

RETURN WITH BID

LETTING DATE June 11, 2010

ITEM NUMBER 18A

Proposal Submitted By

Name _____

Address _____

City/State _____

9 Digit Zip Code _____ Telephone Number _____

FEIN Number _____ FAX Number _____

E-Mail Address _____

BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL
(See instructions inside front cover)

NOTICE TO PROSPECTIVE BIDDERS

This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction.
(SEