.

-
- H. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 - I. **Install** aboveground copper tubing according to CDA's "Copper Tube Handbook."
 - J. Plumbing Specialties:
 - 1. Install drains in storm drainage gravity-flow piping. Comply with requirements for drains specified in Section 22 1423 "Storm Drainage Piping Specialties."
 - K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 - L. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 0517 "Sleeves and Sleeve Seals for Plumbing Piping."

93.2 JOINT CONSTRUCTION

- A. Join hub-and-spigot, cast-iron soil piping with gasketed **joints** according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast **Iron** Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- C. Join copper tube and fittings with soldered joints according to ASTM B 828 procedure. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
- D. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

93.3 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
 - 1. Install transition couplings at joints of piping with small differences in OD's.
 - 2. In Drainage Piping: Shielded, nonpressure transition couplings.

93.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 0529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Install **carbon-steel** pipe hangers for horizontal piping in noncorrosive **environments**.
 - 2. **Install carbon-steel** pipe support clamps for vertical piping in noncorrosive **environments**.

3. Vertical Piping: MSS Type 8 or Type 42, clamps.
 4. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - B. Support horizontal piping and tubing **within** 12 inches of each fitting and coupling.
 - C. Support vertical piping and tubing at base and at each floor.
 - D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
 - E. Install hangers for cast-iron soil piping with the following **maximum** horizontal spacing and minimum rod diameters:
 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 2. NPS 3: 60 inches with 1/2-inch rod.
 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
 5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
 6. Spacing for 10-foot pipe lengths may be increased to 10 feet.
 7. Spacing for fittings is limited to 60 inches.
 - F. Install supports for vertical cast-iron soil piping every 15 feet.
 - G. Install hangers for copper tubing **with** the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 3: 10 feet with 1/2-inch rod.
 - H. Install **supports for** vertical copper tubing every 10 feet.
 - I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.
- 93.5 CONNECTIONS
- A. Drawings indicate general arrangement of piping, fittings, **and** specialties.
 - B. Connect **storm** drainage piping to roof **drains** and storm **drainage** specialties.
 1. Install test tees (wall cleanouts) in conductors near floor.
 2. Comply with requirements for cleanouts and drains specified in Section 22 1423 "Storm Drainage Piping Specialties."
 - C. Where **installing** piping adjacent to equipment, allow space for service and maintenance of **equipment**.

93.6 IDENTIFICATION

- A. Identify exposed storm drainage piping. Comply with requirements for identification specified in Section 22 0553 "Identification for Plumbing Piping and Equipment."

93.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 3. Test Procedure: Test storm drainage piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.
 - 4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 5. Prepare reports for tests and required corrective action.

93.8 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

93.9 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping **unless** otherwise indicated.
- B. Aboveground storm drainage piping NPS 6 and smaller shall **be** any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; **and** gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; heavy-duty, hubless-piping couplings; and coupled joints.
 - 3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- C. Aboveground, **storm** drainage piping NPS 8 and larger shall be any of the following:
 - 1. Service class, cast-iron soil pipe **and** fittings; gaskets; and gasketed joints.
 - 2. Hubless, cast-iron soil pipe and fittings; heavy-duty, hubless-piping couplings; **and** coupled joints.
 - 3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- D. Aboveground storm drainage force mains NPS 3 shall be the following:
 - 1. Hard copper tube, Type L **copper** pressure fittings, and soldered joints.

END OF SECTION 221413

SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

PART 94 - GENERAL

94.1 SUMMARY

A. Section Includes:

1. Garage drains.
2. Cleanouts.

94.2 ACTION SUBMITTALS

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

94.3 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 95 - PRODUCTS

95.1 GARAGE DRAINS

A. Cast-Iron Garage Drains (GD-1):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Zurn Z610-TC-VC or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
2. Pattern: Garage drain.
3. Body Material: Dura-coat cast iron.
4. Outlet: Bottom.
5. Grate Material: Dura coated cast iron.
6. Strainer: Extra-Heavy-Duty
7. Top Shape: Square.
8. Dimensions of Top or Strainer: 12".

95.2 CLEANOUTS

A. Test Tees:

1. **Standard:** ASME A112.36.2M and ASTM A 74, **ASTM A 888**, or CISPI 301.
2. **Size:** Same as connected drainage piping.
3. **Body Material:** Hub-and-spigot, cast-iron soil-pipe T-branch or no-hub, cast-iron soil-pipe test tee as required to match connected piping.
4. **Closure Plug:** Countersunk or raised head, brass.
5. **Closure Plug Size:** Same as, or not more than, one size smaller than cleanout size.

PART 96 - EXECUTION

96.1 CONNECTIONS

- A. Comply with requirements for piping specified in Section 22 1413 "Facility Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

96.2 PROTECTION

- A. Protect drains during remainder of construction period to **avoid** clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221423

SECTION 260010 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

-
- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other Electrical Specification Sections.

1.2 SUMMARY

A. Summary of Work:

1. Provide a complete integrated electrical system in accordance with the intent of these specifications and the accompanying drawings.

B. This Section includes general administrative and procedural requirements, as well as the following basic electrical materials and methods:

1. Wire & Cable
2. Wiring devices and wall plates
3. Rough-in
4. Electrical Installation
5. Cutting & Patching
6. Protection of Work
7. Cutting and Patching.
8. Access to Electrical Installations.
9. Equipment Provided Under Different Divisions
10. Record Drawings
11. Close Out
12. Inspection
13. Demolition
14. Repair & Restoration
15. Final Cleaning
16. Punch-Out

1.3 REFERENCED ORGANIZATIONS AND CODES

- A. The following list of abbreviations, are utilized within the specifications and are provided as a reference.

- B. All work in Divisions 26 shall comply with the applicable version of following codes and regulations as adopted by the Montgomery County, State of Maryland and the State Fire Marshal, unless otherwise specified.

1. **NFPA** (National Fire Protection Association).
2. **NESC** (National Electrical Safety Code).

3. ADA (American with Disabilities Act).
4. ANSI (American National Standards Inst.).
5. OSHA (Occupational Safety & Health Act).
6. COMAR (Code of Maryland Regulations).
7. UL (Underwriters Laboratories).
8. IBC (International Building Code).
9. State of Maryland Fire Prevention Code.
10. ANSI/EIA/TIA.
11. NETA (National Electrical Testing Association).
12. NEMA (National Electrical Manufacturer's Association).
13. NECA (National Electrical Contractors Association).

1.4 SITE VISIT

- A. Prior to preparing the bid, the electrical subcontractor shall visit the site and become familiar with all existing conditions. Make all necessary investigations as to locations of utilities and all other matters which can affect the work. No additional compensation will be made to the contractor as a result of his failure to familiarize himself with the existing conditions under which the work must be performed.

1.5 OUTAGES

- A. For all work requiring an outage, the contractor shall submit an outage request to the Project Manager, using the Standard Request for Outage Form. The existing mechanical/electrical systems shall remain operational unless turned off by the Owner's personnel during the construction of the project. For each electrical outage request include a photograph of the panel index schedule for each panel affected by the outage.
- B. Unless otherwise specified, outages of any services required for the performance of this contract and affecting areas other than the immediate work area shall be scheduled at least ten days (10) days in advance with the Office of Facilities Management. All such outages shall be performed on other than normal duty hours.
- C. All electrical outages which will interfere with the normal use of the building in any manner shall be done at such times as shall be mutually agreed upon by the contractor and the Office of Facilities Management.
- D. The contractor shall include in his price the cost of all premium time required for outages and other work which interferes with the normal use of the building, which will be performed, in most cases, during other than normal work time and at the convenience of the Owner.
- E. The operation of electrical equipment; required to achieve an outage must be accomplished by the Owner's personnel only. Prospective subcontractors under this section are cautioned that the unauthorized operation of electrical equipment or other control devices by their personnel can result in extremely serious consequences for which the contractor will be held accountable.

1.6 INSTALLER'S QUALIFICATIONS

- A. Electrical Installer shall submit the following evidence:
 - 1. Five (5) comparable completed projects.
 - 2. Reference letters from minimum of three (3) registered professional engineers, general contractors, building owners, explaining proficiency, quality of work, or other attribute on projects of similar size or substance.
 - 3. Copy of Maryland Master Electrician's License.
 - 4. Local or State license where required.
 - 5. BICSI and NICET certification, where required by these specifications.
- B. The electrical installer shall utilize a full-time project foreman in charge of all electrical work.
 - 1. Fully qualified and experienced in such work.
 - 2. Available, on site, at all times during construction.
 - 3. All communication shall be through this person.
- C. Installer of specialized systems such as Fire Alarms, telecommunication systems, etc. shall meet the requirements of the associated spec section(s).

1.7 CUTTING, WELDING, BURNING

- A. Before the contractor and/or any sub-contractor commence's any **cutting**, welding, and/or burning, the contractor shall obtain a hot work permit from **Environmental Health and Safety**.
- B. The hot work permit copy shall remain on the job site at the hot work location until such work is completed at which time the permit shall be **returned** to Environmental Health and Safety.

1.8 WORK PERFORMANCE

- A. All electrical work must comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by the contract.
- B. Before initiating any work, a job specific work plan must be developed by the contractor. The work plan must include procedures to be used on and near the **live** electrical equipment, barriers to be **installed**, and safety equipment to be used and exit pathways.
- C. Job site and worker **safety** are the responsibility of the contractor. Compliance with the requirements of NFPA 70E is subject to ongoing inspection by the Owner's personnel and failure to comply will result in an **immediate** Stop Work order being issued and enforced at the contractor's expense.
- D. Energized electrical conductors and circuit parts to which an employee might be exposed shall be put into an electrically safe work condition before an employee performs work any time the employee is within the limited approach boundary or, where an increased risk of injury from an exposure to an arc **flash hazard exists**.

- E. Outages should **be** scheduled a minimum of seven (7) days **in** advance.
- F. Mandatory Requirements: **The following** requirements are mandatory:
 - 1. **Protective** Equipment: Electricians must use **full protective** equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.
 - 2. **Energized** Work Permit: An Energized Work Permit is required for any work **on** energized circuits or equipment. Permit must be approved prior to performing **energized** work. Submit the work permit with the outage request.

1.9 SUBMITTALS

- A. General: Follow the procedures specified in Division 1 Section "Submittals."
- B. Product data as specified in the electrical specifications.
- C. Shop drawings **detailing** fabrication and installation requirements for electrical equipment.
- D. In addition to the following list, **submit other** shop drawings as may be requested by the Owner.
 - 1. Divisions 26:
- E. In instances of complex field wired systems, including but not limited to: fire alarm system, the contractor shall submit:
 - 1. Cut **sheets** of **every** component such as control panels, fire alarm devices, wire, etc.
 - 2. The contractor shall submit **detailed** riser diagrams **detailing** point-by-point connections. Diagrams shall indicate cable on raceway between points.
 - 3. Corresponding floor plans showing only this particular system with conduit and wire runs between points.
 - 4. Both riser and floor plan shall **indicate** address of devices where applicable.
 - 5. Calculations for battery capacity and voltage drop.
 - 6. Preliminary programming information.
- F. Increase, by **the** quantity listed below, the number of electrical **related** shop drawings, product data, and samples submitted, to allow for required distribution plus two **copies** of each submittal required, which will be retained by the Electrical Consulting Engineer.
 - 1. Shop Drawings: Initial Submittal: One (1) additional blue or black line prints.
 - 2. Shop Drawings: Final Submittal: One (1) additional blue or black line prints.
 - 3. Product Data: One (1) additional copy of each item.
 - 4. Eight copies of all above **final submittals** and data, to be retained by the Owner.

G. Additional copies may be required by individual sections of these Specifications.

1.10 QUALITY ASSURANCE

A. Comply with NFPA 70 for components and installation.

B. **Listing and Labeling:** Provide products specified in this Section that are listed and labeled.

1. The Terms "Listed and Labeled": As defined in the National Electrical Code, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

C. Install all components and equipment per manufacturer's written instructions.

D. Provide installation in accordance with recognized trade organizations and standards:

1. NEMA.
2. NECA "Standards of Installation"

1.11 COORDINATION DRAWINGS

A. Prepare coordination drawings in accordance with Division 1 Section "Project Coordination," to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Indicate the proposed locations of electrical equipment, and materials. Include the following:
 - a. Planned electrical systems layout, including conduit elbow radii and accessories.
 - b. Clearances for servicing and maintaining electrical equipment.
 - c. Exterior wall and foundation penetrations.
 - d. Fire rated wall and floor penetrations.
 - e. Sizes and location of required concrete pads and bases.
 - f. Size and location of all electrical panels.
2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Show all access doors for concealed junction boxes devices.
4. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, cable trays, sprinklers, access doors and other ceiling mounted items.

1.12 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements in Division 1 Section "Contract Closeout." In addition to the requirements specified in Division 1, indicate the following installed conditions:
 - 1. Conduit and wire runs between the points
 - 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 - 3. Approved substitutions, Contract Modifications, RFI responses and actual equipment and materials installed.

1.13 OPERATION AND MAINTENANCE MANUALS

- A. **Electrical O & M Manual File:** Provide one (1) electronic **file** "pdf format" **for the projects** Electrical Operation and Maintenance Manual for the Material and Equipment **installed** in the project included in Divisions 26 on a CD-R. The electronic Electrical O & M manual shall include one copy of each approved submittal, any manufacturer's maintenance manuals, all warranty certificates, arranged in file folders for each submittal. Also include the address, phone number and contact person for each supplier. Files shall be stacked and include both a book mark and tree structure for accessing each submittal file as indicated in Division 1 Closeout Procedures.

1.14 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.15 SEQUENCING AND SCHEDULING

- A. Coordinate electrical equipment **installation** with other building components.
- B. Arrange **for chases**, slots, and openings in building structure **during** progress of construction to allow for electrical installations.
- C. Coordinate the installation of required supporting devices and set sleeves in poured in place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate **installations** of mechanical materials and equipment for efficient flow of the Work. Coordinate **installation** of large equipment requiring positioning prior to closing in the building.
- E. Coordinate connection of electrical **services**.
- F. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling **agencies**.

- G. Coordinate requirements for access panels and doors where electrical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in the Architectural Specifications.
- H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

1.16 VARIANCES

- A. Where variances occur between the drawings and specifications or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the contract price. The Engineer shall decide on the item and manner in which the work shall be provided.

1.17 GUARANTEE/WARRANTY:

- A. All materials, equipment, etc. provided by the general contractor and/or his subcontractors shall be guaranteed and warranted to be free from defects in workmanship and materials for a period of two (2) years after date of certificate of completion and acceptance of work by the Owner. Any defects in workmanship, materials, or performance which appear within the guarantee period shall be corrected by the contractor without cost to the owner, within a reasonable time, to be specified by the Owner. In default thereof, owner may have such work done and charge the cost of same to the contractor. In addition to the above statement the Guarantee/Warranty Period shall include all labor cost related to all warranty work. For compressorized equipment include an additional three (3) year Guarantee/Warranty Period.

PART 2 - PRODUCTS

BASIC MATERIALS

- A. All products shall be UL (Underwriters Laboratories) listed.
- B. Nameplates: Engraved, Phenolic laminated plastic, 0.125 inch thick, black background with white core, with beveled edges. ALL LETTERING SHALL BE UPPERCASE. Shall be attached using self tapping screws.
 - 1. Nameplate shall be installed on all equipment items. Use ¼" high engravings.
 - 2. Nameplates shall be installed on all feeder circuits and all outdoor circuits.
 - a. Attach nameplates to each cable or wire located in pullboxes and at each splice and termination. Use ¼" letters. Cable nameplates shall be secured in place with ¼" cable ties. Nameplates shall indicate which panel and circuit breaker the feeder or circuits is fed from.
 - 3. Phases of all 600V wire shall be identified at all splice and termination points using

colored tape. Colors shall be black, red, and blue for 208 volt phase conductors, white for neutrals, and green for ground conductors. Utilize orange, brown, and yellow for 480 volt phase conductors, gray for neutrals, and **green** for ground conductors.

- C. **Warning Signs:** Provide **warning** signs for electrical equipment per OSHA and NFPA.
- D. Label junction boxes with **panel #**, and circuit breaker **#** of where circuits originate – use permanent marker.
- E. Steel – all steel products shall be galvanized or treated for corrosion.
- F. Conduit and fittings:
 - 1. Use **only** specified raceway in the following indoor and outdoor locations:
 - a. Exposed outdoor locations: Only rigid galvanized steel conduit shall be used.
 - b. Exposed dry interior locations: EMT or rigid steel in areas with motorized vehicles.
 - c. Connections to vibration producing equipment or motors shall be liquid tight flexible metallic conduit.
 - d. **New Construction:** raceway/conduit in finished areas shall be concealed by architectural surfaces.
 - e. Electrical Feeder Distribution conduits within a building shall not be in the concrete slab or underground.
 - 2. Use only specified raceway in the following indoor and outdoor locations:
 - a. Exposed outdoor locations: Only rigid galvanized steel conduit shall be used.
 - b. Exposed dry interior locations: Rigid steel in areas with motorized vehicles.
 - c. Connections to vibration producing equipment or motors shall be liquid **tight** flexible metallic conduit.
 - d. **New Construction:** raceway/conduit in finished areas shall be concealed by architectural surfaces.
 - e. Electrical Feeder Distribution conduits within a building shall not be in the concrete slab or underground.
 - 3. Use **only** specified raceway in the following indoor and outdoor locations:
 - a. Exposed outdoor locations: Only rigid galvanized steel conduit shall be used.
 - b. Concealed dry interior locations: IMC Conduit as allowed below.
 - c. Exposed dry interior locations: I M C or rigid steel in areas with motorized vehicles.
 - d. Connections to vibration producing equipment or motors shall be liquid tight flexible metallic conduit.
 - e. **New Construction:** raceway/conduit in finished areas shall be concealed by architectural surfaces.
 - f. Electrical Feeder Distribution conduits within a building shall not be in the concrete slab or underground.
 - 4. Use of the following types of conduits and fittings shall not be permitted in any application for this project:
 - a. "Die-cast metal" conduit fittings.
 - b. Aluminum Conduit, Cable Tray and fittings.
 - c. PVC Type 'EB'.
- G. Electrical Boxes
 - 1. Interior – metal **only**, approved for the specific location and application.

2. **Exterior** – metal, NEMA approved for outdoor locations.

WIRE AND CABLE

A. Building Wire:

1. Feeders and Branch Circuits Larger Than 10 AWG: Copper, stranded conductor, 600 volt insulation, THHN/THWN, rated at 75 degree C.
2. Feeders and Branch Circuits 10 AWG and Smaller: Copper, 600 volt insulation, THHN/THWN solid conductor, rated at 75 degree C. No conductor smaller than #12 AWG is acceptable.

B. Forbidden Cables:

1. Use of BX (Armored) Cable, UF, and Romex Cable is not permitted.

- C. Color coding shall be a permanent part of and uniform throughout the entire length of the jacket material of the cable and shall be used throughout the building for feeder circuits. Color applied to the outer surface only is not acceptable. Taping (6" minimum) at termination points is acceptable. Color coding shall be:

	480/277 Volts	208/120 Volts
Phase	Color	Color
A	Brown	Black

B	Orange	Red
C	Yellow	Blue
Neutral	Gray	White
Ground	Green	Gree

WIRING
DEVICES AND

WALL PLATES

A. Receptacle:

1. Use specification grade receptacles and switches.
2. GFCI Receptacle: Duplex convenience receptacle **with** integral ground fault current interrupter, test and reset push buttons.
3. Device plates for interior use on flush-mounted devices **shall** be satin finish type 302 stainless steel.
4. Device plates for interior use on surface-mounted devices shall be galvanized sheet metal with rounded corners.

B. Weatherproof Cover Plate: Match receptacle configuration provided for equipment connection. Gasketed cast metal with gasketed device covers.

1. A receptacle installed in a wet location where the product intended to be plugged into is not attended while in use (e.g. sprinkler system controller, landscape lighting, holiday lights, etc.) shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.
2. A receptacle installed in a wet location where the product intended to be plugged into is attended while in use (e.g. portable tools, etc.) shall have an enclosure that is weatherproof when the attachment is removed.

PART 3 – EXECUTION

3.1 DEMOLITION:

- A. Remove and dispose of all existing materials not required **for re-use** or re-installation.
- B. Deliver on the premises, where directed, existing **material** and equipment which is to be salvaged and remain property of Owner.
- C. All other materials removed shall become the property of the Contractor and shall be removed from the premises.
- D. Remove conduit, hangers, supports, **etc. to** a point below the **finished** floors or behind finished walls and cap. Cut such items flush **with masonry** surfaces.
- E. Remove **wiring** and conduit back to source panelboard or switch, or to last remaining device on the circuit. Remove conduit, hangers, supports, etc. unless otherwise noted. Conduit may remain to be reused for new work provided it is of the specified size and type and in condition acceptable to the Owner.

- F. Any conduit abandoned in concrete slabs, walls, or other inaccessible locations shall be left with a nylon pull wire. Ends shall be capped with push plugs for future use.

3.2 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. For equipment rough-in requirements see specifications for electrical equipment.

3.3 ELECTRICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
1. Coordinate electrical systems, equipment, and materials installation with other building components.
 2. Verify all dimensions by field measurements.
 3. Install systems, materials, and equipment to conform with approved submittal data, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Owner.
 4. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 5. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
 6. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.4 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 1 Section "Cutting and Patching." In addition to the requirements specified in Division 1, the following requirements apply:
1. **Protection of Installed Work:** During cutting and patching operations, protect adjacent installations.
- B. Perform cutting, fitting, and patching of electrical equipment and materials required to:
1. Uncover Work to provide for installation of ill timed Work.
 2. Remove and replace defective Work.
 3. Remove and replace Work not conforming to requirements of the Contract Documents.
 4. Disconnect installed work as specified for testing.
 5. Install equipment and materials in existing structures.

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6. Upon written instructions **from** the Owner, uncover and restore Work to provide for the Owner's observation of **concealed** Work.
 - C. Cut, remove and legally dispose of selected electrical equipment, components, and **materials** as indicated, including but not limited to removal of electrical systems and equipment as indicated on the drawings and specifications and other electrical items made obsolete by the new Work.
 - D. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
 - E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
 1. Patch **existing** finished **surfaces** and building components using new materials **matching** existing materials and experienced Installers. Installers' qualifications refer to the **materials** and methods required for the surface and building components being patched.
 - a. Refer to Division 1 Section "Definitions and Standards" for definition of "experienced Installer."
 2. Patch finished surfaces and **building** components **using new** materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 1 Section "Definitions **and** Standards" for **definition** of "experienced Installer."

3.5 PROTECTION OF WORK

- A. Protect work, material and equipment **from** weather and construction operations before, **during** and after installation. Where concrete slab is scheduled to be removed over the electrical room, provide protection, if need be, coordinated and designed by the **project structural engineer**
- B. Properly store **and** handle all materials and equipment.
- C. Cover temporary openings for electrical equipment to prevent the entrance of water, dirt, debris, and other foreign matter.

3.6 PROVISIONS FOR ACCESS

- A. Furnish and **install** adequate access to all electrical components. The following list shall be used as a guide only:
 1. Equipment such as **transformers, generators, etc.**
 2. Distribution panels.
 3. Switch Gear.
 4. Disconnects.
 5. Variable frequency drives.

- B. Access shall be as required by code and/or as determined by the Architect and **Engineer**.
- C. Refer to contract drawings where access panels **have** been specifically located.
- D. Where access is by means of lift out ceiling tiles or panels mark access each panel using small color coded or numbered tabs. Provide an index chart for identification. Place markers in corner of tile.

3.7 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of equipment and systems to Owner's personnel a minimum two (2) weeks prior to date of final inspection.
 - 1. For equipment **requiring** seasonal operation, perform instructions for other seasons at the same time.
 - 2. Training period shall be performed within one (1), two (2) week period.
- B. Use operation and maintenance manuals and video as basis of instruction. Review contents of manual and video with personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate the following:
 - 1. Start up.
 - 2. Operation.
 - 3. Control.
 - 4. Adjustment.
 - 5. Trouble shooting.
 - 6. Servicing.
 - 7. Maintenance.
 - 8. Shutdown.
- D. Provide at least forty (40) hours straight time instruction to the operating personnel.
 - 1. This **instruction** period shall consist of not **less** than five (5) eight (8) hour days.
 - 2. Time of instruction shall be designated by the Owner.
 - 3. This instruction shall be in addition to instructional requirements of specific equipment **specified elsewhere** in the mechanical specifications.

3.8 EQUIPMENT PROVIDED UNDER ANOTHER DIVISION AND BY OTHERS

- A. The Installer of products under Divisions 26, 27, & 28 shall make all **system** connections required to equipment furnished and installed under **another** division and by **others**.
- B. It shall be the responsibility of the **Installer** to obtain all necessary data from the equipment supplied under other Divisions.

3.9 CLOSEOUT PROCEDURES

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- A. Operating and **Maintenance Instructions**: Submit Complete Package At Least Two (2) Months Prior To Substantial Completion. Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
1. Maintenance manuals, including a customized list of preventive maintenance items and annual schedule for maintenance.
 2. Record documents.
 3. Complete inventory of spare parts and materials.
 4. Tools.
 5. Identification systems.
 6. Control sequences.
 7. Hazards.
 8. Cleaning.
 9. Warranties and bonds.
 10. Maintenance agreements **and similar continuing commitments**.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start up.
 2. Shut down.
 3. Emergency operations.
 4. Noise and vibration adjustments.
 5. Safety procedures.
 6. Economy and efficiency adjustments.
 7. Effective energy utilization.

3.10 INSPECTIONS

- A. Contractor shall:
1. Schedule, pay for (as applicable) and attend all inspections required by the Authorities Having Jurisdiction.
 2. Deliver all certificates to the Owner prior to final acceptance of work.
- B. Notify the Owner in advance of scheduled inspections.
- C. An electrical **foreman**, superintendent or other supervisor **familiar** with the project shall be in attendance for all scheduled electrical inspections.
- D. Electrical **inspection** shall be by the Owner's inspection department personnel.
- E. Schedule the preliminary and rough-in inspections in a timely manner. Any work covered prior to any inspection in a manner which, in the inspector's opinion, precludes a complete inspection shall be uncovered at the installer's cost.

3.11 REPAIRS & RESTORATION OF SURFACES AND FINISHES:

- A. Restore all finishes, equipment and surfaces to original condition, where affected by the work. Provide the following, where applicable, in accordance with accepted trade standards and to Owner's satisfaction:
1. Replace damaged ceiling tiles.
 2. Replace ceiling tiles where removal has left holes or cuts in original tiles.
 3. Patch, repair and repaint all walls and surfaces cut, penetrated or otherwise disturbed by the work.
 4. Patch holes and penetrations in wood, masonry and plaster.
 5. Provide suitable cover plates for all recessed back boxes of equipment removed and not covered by new devices.
 6. Provide larger trim or cover plates for new devices, where old back boxes, holes, etc. are not concealed by new work.

3.12 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in Section Temporary Facilities.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- C. Remove all electrical clippings, wiring, nuts, bolts, etc. left on top of ceilings and ceiling tiles.

3.13 PROJECT PUNCH OUT

- A. Architect/Engineer will perform punch out reviews and will provide the Contractor with a list of punch list items to be completed before contract close out. Each and every punch list item shall be initialed and dated by the Contractor when the work is complete. The Architect/ Engineer will not perform any punch list verification until all items have been completed, initialed, dated and the list returned to the Architect/Engineer. If any items have been initialed as being completed by the Contractor and the Architect/Engineer determines that the work is not complete, the Architect/Engineer shall be reimbursed by the Contractor at his regular hourly rate for any and all items requiring revisiting of the site by the Architect/Engineer. Reimbursement shall be made by deducting the Architect/Engineer fee from the Contractor's final payment.

END OF SECTION 260010

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 97 - GENERAL

97.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

97.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

97.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

97.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 98 - PRODUCTS

98.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
 - 1.
 - 2. Type THHN and Type THWN-2: Comply with UL 83.
 - 3. Type THW and Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alpha Wire Company.

2. Southwire Company
3. The Okonite Company
4. Cerro Wire, LLC
5. General Cable

C. Standards:

1. Listed and labeled as **defined** in NFPA 70, and **marked** for intended location and use.
2. Conductor and Cable Marking: Comply with **wire** and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

E. Conductor Insulation:

- 1.
2. Type **THHN** and Type **THWN-2**: Comply with UL 83.
3. Type **THW** and Type **THW-2**: Comply with NEMA WC-70/**ICEA S-95-658** and UL 83.

98.2 CONNECTORS AND SPLICES

A. Description: **Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.**

B. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

- 1.
2. 3M
3. NSi Industries
4. Gardner Bender
5. ILSCO
6. O/Z Gedney: A brand of **Emerson Industrial Automation**.
7. Hubbell Power Systems

C. **Jacketed Cable Connectors:** For steel and aluminum jacketed cables, **zinc die-cast with set screws, designed to connect conductors specified in this Section.**

D. **Lugs:** One piece, **seamless, designed to terminate conductors specified in this Section.**

1. Material: Copper.
2. Type: Two hole with long barrels.
3. Termination: Compression.

PART 99 - EXECUTION

99.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; **stranded** for No. 8 AWG and **larger**.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; **stranded** for No. 8 AWG and larger.

99.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors **in** raceway.
- B. **Exposed Feeders:** Type THHN/THWN-2, single conductors in raceway.

99.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Complete raceway installation **between** conductor and **cable** termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable **grips**, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- F. Complete cable **tray** systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to **installing** conductors and cables.

99.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's **published** torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, **terminations**, and **taps** that are compatible **with conductor** material and that possess equivalent or **better** mechanical **strength** and insulation ratings **than** unspliced conductors.

1. Use oxide inhibitor in **each** splice, **termination**, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

99.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end **with** identity number and location of other end of conductor, and identify as spare conductor.

99.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of **assembly** according to Section 078413 "Penetration Firestopping."

99.7 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service: Engage** a factory-authorized service representative to test and **inspect components, assemblies, and equipment installations, including connections.**
- B. Perform tests and inspections
 1. After **installing** conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 2. **After** installing conductors and cables and before electrical circuitry has been energized, **test service entrance and feeder conductors feeding the following critical equipment and services for compliance** with requirements:
 3. Perform **each** of the following **visual** and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and **correct** connection according to the single-line diagram.
 - b. **Test** bolted connections for **high** resistance **using one of the** following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic **survey**.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.

- f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
4. Initial Infrared Scanning: After Substantial Completion, but before **Final** Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
- a. Instrument: Use an infrared scanning device **designed** to measure temperature or to detect significant deviations from normal **values**. Provide calibration record for device.
 - b. Record of **Infrared Scanning**: Prepare a certified report that **identifies** switches checked and that describes scanning results. Include notation of **deficiencies** detected, remedial action taken, and observations after remedial action.
- C. Cables will be considered defective **if they** do not pass tests and inspections.
- D. Prepare test and inspection reports to record the following:
- 1. Procedures used.
 - 2. Results that comply with **requirements**.
 - 3. Results that do not comply **with** requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 100 - GENERAL

100.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

100.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

100.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.

PART 101 - PRODUCTS

101.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

101.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

101.3 CONNECTORS

- A. Listed and labeled by an NRTL **acceptable** to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. **Beam Clamps**: Mechanical type, **terminal**, ground wire **access** from four directions, with dual, tin-plated **or** silicon bronze bolts.
- C. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- D. Conduit **Hubs**: Mechanical type, **terminal** with threaded hub.
- E. Water Pipe Clamps:
 - 1. Mechanical type, two pieces **with** stainless-steel bolts.
 - a. **Material**: Tin-plated aluminum.

PART 102 - EXECUTION

102.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.
- B. Conductor **Terminations** and Connections:
 - 1. Pipe and Equipment Grounding Conductor **Terminations**: Bolted connectors.

102.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all **feeders** and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. **Feeders** and branch **circuits**.
 - 2. **Lighting** circuits.
 - 3. **Receptacle** circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. **Flexible** raceway runs.

102.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

102.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- B. Grounding system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.
- D. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
- E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - **HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 103 - **GENERAL**

103.1 **RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

103.2 **SUMMARY**

- A. **Section Includes:**
 - 1. Steel slotted support systems.
 - 2. Conduit support devices.
 - 3. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

103.3 **ACTION SUBMITTALS**

- A. **Product Data:** For each type of product.
 - 1. Include construction details, material descriptions, **dimensions** of individual components and profiles, and finishes for the following:
 - a. Slotted support **systems**, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - 2. Include rated capacities and furnished specialties and accessories.

PART 104 - **PRODUCTS**

104.1 **PERFORMANCE REQUIREMENTS**

- A. **Delegated Design:** Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.

104.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with **minimum 13/32-inch**-diameter holes at a maximum of 8 inches o.c. in at least one surface.
 - 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 2. Material for Channel, Fittings, and Accessories: Galvanized steel.
 - 3. Channel Width: 1-5/8 inches.
 - 4. **Metallic Coatings:** Hot-dip galvanized after fabrication and applied according to MFMA-4.
- B. Conduit Support Devices: Steel hangers, clamps, and associated fittings, **designed** for types and sizes of raceway or cable to be supported.
- C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: **Insert-wedge-type, zinc-coated steel**, for use in hardened portland cement concrete, **with** tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are **similar** to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 5. Hanger Rods: Threaded **steel**.

PART 105 - EXECUTION

105.1 APPLICATION

- A. Comply with the following standards for application and installation requirements **of hangers** and supports, **except** where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
 - 3. NECA 102.
 - 4. NECA 105.
 - 5. NECA 111.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated **walls**, ceilings, and assemblies.

- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 10 percent in future without exceeding specified design load limits.
 - 1. Secure raceways to these supports with two-bolt conduit clamps.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

105.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT AND IMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes,

transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.

- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

105.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 106 - GENERAL

106.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

106.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Metal wireways and auxiliary gutters.
 - 3. Boxes, enclosures, and cabinets.

106.3 DEFINITIONS

- A. GRC: **Galvanized** rigid steel conduit.
- B. IMC: **Intermediate** metal conduit.

106.4 ACTION SUBMITTALS

- A. Product **Data**: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

106.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to **scale**, on which the following items are shown and coordinated with each other, using input from **installers** of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Source **quality-control** reports.

PART 107 - PRODUCTS

107.1 METAL CONDUITS AND FITTINGS

- A. Conduit 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. Allied Tube and Conduit
 2. O/Z Gedney; an Emerson Industrial Company.
 3. Republic Conduit
 4. Western Tube and Conduit Corporation
 5. Wheatland Tube Company.
- B. Metal Conduit:
- 1.
 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 3. IMC: Comply with ANSI C80.6 and UL 1242.
 4. EMT: Comply with ANSI C80.3 and UL 797.
 5. FMC: Comply with UL 1; zinc-coated steel.
 6. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- C. Conduit Fitting 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. Allied Tube and Conduit
 2. O/Z Gedney; an Emerson Industrial Company.
 3. Republic Conduit
 4. Western Tube and Conduit Corporation
 5. Wheatland Tube Company.
 6. Thomas & Betts: a member of the ABB Group.
- D. Metal Fittings:
1. Comply with NEMA FB 1 and UL 514B.
 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 3. Fittings, General: Listed and labeled for type of conduit, location, and use.
 4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
 5. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Setscrew or compression.

- E. Joint Compound for IMC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

107.2 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 or 3R unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Flanged-and-gasketed type unless otherwise indicated.

107.3 BOXES, ENCLOSURES, AND CABINETS

- 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. Cooper Technologies Company
 - 2. Hoffman-Panduit
 - 3. Hubbell Corporation
 - 4. Milbank Manufacturing.
 - 5. Robroy Industries.
 - 6. Spring City Electrical Manufacturing Company
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be **listed** for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be **listed** and marked for the maximum allowable weight.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

- H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- I. Gangable boxes are prohibited.
- J. **Hinged-Cover Enclosures:** Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch **unless** otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 108 - EXECUTION

108.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: IMC.
 - 2. Concealed Conduit, Above ground: IMC.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below **unless** otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: ENT.
 - 2. Exposed and Subject to Severe Physical Damage: IMC. Raceway locations include the following:
 - a. Loading dock.
 - b. Material Loading Areas
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 4. Damp or Wet Locations: IMC.
 - 5. Boxes and Enclosures: NEMA 250, Type 1., except use NEMA 250, Type 4 stainless steel in damp or wet locations.
- C. Minimum Raceway Size: **3/4-inch trade size.**
- D. **Raceway Fittings:** Compatible with raceways and suitable for use and location.
 - 1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
 - 3. Flexible Conduit: Use **only** fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

108.2 INSTALLATION

- A. Comply **with** requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply **with** NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. Keep raceways at least 6 inches **away** from parallel runs of flues and steam or hot-water pipes. Install **horizontal** raceway runs **above** water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Install **no** more than the equivalent of three 90-degree bends in **any** conduit run **except** for control wiring conduits, for which fewer bends are allowed. Support **within** 12 inches of changes in direction.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- K. Support conduit within 12 inches of enclosures to which attached.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating **bushings** to protect conductors including conductors smaller than No. 4 AWG.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure **and** terminate at enclosures with locknuts. **Install** locknuts hand tight plus 1/4 turn more.

-
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service raceway enters a building or structure.
 3. Conduit extending from interior to exterior of building.
 4. Conduit extending into pressurized duct and equipment.
 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- W. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- X. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- Y. Locate boxes so that cover or plate will not span different building finishes.
- Z. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

- AA. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

108.3 FIRESTOPPING

- A. Install **firestopping** at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 109 - GENERAL

109.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

109.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Tapes and stencils.
 - 4. Cable ties.

109.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- C. Delegated-Design Submittal: For arc-flash hazard study.

PART 110 - PRODUCTS

110.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

- D. Comply **with ANSI Z535.4** for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, **laminating adhesives**, and inks used by label printers, shall comply with UL 969.

110.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - 4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 5. Color for Neutral: gray.
 - 6. Color for Equipment Grounds: Green
- C. Warning Label Colors:
 - 1. **Identify** system voltage with black letters on an **orange** background.
- D. Warning labels and signs shall **include**, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

E. Equipment Identification Labels:

1. Black letters on a white field.

110.3 LABELS

A. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

- 1.
2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
3. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.
4. Marker for Labels: Machine-printed, permanent, **waterproof**, black ink recommended by printer manufacturer.

B. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As **required** by authorities having jurisdiction.

110.4 SIGNS

A. Laminated Acrylic or Melamine Plastic Signs:

- 1.
2. Engraved legend.
3. Thickness:
 - a. **For signs** up to 20 sq. in., minimum 1/16 inch thick.
 - b. **For signs** larger than 20 sq. in. , 1/8 inch thick.
 - c. **Engraved legend with white letters on** a dark gray background.
 - d. **Punched or drilled for mechanical fasteners** with 1/4-inch grommets in **corners** for mounting.
 - e. Framed with mitered acrylic molding and **arranged** for attachment at applicable equipment.

110.5 CABLE TIES

A. General-Purpose Cable Ties: Fungus **inert**, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

110.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 111 - EXECUTION

111.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

111.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical **ceilings** and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate **identification** with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs **with** approved legend to facilitate proper **identification**, operation, and **maintenance** of electrical systems and connected items.
- G. System **Identification** for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 1. **Secure** tight to surface of conductor, cable, or raceway.
- H. Auxiliary **Electrical Systems** Conductor Identification: **Identify** field-installed alarm, control, and signal connections.

-
- I. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
1. "EMERGENCY POWER."
 2. "POWER."
 3. "UPS."
- J. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- K. Self-Adhesive Labels:
1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- L. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- M. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- N. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use labels 2 inches (50 mm) high.
- O. Cable Ties: General purpose, for attaching tags, except as listed below:
1. Outdoors: UV-stabilized nylon.
 2. In Spaces Handling Environmental Air: Plenum rated.
- 111.3 IDENTIFICATION SCHEDULE
- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways , 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
 - 3. "UPS."
- E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with the conductor designation.
- G. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- H. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- J. Arc Flash Warning Labeling: Self-adhesive labels.
- K. Operating Instruction Signs: Laminated acrylic or melamine plastic signs].
- L. Equipment Identification Labels:
 - 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign 4 inches high.
 - 3. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Emergency system boxes and enclosures.
- e. Enclosed switches.
- f. Enclosed circuit breakers.
- g. Power-transfer equipment.
- h. Contactors.
- i. Power-generating units.
- j. Monitoring and control equipment.

END OF SECTION 260553

SECTION 262726 - WIRING DEVICES

PART 112 - GENERAL

112.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

112.2 SUMMARY

- A. Section Includes:
 - 1. Straight-blade convenience receptacles.
 - 2. GFCI receptacles.
 - 3. Toggle switches.
 - 4. Wall plates.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

112.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

112.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

112.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 113 - PRODUCTS

113.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton (Arrow-Hart).
 - 2. Hubbell Incorporated; Wiring Device-Kellems.
 - 3. Leviton Manufacturing Co., Inc.
 - 4. Pass 7 Seymour/Legrand (Pass and Seymour).
- B. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.
- D. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

113.2 STRAIGHT-BLADE RECEPTACLES

- A. Duplex Convenience Receptacles: 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
- B. General Description:
 - 1. 125 V, 20 A, straight blade, non-feed-through type.
 - 2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
 - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- C. Duplex GFCI Convenience Receptacles:

113.3 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
 - 1. Single Pole:

113.4 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Unfinished Spaces: Galvanized steel.

113.5 FINISHES

- A. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: Brown unless otherwise indicated or required by NFPA 70 or device listing.
 - 2. Wiring Devices Connected to Emergency Power System: Red.
- B. Wall Plate Color: For plastic covers, match device color.

PART 114 - EXECUTION

114.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:

- a. Cut back and pigtail, or replace all damaged conductors.
- b. Straighten conductors that remain and remove corrosion and foreign matter.
- c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 12 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up..

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

114.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

114.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

114.4 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments **that** comply with UL 1436.
- B. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 3. Ground Impedance: Values **of up** to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using **the test** plug, verify **that** the device and its **outlet** box are securely mounted.
- D. Wiring device will be considered **defective** if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 115 - GENERAL

115.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

115.2 SUMMARY

- A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a.
 - b. Enclosed switches.
2. Spare-fuse cabinets.

115.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 3. Current-limitation curves for fuses with current-limiting characteristics.
 4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in electronic format suitable for use in coordination software and in PDF format.
 5. Coordination charts and tables and related data.

115.4 CLOSEOUT SUBMITTALS

- A. **Operation and Maintenance Data:** For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data,]" include the following:
1. Ambient temperature adjustment information.
 2. Current-limitation curves for fuses with current-limiting characteristics.
 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in electronic format suitable for use in coordination software and in PDF format.
 4. Coordination charts and tables and related data.

115.5 **FIELD CONDITIONS**

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F , apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 116 - PRODUCTS

116.1 **MANUFACTURERS**

- A. **Manufacturers:** Subject to compliance with requirements, provide products from one of the following: .
1. **Bussman;** an Eaton company.
 2. **Edison;** a brand of Bussman.
 3. **Littlefuse,** Inc.
 4. **Ferraz Shawmut**
- B. **Source Limitations:** Obtain fuses, for use within a specific product or circuit, from **single** source from **single** manufacturer.

116.2 **CARTRIDGE FUSES**

- A. **Characteristics:** NEMA FU 1, **current-limiting**, **nonrenewable** cartridge fuses with **voltage** ratings consistent with circuit voltages.
1. Type RK-1: 250-V, zero- to 600-**A** rating, 200 kAIC, time delay.
 2. Type J: 600-V, zero- to 600-**A** **rating**, 200 kAIC, time delay.
- B. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

116.3 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. **Size:** Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch-high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 117 - EXECUTION

117.1 EXAMINATION

- A. **Examine** fuses before installation. Reject fuses **that** are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation **tolerances** and other conditions affecting performance, **such** as rejection features.
- C. **Examine** utilization equipment nameplates and installation instructions. **Install** fuses of sizes and **with** characteristics **appropriate** for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating **adjustment** factors must be applied to fuse ratings.
- E. Proceed with installation only **after** unsatisfactory conditions **have** been corrected.

117.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 - 1. Service Entrance: Class RK1, time delay or Class J, time delay.
 - 2. Feeders: Class RK1, time delay or Class J, time delay.
 - 3. Motor Branch Circuits: Class RK5, time delay.
 - 4. Control Transformer Circuits: **Class CC**, time delay, control transformer duty.
 - 5. Provide open-fuse indicator fuses or fuse **covers** with open fuse indication.

117.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings..

117.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 118 - GENERAL

118.1 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.

118.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Molded-case circuit breakers (MCCBs).
 - 4. Enclosures.

118.3 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate **ratings**, dimensioned elevations, sections, weights, and **manufacturers' technical data** on features, performance, **electrical characteristics**, ratings, **accessories**, and **finishes**.
 - 1. **Enclosure types and details for types other than NEMA 250, Type 1.**
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
 - 5. Detail features, **characteristics**, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 6. Include time-current coordination **curves (average melt) for each type and rating of overcurrent protective device**; include selectable ranges **for each type of overcurrent protective device**. Provide in [PDF] [and] **<Insert calculation program format> electronic format.**
- B. Shop Drawings: For enclosed **switches** and **circuit breakers**.
 - 1. Include **plans, elevations, sections, details, and attachments** to other work.
 - 2. Include **wiring diagrams** for power, signal, and control wiring.

118.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

118.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF and electronic format.

118.6 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F
 - 2. Altitude: Not exceeding 6600 feet.

PART 119 - PRODUCTS

119.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- C. Comply with NFPA 70.

119.2 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following:
 - 1.
 - 2. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 3. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 4. Siemens Energy & Automation, Inc.
 - 5. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty:
 - 1. Single throw.
 - 2. Three pole.
 - 3. 240-V ac.
 - 4. 1200 A and smaller.
 - 5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.

6. Lockable handle with capability to accept three padlocks and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

119.3 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products from one of the following: .

- 1.
2. **Eaton** Electrical Inc.; Cutler-Hammer Business Unit.
3. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
4. Siemens Energy & Automation, Inc.
5. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Three Pole, Single Throw, 240-V ac, 1200 A and Smaller: **UL 98** and **NEMA KS 1**, horsepower rated, lockable handle with capability to accept three padlocks, and **interlocked** with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses **are** specified.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

119.4 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products **from** one of the following:

- 1.
2. **Eaton** Electrical Inc.; Cutler-Hammer Business Unit.
3. General Electric Company; GE Consumer & Industrial - **Electrical Distribution**.
4. Siemens Energy & Automation, **Inc.**
5. Square D; a brand of Schneider Electric.

B. Circuit **breakers** shall be constructed using **glass-reinforced** insulating material. Current carrying components shall be **completely** isolated from the handle and the **accessory** mounting **area**.

C. Circuit **breakers** shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip **free**, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to **providing** international I/O markings. Equip circuit breaker with a push-to-trip

button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

- D. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be fully rated. Fuse/circuit breaker combinations for series connected interrupting ratings shall be listed by UL as recognized component combinations. Any series rated combination used shall be marked on the end-use equipment along with the statement "Caution - Series Rated System. _____ Amps Available. Identical Replacement Component Required."
- E. MCCBs shall be equipped with a device for locking in the isolated position.
- F. Lugs shall be suitable for 194 deg F (90 deg C) rated wire, sized according to the 167 deg F (75 deg C) temperature rating in NFPA 70.
- G. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.
- H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- I. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Instantaneous trip.
 - 2. Long- and short-time pickup levels.
 - 3. Long- and short-time time adjustments.
 - 4. Ground-fault pickup level, time delay, and I-squared t response.
- J. Ground-Fault Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- K. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

119.5 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1), and electrodeposited on cleaned, phosphatized galvanized steel (NEMA 250 Types 3R, 12)..
- C. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the

locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

119.6 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

119.7 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Construction Manager's] & Owner's written permission.
 - 4. Comply with NFPA 70E.

119.8 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.

119.9 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Install fuses in fusible devices.
- E. Comply with NFPA 70 and NECA 1.

119.10 IDENTIFICATION

- A. Comply with **requirements** in Section 260553 "Identification for Electrical Systems."
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 2. Label each enclosure with engraved metal or laminated-plastic **nameplate**.

119.11 FIELD QUALITY CONTROL

A. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:

- a. Inspect **physical** and mechanical condition.
- b. Inspect anchorage, alignment, grounding, and clearances.
- c. Verify that the unit is clean.
- d. Verify blade alignment, blade **penetration**, travel stops, and mechanical operation.
- e. Verify that fuse sizes and types match the Specifications and Drawings.
- f. Verify that each fuse has adequate mechanical support and contact integrity.
- g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted **connection resistance values** to values of similar connections. Investigate values **that deviate** from those of **similar** bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance **with** manufacturer's published data. In **the** absence of manufacturer's published data, **use** NETA ATS Table 100.12.
- h. Verify **that** operation and sequencing of interlocking **systems** is as described in the Specifications and shown on the Drawings.
- i. Verify correct phase barrier **installation**.
- j. Verify lubrication of **moving current-carrying** parts and moving and sliding surfaces.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Measure fuse resistance. Investigate fuse-resistance values that deviate from **each other** by more than 15 percent.

B. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and clearances.
 - d. Verify that the unit is clean.
 - e. Operate the circuit breaker to ensure smooth operation.
 - f. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - g. Inspect operating mechanism, contacts, and chutes in unsealed units.
 - h. Perform adjustments for final protective device settings in accordance with the coordination study.
2. Electrical Tests:
- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - b. Determine the following by primary current injection:
 - 1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.
 - c. Test functionality of the trip unit by means of primary current injection. Pickup values and trip characteristics shall be as specified and within manufacturer's published tolerances.
 - d. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.
 - e. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.
 - f. Verify operation of charging mechanism. Investigate units that do not function as designed.

3. Correct **malfunctioning** units **on-site**, **where** possible, and **retest** to demonstrate compliance; otherwise, replace **with** new units and retest.
 4. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial **Infrared Scanning**: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Instruments and Equipment: **Use** an infrared scanning device designed to measure temperature or to detect significant deviations **from** normal values. **Provide** calibration record for device.
 5. Test and adjust controls, remote **monitoring**, and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
1. Test procedures used.
 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 3. List deficiencies detected, remedial action taken, and observations after remedial action.

119.12 ADJUSTING

- A. Adjust moving **parts** and operable **components** to function **smoothly**, and lubricate as recommended by manufacturer.
- B. Set field-adjustable **circuit-breaker** trip ranges as specified in Section 260573.16 "Coordination Studies."

END OF SECTION 262816

ATTACHMENT A

MINORITY BUSINESS PROGRAM & OFFEROR'S REPRESENTATION

It is the policy of the County to recruit actively, minority-owned businesses to provide goods and services to perform governmental functions pursuant to Section 11B-57 of the County Code. Minority-owned businesses are described in County law as Minority/Female/Disabled Person owned businesses (MFD). MFD businesses include certain non-profit entities organized to promote the interests of persons with a disability demonstrating (on a contract by contract basis) that at least 51% of the persons used by the non-profit entity to perform the services or manufacture the goods contracted for by the County, are persons with a disability. MFD firms also include those firms that are 51% owned, controlled and managed by one or more members of a socially or economically disadvantaged minority group, which include African Americans who are not of Hispanic origin, Hispanic Americans, Native Americans, Asian Americans, Women and Mentally or Physically Disabled Persons.

Section 7 - "Minority Contracting", Montgomery County Procurement Regulations specifies the procedure to be followed and will govern the evaluation of offers received pursuant to this solicitation. A copy of Section 7 of the Procurement Regulations is available upon request.

Prior to awarding contracts with a value of \$50,000 or more, a prospective Contractor must demonstrate that a minimum percentage of the overall contract value as set by the County, will be subcontracted to certified MFD businesses. A decision as to whether the prospective Contractor has demonstrated a good faith effort to meet this subcontracting requirement will be made by the Director, Office of Procurement, or his/her designee, who may waive this requirement.

A sample of the MFD Report of payment Received is attached. This form is mailed to the MFD Subcontractor to complete for documentation of payment by the Prime Contractor. It is not to be completed by the Prime Contractor nor submitted with the MFD Subcontractor Performance Plan.

The Director, Office of Procurement, or his /her designee determines whether a waiver of MFD subcontracting would be appropriate, under Section 7.3.3.5 of the Procurement Regulations.

For further information regarding the MFD Business Program, please contact the MFD Program Manager, Division of Business Relations and Compliance at (240) 777-9912.

Offerors are encouraged (but not required) to complete the following:

I hereby represent that this is a Minority Business firm as indicated below (CIRCLE ONE):

AFRICAN AMERICAN	ASIAN AMERICAN	DISABLED PERSON
FEMALE	HISPANIC AMERICAN	NATIVE AMERICAN

Attach one of the following certification documents from: Maryland Department of Transportation (MDOT); Federal SBA 8(a); MD/DC Minority Supplier Development Council, Women's Business Enterprise National Council; or City of Baltimore.

ATTACHMENT B

**MONTGOMERY COUNTY, MARYLAND
MINORITY, FEMALE, DISABLED PERSON SUBCONTRACTOR
PERFORMANCE PLAN**

Contractor's
Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone Number: _____ Fax Number: _____ Email: _____

CONTRACT NUMBER/PROJECT DESCRIPTION: _____

A. Individual assigned by Contractor to ensure Contractor's compliance with MFD Subcontractor Performance Plan:

Name: _____
Title: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone Number: _____ Fax Number: _____ Email: _____

B. This Plan covers the life of the contract from contract execution through the final contract expiration date.

C. The percentage of total contract dollars, including modifications and renewals, to be paid to all certified minority owned business subcontractors, is _____% of the total dollars awarded to Contractor.

D. Each of the following certified minority owned businesses will be paid the percentage of total contract dollars indicated below as a subcontractor under the contract.

I hereby certify that the business(s) listed below are certified by one of the following: Maryland Department of Transportation (MDOT); Federal SBA (8A); MD/DC Minority Supplier Development Council (MSDC); Women's Business Enterprise National Council (WBENC); or City of Baltimore.
A Certification Letter must be attached.
For assistance, call 240-777-9912.

1. Certified by: _____
Subcontractor Name: _____
Title: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone Number: _____ Fax Number: _____ Email: _____

CONTACT PERSON: _____

Circle MFD Type:

- | | | |
|------------------|-------------------|-----------------|
| AFRICAN AMERICAN | ASIAN AMERICAN | DISABLED PERSON |
| FEMALE | HISPANIC AMERICAN | NATIVE AMERICAN |

The percentage of total contract dollars to be paid to this subcontractor:

This subcontractor will provide the following goods and/or services:

2. Certified by:

Subcontractor Name:

Title:

Address:

City:

State:

Zip:

Phone Number:

Fax Number:

Email:

CONTACT PERSON:

Circle MFD Type:

AFRICAN AMERICAN

ASIAN AMERICAN

DISABLED PERSON

FEMALE

HISPANIC AMERICAN

NATIVE AMERICAN

The percentage of total contract dollars to be paid to this subcontractor:

This subcontractor will provide the following goods and/or services:

3. Certified by:

Subcontractor Name:

Title:

Address:

City:

State:

Zip:

Phone Number:

Fax Number:

Email:

CONTACT PERSON:

Circle MFD Type:

AFRICAN AMERICAN

ASIAN AMERICAN

DISABLED PERSON

FEMALE

HISPANIC AMERICAN

NATIVE AMERICAN

The percentage of total contract dollars to be paid to this subcontractor:

This subcontractor will provide the following goods and/or services:

4. Certified By:

Subcontractor Name:

Title:

Address: _____

City: _____ State: _____ Zip: _____

Phone Number: _____ Fax Number: _____ Email: _____

CONTACT PERSON: _____

Circle MFD Type:

AFRICAN AMERICAN

ASIAN AMERICAN

DISABLED PERSON

FEMALE

HISPANIC AMERICAN

NATIVE AMERICAN

The percentage of total contract dollars to be paid to this subcontractor:

This subcontractor will provide the following goods and/or services:

E. The following language will be inserted in each subcontract with a certified minority owned business listed in D above, regarding the use of binding arbitration with a neutral arbitrator to resolve disputes with the minority owned business subcontractor; the language must describe how the costs of dispute resolution will be apportioned:

F. Provide a statement below, or on a separate sheet, that summarizes maximum good faith efforts achieved, and/or the intent to increase minority participation throughout the life of the contract or the basis for a full waiver request.

G. A full waiver request must be justified and attached.

Full Waiver Approved:

Partial Waiver Approved:

Date: _____
MFD Program Officer

Date: _____
MFD Program Officer

Full Waiver Approved:

Partial Waiver Approved:

Date: _____
Director
Cherri Branson
Office of Procurement

Date: _____
Director
Cherri Branson
Office of Procurement

The Contractor submits this MFD Subcontractor Performance Plan (Plan Modification No. _____) in accordance with the Minority Owned Business Addendum to General Conditions of Contract between County and Contractor.

CONTRACTOR SIGNATURE

USE ONE:

1. TYPE CONTRACTOR'S NAME: _____

Signature

Typed Name

Date

2. TYPE CORPORATE CONTRACTOR'S NAME: _____

Signature

Typed Name

Date

I hereby affirm that **the** above named person is a corporate **officer** or a designee empowered to **sign** contractual agreements for the corporation.

Signature

Typed Name

Title

Date

APPROVED:

Cherri Branson, Director, Office of Procurement

Date

Section 7.3.3.4(a) of the Procurement Regulations requires:
The Contractor must notify the Director, Office of Procurement of any proposed change to the Subcontractor Performance Plan.

Montgomery County Office of Business Relations and Compliance	MFD Report of Payments Received	For Office Use
SAMPLE ONLY! NOT TO BE USED BY PRIME		



title:

MFD Subcontractor Company Name: _____

Prime Contractor Company Name: _____

MFD Subcontract Amount: \$ _____

READ CAREFULLY BEFORE SIGNING

This certifies that for the month of _____, my company received \$ _____ for work performed, services rendered and/or materials supplied on the above contract.

TOTAL AMOUNT OF SUBMITTED INVOICES TO DATE: \$ _____

TOTAL PAYMENTS RECEIVED TO DATE: \$ _____

Are you experiencing any contract problems with the prime contractor and/or the project? YES NO

Comments: _____

I certify that the above information is true and accurate to the best of my record documentation and knowledge.

(TYPED/PRINTED COMPANY NAME)

(TYPED/PRINTED NAME OF COMPANY OFFICIAL) (TITLE)

SIGNATURE OF COMPANY OFFICIAL) (DATE)

TELEPHONE

PART I -

FAX

E-MAIL

Return by: Email – MFD@montgomerycountymd.gov FAX – 240-777-9952

For assistance, contact the MFD Office at 240-777-9912

ATTACHMENT C

Requirements for Services Contract
Addendum to The General Conditions of Contract Between County and Contractor

- A. This contract is subject to the Wage Requirements Law, found at Section 11B-33A of the Montgomery County Code (“WRL” or “11B-33A”). A County contract for the procurement of services must require the contractor and any of its subcontractors to comply with the WRL, subject to the exceptions for particular contractors noted in 11B-33A (b) and for particular employees noted in 11B-33A (f).
- B. Conflicting requirements (11B-33A (h)): If any federal, state, or County law or regulation requires payment of a higher wage, that law or regulation controls. For an existing County Contract, if an applicable collective bargaining agreement (CBA) that existed prior to May 10, 2016, governs the parties, then that CBA controls. If the term of the CBA mentioned in the preceding sentence ends during the Contract, the WRL will then control.
- C. A nonprofit organization that is exempt from the WRL under 11B-33A (b)(3), must specify, in each bid or proposal, the wage the organization intends to pay to those employees who will perform direct, measurable work under the contract, and any health insurance coverage the organization intends to provide to those employees. Section 11B-33A (c)(2).
- D. A contractor must not split or subdivide a contract, pay an employee through a third party, or treat an employee as a subcontractor or independent contractor, to avoid the imposition of any requirement in 11B-33A. Section 11B-33A (c)(3).
- E. Each contractor and subcontractor covered under the WRL must: certify that it is aware of and will comply with the applicable wage requirements; keep and submit any records necessary to show compliance; and conspicuously post notices approved and/or supplied by the County, informing employees of the requirements in 11B-33A. Section 11B-33A (i).
- F. An employer must comply with the WRL during the initial term of the contract and all subsequent renewal periods, and must pay the adjusted wage rate increase required under 11B-33A (e)(2), if any, which is effective July 1 of each year. The County will adjust the wage rate by the annual average increase in the Consumer Price Index for all urban consumers for the Washington-Baltimore metropolitan area, or successor index, for the previous calendar year and must calculate the adjustment to the nearest multiple of 5 cents. Section 11B-33A (e)(2).
- G. An employer must not discharge or otherwise retaliate against an employee for asserting any right, or filing a complaint of a violation, under the WRL. Section 11B-33A (i)(3).
- H. The sanctions under Section 11B-33 (b), which apply to noncompliance with nondiscrimination requirements, apply with equal force and scope to noncompliance with the wage requirements of the WRL. Section 11B-33A (i)(4).
- I. In the event of a breach of this contract as a result of a contractor’s or subcontractor’s violation of the WRL, the County may seek its available remedies, which include but are not limited to liquidated damages, withholding of payment, and recoupment of audit costs that are described below. The Contractor is jointly and severally liable for any noncompliance by a subcontractor. An aggrieved employee, as a third-party beneficiary, may by civil action against the violating Contractor or subcontractor enforce the payment of wages due under the WRL and recover from the Contractor or subcontractor any unpaid wages with interest, a reasonable attorney’s fee, and damages for any retaliation by the Contractor or subcontractor arising from the employee asserting any right, including filing a complaint under the WRL. Section 11B-33A (i)(5). Furthermore, the contractor expressly acknowledges that the County may assess liquidated damages against the Contractor in the event that it, as a covered employer, fails to pay the required wage, or violates the wage

reporting or payroll records reporting requirement found at 11B-33A (g), including its providing late or inaccurate payroll records.

(i) Liquidated Damages

The County may assess liquidated damages for any noncompliance by contractor or its subcontractor at the rate of 1% per day of the total contract amount, or the estimated annual contract value of a requirements contract, for each day of the violation. This liquidated damages amount includes the amount of any unpaid wages, with interest. The Contractor must pay to the County liquidated damages noted above, in addition to any other remedies available to the County. Contractor and County acknowledge that damages that would result to the County as a result of a breach under the WRL are difficult to reasonably ascertain, and that the liquidated damages provided for in this paragraph is a fair and reasonable estimate of damages the County would incur as a result of contractor's or subcontractor's violation of the WRL.

(ii) Withholding of Payment

If the Director determines that a provision of the WRL has been violated, the Director must issue a written decision, including imposing appropriate sanctions and assessing liquidated damages (as outlined above) and audit costs (as outlined below), and may withhold from payment due the contractor, pending a final decision, an amount sufficient to: (a) pay each employee of the contractor or subcontractor the full amount of wages due under the WRL; (b) reimburse the County for audit costs; and (c) satisfy a liability of a contractor or subcontractor for liquidated damages.

(iii) Audit Costs

If the County determines, as a result of a WRL audit, that the Contractor has violated requirements of the WRL, the Contractor must reimburse to the County the cost incurred by the County in conducting the audit. Section 11B-33A (i)(2)(C).

- J. The County must conduct, and the contractor or subcontractor must comply with, random or regular audits to assure compliance with the WRL. Section 11B-33A (i)(2). The Director may conduct an on-site inspection(s) for the purpose of determining compliance. Some of the documents that may be required during an audit are listed on the Wage Requirements Law FAQ web page:
<http://www.montgomerycountymd.gov/PRO/DBRC/WRL.html>
- K. The Contractor is in breach of this Contract if the Contractor fails to submit timely documentation demonstrating compliance with the WRL to the satisfaction of the Director, including: the Wage Requirements Law Payroll Report Form (PMMD-183), which is required to be submitted by the 14th day of the month following the end of each quarter (January, April, July, October); documents requested in conjunction with a random or regular audit by the County; or, documents otherwise requested by the Director. Section 11B-33A (g)(2).

If a contractor or subcontractor fails to submit, or is late in submitting, copies of any payroll record or other report required to be submitted under the WRL, the County may deem invoices unacceptable until the contractor or subcontractor provides the required records or reports, and may postpone processing payments due under the contract or under an agreement to finance the contract.

For any questions, please contact the Wage Requirements Law Program Manager at 240-777-9918 or WRL@montgomerycountymd.gov.

Wage Requirements Law Certification

(Montgomery County Code, Section 11B-33A)

Business Name					
Address					
City		State		Zip Code	
Phone Number			Fax Number		
E-Mail Address					

Provide, in the spaces below, the contact name and information of the individual designated by your firm to monitor your compliance with the County’s Wage Requirements Law, unless exempt under Section 11B-33A (b) (see Section B. below):

Contact Name			Title	
Phone Number		Fax Number		
E-mail Address				

In the event that you, the “Offeror,” are awarded the contract and become a Contractor, YOU MUST MARK or in ALL BOXES BELOW that apply.

A. Wage Requirements Compliance

This Contractor, as a “covered employer”, must comply with the requirements under Montgomery County Code Section 11B-33A, “Wage Requirements” (“Wage Requirements Law” or “WRL”). Contractor and its subcontractors must pay all employees not exempt under the WRL, and who perform direct measurable work for the County, the required gross wage rate effective at the time the work is performed. For employees who are not paid an hourly wage, Contractor’s compliance with the WRL must be measured by dividing the amount paid to the employee each pay period by the number of hours worked by that employee during each pay period. A covered employer must not make any deduction for any item necessary for an employee to perform the essential job function unless the deduction is permitted by Executive Regulation. The offer price(s) submitted under this solicitation include(s) sufficient funds to meet the requirements of the WRL. A “covered employer” must submit, within 14 days after the end of each quarter (by the 14th of January, April, July, and October, for the quarter ending the preceding month), certified payroll records for each payroll period and for all employees of the contractor or a subcontractor performing services under the County contract governed by the WRL. The payroll records must contain a statement signed by the contractor or subcontractor certifying that the payroll records are correct and the wage rates paid are not less than those required by the WRL. These payroll records must include the following: name, address and telephone number of the contractor or subcontractor; the name and location of the job; and each employee’s name, current home address, daily straight time and overtime hours, total straight time and overtime hours for the payroll period, rate of pay, fringe benefits by type and amount, gross wages, race and gender of the employee, and the employer and the employee share of any health insurance premium provided to the employee. **The Contractor must ensure that NO Social Security number of any person, other than the last four digits, is included on the quarterly report. A sample, blank Payroll Report Form, for your use and completion, can be found at:**

<http://www.montgomerycountymd.gov/PRO/DBRC/WRL.html> . The above must be submitted to the Division of Business

Relations and Compliance, Attn: Wage Requirements Law Program Manager (preferably via email to WRL@montgomerycountymd.gov),

Each Contractor **must**: keep payroll records covering work performed on a contract covered by the WRL for not less than 5 years after the work is completed; and, subject to reasonable notice, permit the County to inspect the payroll records at any reasonable time and as often as the County deems necessary. If the Contractor or subcontractor fails to submit, or is late in submitting, copies of any payroll record or other report required to be submitted under the WRL, the County may deem invoices unacceptable until the Contractor or subcontractor provides the required records or reports, and may postpone processing payments due under the contract or under an agreement to finance the contract. A violation of the WRL, including the late submission or non-submission of the information noted above, may result in action by the County, including: (a) withholding contract payments, reducing payment amounts, or otherwise assessing damages against Contractor, in an amount sufficient to: (i) pay each employee of the Contractor or subcontractor the full amount of wages due under the WRL; (ii) reimburse the County for audit costs; or (iii) satisfy a liability of a contractor or subcontractor for liquidated damages; (b) terminating the contract; or, (c) otherwise taking action to enforce the contract or the WRL. Violation of the WRL may also result in a finding of non-responsibility for a future contract, or may form the basis for debarment or suspension.

B. Exemption Status (if applicable)

This Contractor is exempt from Section 11B-33A, "Wage Requirements," because it is:

- 1. Reserved – [Intentionally left blank].
- 2. a contractor who, at the time a contract is signed, has received less than \$50,000 from the County in the most recent 12-month period, and will be entitled to receive less than \$50,000 from the County under that contract in the next 12-month period. Section 11B-33A (b)(1).
- 3. a public entity. Section 11B-33A (b)(2).
- 4. a non-profit organization that has qualified for an exemption from federal income taxes under Section 501(c)(3) of the Internal Revenue Code. Section 11B-33A (b)(3) (**must complete item C below**).
- 5. an employer expressly precluded from complying with the WRL by the terms of any federal or state law, contract, or grant. Section 11B-33A (b)(7) (**must specify the law, or furnish a copy of the contract or grant**).

C. Nonprofit Wage & Health Information

This Contractor is a non-profit organization that is exempt from coverage under Section 11B-33A (b)(3). Accordingly, the contractor has completed the 501 (c)(3) Nonprofit Organization's Employee's Wage and Health Insurance Form, which is attached. See Section 11B-33A (c)(2). **Also**, the contractor must provide proof of its 501(c)(3) status (i.e. Letter from the IRS).

D. Nonprofit's Comparison Price(s) (if desired)

This Contractor is a non-profit organization that is opting to pay **its** covered employees the hourly rate specified in the wage requirements. Accordingly, Contractor is duplicating the blanket-cost quotation sheet on which it is submitting its price(s) in the Solicitation, **and** is submitting on this duplicate form its price(s) to the County had it not opted to pay **its** employees the hourly rate specified in the WRL. For proposal evaluation purposes, **this** price(s) will be compared to price(s) of another nonprofit organization(s) that is paying its employees an amount consistent with its exemption from paying the hourly rate under the WRL. This revised information on the duplicate cost sheet must be clearly marked as your

nonprofit organization comparison price(s). In order for the County to compare your price(s), the revised information on the duplicate cost sheet must be submitted with your offer on or before the offer opening date, and must show how the difference between your nonprofit organization price(s) and other organization comparison price(s) was calculated. Section 11B-33A (c)(2).

E. Sole Proprietorship

Sole Proprietorships are subject to the WRL. In order to be excused from the posting and reporting requirements of the WRL, the individual who is the sole proprietor must sign the certifications below in order to attest to the fact that the Sole Proprietorship:

- (1) is aware of, and will comply with, the WRL, as applicable;
- (2) has no employee other than the sole proprietor; and
- (3) will inform the Montgomery County Division of Business Relations and Compliance if the sole proprietor employs any worker other than the sole proprietor.

Contractor Certification

CONTRACTOR SIGNATURE: Contractor submits this certification form in accordance with Section 11B-33A of the Montgomery County Code. Contractor certifies that it, and any and all of its subcontractors that perform services under the resultant contract with the County, adhere to Section 11B-33A of the Montgomery County Code.

Authorized Signature		Title of Authorized Person	
Typed or Printed Name		Date	

ATTACHMENT D**Prevailing Wage Requirements for Construction Contract Addendum to the General Conditions of Contract
between County and Contractor**

The Contractor and all Subcontractors must comply with the Prevailing Wage Law contained in Chapters 11B-33C and 20-75 of the Montgomery County Code. Prevailing wage means the wage rate paid by employers that is determined by a governmental authority, based upon a particular geographic area, for a given class of labor and type of project. The purpose of a prevailing wage is to ensure that construction workers who work on public works contracts are paid the going rate for their services. The prevailing wage rates are established by the State of Maryland and apply to all of the Contractor's employees and any and all Subcontractors. The Contractor and all Subcontractors must comply with all of the requirements of the Prevailing Wage Law including, but not limited to, the following:

1. Pay employees the prescribed rate as annually established by the State of Maryland Commissioner of Labor and Industry; the prevailing wage rates in effect on the date a solicitation is issued will apply throughout the term of a contract **resulting** from that solicitation.
2. Pay employees overtime for work more than 10 hours in any single day, work more than 40 hours in a work week, or work on Sunday or legal holiday;
3. Classify employees in their proper work classification in conformance with the schedule established by the State of Maryland Commissioner of Labor and Industry;
4. Electronically submit payroll records through www.LCPTracker.net, within 14 days after the end of each payroll period, to verify that Prevailing Wage rates have been paid to employees. The payroll records must include the following:
 - A. **The name, address and telephone number of the Contractor or Subcontractor;**
 - B. **The name and location of the job;**
 - C. **Each employee's:**
 - a. Name;
 - b. Current address unless previously reported;
 - c. Specific work classification;
 - d. Daily straight time and overtime hours;
 - e. Total straight time and overtime hours for the payroll period;
 - f. Rate of pay;
 - g. **Fringe benefits by type and amount;**
 - h. **Gross wages.**
5. If a Contractor or any Subcontractors are late in submitting copies of any payroll records required to be submitted under the Prevailing Wage Law, the County may deem Contractor's invoice(s) submitted to the County for payment unacceptable until the Contractor and Subcontractors provide the required records; and, the County may postpone processing payments otherwise due under the Contract or under an agreement to finance the **Contract**;
6. The Contractor and all Subcontractors must retain all payroll records for a period not **less** than five (5) years after the Work is completed;
7. The County **may** inspect the payroll records at any reasonable time and as often **as it deems** necessary;
8. The County may perform random or **regular audits and investigate** any complaint of a violation of the Prevailing Wage Law;
9. In the event the County determines that a provision of the Prevailing Wage Law has been violated, the County may withhold payment to the Contractor **in an amount sufficient** to pay each employee of the Contractor or any

IFB #1086044

Subcontractors the full amount of wages due **under the Prevailing Wage Law**, and an amount **sufficient to satisfy a liability of a Contractor or any Subcontractors for liquidated damages as provided under the Prevailing Wage Law**, pending a final **decision** on the violation by the County;

10. Contractor may **appeal a** written decision of the **Director**, Office of Procurement, that the Contractor violated a provision of the Prevailing Wage Law to the Chief Administrative Officer (“CAO”), within ten (10) days after receiving a copy of the decision. The CAO must designate a hearing officer to conduct a hearing upon receipt of a timely appeal. If the Contractor does not appeal a written decision within ten (10) days after receipt, the decision of the Director, becomes **final and binding**;
11. **Contractor and all Subcontractors must not discharge, or otherwise retaliate against, an employee for asserting any right under the Prevailing Wage Law or for filing a complaint of a violation;**
12. An aggrieved employee is a third-party beneficiary of this Contract and the employee may by civil action recover the difference between the prevailing wage for the type of work performed and the amount actually received, with interest and a reasonable attorney’s fee; and
13. Each Contract subject to the Prevailing Wage Law may specify the payment of liquidated damages to the County by the Contractor and any Subcontractors for any noncompliance with the Prevailing Wage Law. Liquidated damages are: \$10 for each calendar day that the payroll records are late; \$20 per day for each day that an employee is misclassified; and \$50 per violation of the requirement to post the prevailing wage rates at the **work site**.
14. Where the initial Contract Sum is below the \$500,000.00 threshold, but it is subsequently increased and exceeds the \$500,000.00 threshold due to an approved Contract Modification, the amount of any such Contract Modification that causes the Contract Sum to exceed the \$500,000.00 threshold is subject to the Prevailing Wage Law.
15. The Contractor **and all Subcontractors must post a clearly legible statement** of each prevailing wage rate in a prominent and easily accessible place at the Work Site during the entire time Work is being performed, in English and any other language that is primarily spoken by the employees, at the Work Site.

ATTACHMENT E

Minority-Owned Business Addendum to General Conditions of Contract Between County and Contractor

- A. This contract is subject to the Montgomery County Code and the Montgomery County Procurement Regulations regarding participation in the Minority-Female-Disabled Person (MFD) procurement program.
- B. Contractor must subcontract a percentage goals listed below of the total dollar value of the contract, including all modifications and renewals, to certified minority owned businesses. The MFD subcontracting goal may be waived under appropriate circumstances by submission of a letter to the Minority Business Program Manager. The letter must explain why a waiver is appropriate. The Director of the Office of Procurement or designee may waive, in whole or in part, the MFD subcontracting goal if the Director determines that a waiver is appropriate under Section 7.3.3.5 of the Montgomery County Procurement Regulations. In determining if a waiver should be granted, the Director may require the Contractor to submit additional information; the Director may require the Contractor to submit some or all of this information on forms approved by the Director.
- For Goals by each purchasing category, please refer to www.montgomerycountymd.gov/mfd
- C. The attached MFD Subcontractor Performance Plan, which must be approved by the Director, is an integral part of the contract between County and Contractor. In a multi-term contract, Contractor must submit a MFD Subcontract Performance Plan to be in effect for the life of the contract, including any renewal or modification.
- D. Contractor must include in each subcontract with a minority owned business a provision that requires the use of binding arbitration with a neutral arbitrator to resolve disputes between the Contractor and the minority owned business subcontractor. This arbitration provision must describe how the cost of dispute resolution will be apportioned; the apportionment must not, in the judgment of the Director, attempt to penalize a minority owned business subcontractor for filing an arbitration claim.
- E. County approval of the MFD Subcontractor Performance Plan does not create a contractual relationship between the County and the minority owned business subcontractor.
- F. Contractor must notify and obtain prior written approval from the Director regarding any change in the MFD Subcontractor Performance Plan.
- G. Before receiving final payment under this contract, Contractor must submit documentation showing compliance with the MFD Subcontracting Performance Plan. Documentation may include, at the direction of the Director, invoices, copies of subcontracts with minority owned businesses, cancelled checks, affidavits executed by minority owned business subcontractors, waivers, and arbitration decisions. The Director may require Contractor to submit periodic reports on a form approved by the Director. The Director may conduct an on-site inspection for the purpose of determining compliance with the MFD Subcontractor Performance Plan. If this is a multi-term contract, final payment means the final payment due for performance rendered for each term of the contract.

If the Contractor fails to submit documentation demonstrating compliance with the MFD Subcontractor Performance Plan, to the satisfaction of the Director, after considering relevant waivers and arbitration decisions, the Contractor is in breach of this contract. In the event of a breach of contract under this addendum, the Contractor must pay to the County liquidated damages equal to the difference between all amounts the Contractor has agreed under its Plan to pay minority owned business subcontractors and all amounts actually paid minority owned business subcontractors with appropriate credit given for any relevant waiver or arbitration decision. Contractor and County acknowledge that damages which would result to the County as a result of a breach under this addendum are difficult to ascertain, and that the liquidated damages provided for in this addendum are fair and reasonable in estimating the damage to the County of a breach of this addendum by Contractor. In addition, the County may terminate the contract. As the result of a breach under this addendum, The Director of the Office of Procurement must find the Contractor non-responsible for purposes of future procurement with the County for the ensuing three years.

ATTACHMENT F

Appendix to Section B

MANDATORY INSURANCE REQUIREMENTS

Parking Garage Repair and Refurbishment of Garage Storm, Sanitary and Washdown Systems

Prior to the execution of the contract by the County, the proposed awardee/contractor and their contractors (if requested by County) must obtain, at their own cost and expense, the following *minimum* (not maximum) insurance coverage with an insurance company/companies licensed to conduct business in the State of Maryland and acceptable to the Division of Risk Management. This insurance must be kept in full force and effect during the term of this contract, including all extensions. The insurance must be evidenced by a certificate of insurance, and if requested by the County, the proposed awardee/contractor shall provide a copy of the insurance policies and additional insured endorsements. The minimum limits of coverage listed below shall not be construed as the maximum as required by contract or as a limitation of any potential liability on the part of the proposed awardee/contractor to the County nor shall failure to request evidence of this insurance in any way be construed as a waiver of proposed awardee / contractor's obligation to provide the insurance coverage specified. The Contractor's insurance shall be primary. Coverage pursuant to this Section shall not include any provision that would bar, restrict, or preclude coverage for claims by Montgomery County against Contractor, including but not limited to "cross-liability" or "insured vs insured" exclusion provisions.

Commercial General Liability

A minimum limit of liability of **one million dollars (\$1,000,000), per occurrence**, for bodily injury, personal injury and property damage coverage per occurrence including the following coverages:

- Contractual Liability
- Premises and Operations
- Independent Contractors & Subcontractors
- Products and Completed Operations
- Explosion, Collapse, Underground Hazard

Business Automobile Liability Coverage

A minimum limit of liability of **five hundred thousand dollars (\$500,000), combined single limit**, for bodily injury and property damage coverage per occurrence including the following:

- owned automobiles
- hired automobiles
- non-owned automobiles
- loading and unloading

Worker's Compensation/Employer's Liability

Meeting all statutory requirements of the State of Maryland Law and with the following minimum Employers' Liability limits:

- Bodily Injury by Accident - \$100,000 each accident***
- Bodily Injury by Disease - \$500,000 policy limits***
- Bodily Injury by Disease - \$100,000 each employee***

Additional Insured

Montgomery County, Maryland, its elected and appointed officials, officers, consultants, agents and employees, must be included as an additional insured on Contractor's commercial general, automobile insurance, and contractor's excess/umbrella insurance if used to satisfy the Contractor's minimum insurance requirements under this contract, for liability arising out of contractor's products, goods and services provided under this contract. The stipulated limits of coverage above shall not be construed as a limitation of any potential liability of the contractor.

Policy Cancellation

Should any of the above policies be cancelled before the expiration date thereof, written notice must be delivered to the County in accordance with the policy provisions.

Certificate Holder

Montgomery County, Maryland
Parking Operations / Tim O'Gwin
100 Edison Drive, 4th floor
Gaithersburg, Maryland 20878
Contract #10886044

ATTACHMENT G

SAMPLE PAYMENT REQUEST FORMAT

CONSTRUCTION COMPANY NAME
STREET ADDRESS
CITY – STATE – ZIP CODE
PHONE NO.

Date _____

Montgomery County, Maryland
Department of Transportation
Division of Parking Management
100 Edison Park Drive, 4th floor
Gaithersburg, Maryland 20878

Attn: Name of Capital Projects Manager

Re: IFB No. _____
MCDOT Project No. _____
Project Name _____

Final Estimate **(Use when applicable)**
Final Payment **(Use when applicable)**

Estimate No. _____

ITEM NO.	ITEM DESCRIPTION	CONTRACT QUANTITY	UNIT PRICE	COMPLETED QUANTITY	TOTAL
101	Clearing and Grubbing	Lump Sum	\$00.00	_____ %	\$00.00
201	Class I Excavation	XXX CY	\$00.00	XXX	\$00.00

Total _____
Less (10%) Retainage _____
Balance _____
Less Previous Estimates _____
AMOUNT DUE _____

I hereby certify this invoice is correct for all work performed and all materials furnishes and that payment as indicated is due.
(Use the following sentence on Final Payment.)

I further certify that all sub-contractors and suppliers have been paid or will be paid with the proceeds from this Final Payment.

Construction Company Name

Representative's Name – Title

Date

ATTACHMENT H

Performance Bond

Bond No.: _____

_____ as surety ("Surety"), and _____

as principal ("Contractor"), enter into and execute this bond ("Performance Bond"), and bind themselves in favor of Montgomery County Maryland, as obligee ("Owner"), in the initial amount of \$ 250,000.00 (dollar value written out in words) (the "Penal Sum").

WHEREAS, the Contractor has executed a contract with the Owner dated _____ (the "Contract") for the _____ (the "Project") and,

WHEREAS, the Owner has required the Contractor to furnish this Performance Bond as a condition to executing the Contract with the Contractor;

NOW THEREFORE, the Surety and the Contractor, both jointly and severally, and for themselves, their heirs, administrators, executors, successors and assigns agree:

1. **CONTRACT INCORPORATED; SURETY AND CONTRACTOR BOUND FOR FULL PERFORMANCE.** The Contract is incorporated by reference and made a part of this bond. The Surety and the Contractor are bound for the full performance of the Contract including without exception all of the Contract Documents (as defined in the Contract) and all of their terms and conditions, both express and implied.
2. **OWNER'S AFFIDAVIT OF CONTRACTOR BREACH OR DEFAULT.** If the Owner shall provide to Surety the written affidavit of the Owner stating that the Contractor is in breach or default of the Contract, and that such breach or default remains uncured by the Contractor, then upon delivery of such affidavit to the Surety in the method for providing notices as set forth in Paragraph 7 below, Surety must promptly notify the Owner in writing which action it will take as permitted in Paragraph 3.
3. **SURETY'S OBLIGATION UPON DELIVERY OF OWNER'S AFFIDAVIT OF CONTRACTOR'S BREACH OR DEFAULT.** Upon the delivery of the Owner's affidavit of breach or default by the Contractor as provided in Paragraph 2 above, the Surety may promptly remedy the breach or default or must, within thirty (30) days, proceed to take one of the following courses of action:
 - a. **Proceed Itself.** Complete performance of the Contract including correction of defective and nonconforming Work through its own contractors or employees, approved as being acceptable to the Owner, in the Owner's sole discretion, provided, however, that Owner's discretion to approve Surety's contractor will not be unreasonably withheld as to any contractor who would have qualified to offer a proposal on the Contract and is not affiliated (as defined in the General Conditions of Contract) with the Contractor. During this performance by the Surety the Owner will pay the Surety from its own funds only those sums as would have been due and payable to the Contractor under the Contract as and when they would have been due and payable to the Contractor in the absence of the breach or default not to exceed the amount of the remaining Contract balance less any sums due the Owner under the Contract. During this performance Surety's payment bond must remain in full force and effect; or
 - b. **Tender a completing contractor acceptable to Owner.** Tender a contractor, approved as being acceptable to the Owner (in the Owner's sole discretion), together with a contract for fulfillment and completion of the Contract executed by the completing contractor, to the Owner for the Owner's execution. Owner's discretion to

approve Surety's completing contractor will not be unreasonably withheld as to any contractor who would have qualified to offer a proposal on the Contract and is not affiliated (as defined in the General Conditions of Contract) with the Contractor. Owner's discretion to approve Contractor as the completing contractor, however, shall be in Owner's sole subjective discretion. Upon execution by the Owner of the contract for fulfillment and completion of the Contract, the completing contractor must furnish to the Owner a performance bond and a separate payment bond, each in the form of those bonds previously furnished to the Owner for the Project by the Contractor. Each such bond must be in the Penal Sum of the full cost to complete the Contract. The Owner will pay the completing contractor from its own funds only those sums as would have been due and payable to the Contractor under the Contract as and when they would have been due and payable to the Contractor in the absence of the breach or default not to exceed the amount of the remaining Contract balance less any sums due the Owner under the Contract. To the extent that the Owner is obligated to pay the completing contractor sums which would not have then been due and payable to the Contractor under the Contract (any sums in excess of the then remaining Contract balance less any sums due the Owner under the Contract), the Surety must pay to the Owner the full amount of those sums at the time the completing Contractor is tendered to the Owner so that the Owner can utilize those sums in making timely payment to the completing contractor; or

- c. **Tender the Full Penal Sum.** Tender to the Owner the full Penal Sum of the surety bond. The Owner will refund to the Surety without interest any unused portion not spent by the Owner procuring and paying a completing contractor or completing the Contract itself, plus the cost allowed under Section 4, after completion of the contract for fulfillment and completion of the Contract and the expiration of any applicable warranties; or
 - d. **Other Acts.** Take any other acts mutually agreed upon in writing by the Owner and the Surety.
 - e. **IT SHALL BE NO DEFENSE TO SURETY'S OBLIGATION TO UNDERTAKE ONE OF THE PRECEDING COURSES OF ACTION THAT THE CONTRACTOR CONTENDS THAT IT IS NOT IN BREACH OR DEFAULT OF THE CONTRACT, OR THAT THE NOTICE OF BREACH OR DEFAULT WAS DEFECTIVE, OR THAT THE CONTRACTOR HAS RAISED ANY OTHER CLAIM OF DEFENSE OR OFFSET, PROVIDED ONLY THAT SURETY HAS RECEIVED THE AFFIDAVIT OF THE OWNER AS SPECIFIED IN PARAGRAPH 2.**
4. **SURETY'S ADDITIONAL OBLIGATIONS.** In addition to those duties set forth herein above, the Surety must promptly pay the Owner (i) all losses, costs and expenses resulting from the Contractor's breach(es) or default(s), including, without limitation, fees, expenses and costs for architects, engineers, consultants, testing, surveying and attorneys, plus (ii) liquidated or actual damages, whichever may be provided for in the contract, for lost use of the Project, plus (iii) reprocurement costs and fees and expenses, plus (iv) costs incurred at the direction, request, or as a result of the acts or omissions of the Surety; provided that in no event shall Surety's liability exceed the Penal Sum of this Bond.
 5. **SURETY'S WAIVER OF NOTICE.** The Surety waives notice of any Modifications to the Contract, including changes in the Contract Time, the Contract Sum, the amount of liquidated damages, or the Work to be performed.
 6. **NO THIRD PARTY BENEFICIARIES.** The Surety provides this Performance Bond for the sole and exclusive benefit of the Owner and, if applicable, any dual obligee designated by attached rider, together with their heirs, administrators, executors, successors and assigns. No other party, person or entity has any rights against the Surety.
 7. **METHOD OF NOTICE.** All notices to the Surety, the Contractor or the Owner must be given by Certified Mail, Return Receipt Requested, to the address set forth for each party below:

SURETY:

Name: _____

Attention: _____

Street: _____

City, State, Zip _____

CONTRACTOR:

Name: _____

Attention: _____

Street: _____

City, State, Zip _____

OWNER:

Montgomery County Government

with a copy to:

Office of the County Attorney
 Trevor Ashbarry, Chief, Division of Finance & Procurement
 101 Monroe Street, Third Floor
 Rockville, Maryland 20850

- 8. **STATUTE OF LIMITATIONS.** Any statutory limitation, which may be contractually superseded, to the contrary notwithstanding, any action hereon may be instituted so long as the applicable statute of limitations governing the Contract (including any warranty period) has not run or expired or within three (3) years following final completion of the Contract (including any warranty period) and acceptance of the Work performed under the Contract by the Owner, whichever is longer.
- 9. **RECITALS.** The recitals contained in this Performance Bond are incorporated by reference herein and are expressly made a part of this Performance Bond.
- 10. **GOVERNING LAW.** This Performance Bond shall be governed by, and construed in accordance with the laws of the State of Maryland without regard to its conflict of laws provisions.
- 11. **VENUE.** In the event any legal action shall be filed upon this Performance Bond, venue shall lie exclusively in the Circuit Court for Montgomery County, Maryland.

SIGNATURE PAGE FOLLOWS

SIGNATURE PAGE FOR PERFORMANCE BOND FOR CONTRACT No. 1086044

Contractor

Surety

(Typed Firm Name)

(Typed Firm Name)

(Seal)

(Seal)

By:

By:

(Signature)

(Signature)

(Printed Name)

(Printed Name)

(Title)

(Title)

(Address)

(Address)

(Date of Execution)

(Date of Execution)

ATTACHMENT I

ATTACHMENT I

INFORMATIONAL WAGE RATES

The wage rates listed below are published by the State of Maryland, Division of Labor and Industry, Prevailing Wage Unit.

The wage rates posted on this site are provided for **informational** purposes ONLY.

The wage and fringe rates may change between the time of issuance of the wage determinations and the award of the public works contract. Therefore, prior to the award of the public works contract, verification must be made with the public body, to insure that the rates contained in this determination are still prevailing.

These **Informational Prevailing Wage Rates** may not be substituted for the requirements of pre-advertisement for bids or onsite job posting for a public work contract that exceeds \$500,000 in value and either of the following criteria are met: (1) the contracting body is a unit of State government or an instrumentality of the State and there is any State funding for the project; or (2) the contracting body is a political subdivision, agency, person or entity (such as a county) and the State funds 50% or more of the project.

MONTGOMERY COUNTY		BUILDING CONSTRUCTION			Print Date Nov 09, 2018
CLASSIFICATION	MODIFICATION REASON	BASIC HOURLY RATE	BORROWED FROM	FRINGE BENEFIT PAYMENT	
BALANCING TECHNICIAN	AD	\$40.27		\$17.43	
BOILERMAKER	AD	\$35.00	033	\$31.45	
BRICKLAYER	AD	\$30.91		\$10.93	
BRICKLAYER/SAWMAN	AD	\$27.89	033	\$8.42	
CARPENTER	AD	\$28.36		\$11.59	
CARPENTER - SHORING SCAFFOLD BUILDER	AD	\$33.36	033	\$20.08	
CARPET LAYER	AD	\$28.78		\$11.95	
CEMENT MASON	AD	\$27.15		\$5.93	
COMMUNICATION INSTALLER TECHNICIAN	AD	\$23.20	033	\$0.00 a + b	
DRYWALL - SPACKLING, TAPING, & FINISHING	AD	\$25.06		\$9.76	
ELECTRICIAN	AD	\$44.65		\$16.85	
ELEVATOR MECHANIC	AD	\$42.79		\$35.30	
FIREPROOFER - BY HAND	AD	\$42.79	033	\$31.89	
FIREPROOFER - SPRAYER	AD	\$23.00	033	\$4.24	
FIRESTOPPER	AD	\$27.56		\$7.13	
GLAZIER	AD	\$25.74		\$11.65	
INSULATION WORKER	AD	\$35.03		\$15.47	
IRONWORKER - FENCE ERECTOR	AD	\$30.25	033	\$18.72	
IRONWORKER - ORNAMENTAL	AD	\$31.15	033	\$20.63	
IRONWORKER - REINFORCING	AD	\$33.25		\$0.00	

ATTACHMENT I

IRONWORKER - STRUCTURAL	AD	\$31.15	\$20.63
LABORER - AIR TOOL OPERATOR	AD	\$22.36	\$6.94
LABORER - ASPHALT PAVER	AD	\$22.36	\$6.94
LABORER - ASPHALT RAKER	AD	\$23.42	\$8.47
LABORER - BLASTER - DYNAMITE	AD	\$22.36	\$6.94
LABORER - BURNER	AD	\$22.36	\$6.94
LABORER - COMMON	AD	\$23.42	\$8.47
LABORER - CONCRETE PUDDLER	AD	\$23.42	\$8.47
LABORER - CONCRETE SURFACER	AD	\$22.36	\$6.94
LABORER - CONCRETE TENDER	AD	\$23.42	\$8.47
LABORER - CONCRETE VIBRATOR	AD	\$23.42	\$8.47
LABORER - DENSITY GAUGE	AD	\$23.42	\$8.47
LABORER - FIREPROOFER - MIXER	AD	\$23.42	\$8.47
LABORER - FLAGGER	AD	\$23.42	\$8.47
LABORER - GRADE CHECKER	AD	\$23.42	\$8.47
LABORER - HAND ROLLER	AD	\$23.42	\$8.47
LABORER - HAZARDOUS MATERIAL HANDLER	AD	\$22.36	\$6.94
LABORER - JACKHAMMER	AD	\$23.42	\$8.47
LABORER - LANDSCAPING	AD	\$23.42	\$8.47
LABORER - LAYOUT	AD	\$23.42	\$8.47
LABORER - LUTEMAN	AD	\$23.42	\$8.47
LABORER - MASON TENDER	AD	\$22.36	\$6.94
LABORER - MORTAR MIXER	AD	\$23.42	\$8.47
LABORER - PIPELAYER	AD	\$22.36	\$6.94
LABORER - PLASTERER - HANDLER	AD	\$23.42	\$8.47
LABORER - SCAFFOLD BUILDER	AD	\$22.36	\$6.94
LABORER - TAMPER	AD	\$23.42	\$8.47
MILLWRIGHT	AD	\$32.49	\$11.60

ATTACHMENT I

PAINTER	AD	\$25.06		\$9.76
PILEDRIIVER	AD	\$29.94		\$10.98
PLASTERER	AD	\$28.83	033	\$6.15
PLASTERER - MIXER	AD	\$26.00	033	\$4.89
PLUMBER	AD	\$40.67		\$17.41 a
POWER EQUIPMENT OPERATOR - ASPHALT DISTRIBUTOR	AD	\$27.24		\$6.87
POWER EQUIPMENT OPERATOR - BOOM TRUCK	AD	\$34.08	021	\$3.49 a + b
POWER EQUIPMENT OPERATOR - BROOM / SWEEPER	AD	\$17.50	021	\$0.83
POWER EQUIPMENT OPERATOR - BULLDOZER	AD	\$27.75	021	\$11.90
POWER EQUIPMENT OPERATOR - CONCRETE PUMP	AD	\$36.50		\$0.00
POWER EQUIPMENT OPERATOR - CRANE	AD	\$41.12		\$10.35 a + b
POWER EQUIPMENT OPERATOR - CRANE - TOWER	AD	\$45.00		\$0.00
POWER EQUIPMENT OPERATOR - DRILL - RIG	AD	\$34.53		\$9.15
POWER EQUIPMENT OPERATOR - EXCAVATOR	AD	\$27.75	021	\$11.90
POWER EQUIPMENT OPERATOR - FORKLIFT	AD	\$19.00		\$1.45
POWER EQUIPMENT OPERATOR - GRADALL	AD	\$25.00	021	\$4.83
POWER EQUIPMENT OPERATOR - GRADER	AD	\$29.00	021	\$10.90 a + b
POWER EQUIPMENT OPERATOR - GUARD RAIL POST DRIVER	AD	\$45.72	033	\$30.63
POWER EQUIPMENT OPERATOR - HOIST	AD	\$24.68	033	\$12.97
POWER EQUIPMENT OPERATOR - LOADER	AD	\$29.00	021	\$13.66
POWER EQUIPMENT OPERATOR - MECHANIC	AD	\$32.89		\$9.11
POWER EQUIPMENT OPERATOR - ROLLER - EARTH	AD	\$28.75	021	\$11.76 a + b
POWER EQUIPMENT OPERATOR - SCREED	AD	\$20.00	021	\$4.21
POWER EQUIPMENT OPERATOR - SKID STEER (BOBCAT)	AD	\$24.79	021	\$11.90
POWER EQUIPMENT OPERATOR - SKIDDER	AD	\$20.50	021	\$0.00
POWER EQUIPMENT OPERATOR-VACCUM TRUCK	AD	\$23.40	021	\$3.30
RESILIENT FLOOR	AD	\$28.78		\$11.95
ROOFER/WATERPROOFER	AD	\$36.31	021	\$3.45
SHEETMETAL WORKER	AD	\$40.27		\$17.43
SPRINKLERFITTER	AD	\$36.15	033	\$19.32
STEAMFITTER/PIPEFITTER	AD	\$40.69		\$21.42 a
STONE MASON	AD	\$36.91	033	\$10.96
TILE & TERRAZZO FINISHER	AD	\$22.51		\$10.96
TILE & TERRAZZO MECHANIC	AD	\$27.44		\$11.99
TRUCK DRIVER - FLATBED	AD	\$23.50		\$0.00
TRUCK DRIVER - LOWBOY	AD	\$23.65	033	\$8.98

ATTACHMENT I

TRUCK DRIVER - TACK/TAR TRUCK	AD	\$26.85	021	\$4.91
TRUCK DRIVER - TANDEM	AD	\$25.75	021	\$0.00
TRUCK DRIVER - WATER	AD	\$18.50	021	\$2.26

FRINGE REFERENCES AS NOTED:

- a. PAID HOLIDAYS: New Year Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.
- b. PAID VACATIONS: Employees with 1 year service - 1 week paid vacation; 2 years service - 2 weeks paid vacation; 10 years service - 3 weeks paid vacation.

Incidental Craft Data: Caulker, Man Lift Operator, Rigger, Scaffold Builder, and Welder receive the wage and fringe rates prescribed for the craft performing the operation to which welding, scaffold building, rigging, operating a Man Lift, or caulking is incidental.

These **Informational Prevailing Wage Rates** may not be substituted for the requirements of pre-advertisement for bids or onsite job posting for a public work contract that exceeds \$500,000 in value and either of the following criteria are met: (1) the contracting body is a unit of State government or an instrumentality of the State and there is any State funding for the project; or (2) the contracting body is a political subdivision, agency, person or entity (such as a county) and the State funds 50% or more of the project.

Modification Codes:

- (AD) 17-209 Annual Determination from Survey Wage Data Received
- (CH) 17-211 Commissioners Hearing
- (CR) 17-208 Commissioners Review
- (SR) 17-208 Survey Review by Staff

Each "Borrowed From" county is identified with the FIPS 3-digit county code unique for the specific jurisdiction in Maryland.

For additional information on the FIPS (Federal Information Processing Standard) code, see <http://www.census.gov/datamap/fipslist/AllSt.txt>

The Prevailing Wage rates appearing on this form were originally derived from Maryland's annual Wage Survey. The Commissioner of Labor & Industry encourages all contractors and interested groups to participate in the voluntary Wage Survey, detailing wage rates paid to workers on various types of construction throughout Maryland.

A mail list of both street and email addresses is maintained by the Prevailing Wage Unit to enable up-to-date prevailing wage information, including Wage Survey notices to be sent to contractors and other interested parties. If you would like to be included in the mailing list, please forward (1) your Name, (2) the name of your company (if applicable), (3) your complete postal mailing address, (4) your email address and (5) your telephone number to PWMAILINGLIST@dllr.state.md.us. Requests for inclusion can also be mailed to: Prevailing Wage, 1100 N. Eutaw Street - Room 607, Baltimore MD 21201-2201.

END OF REPORT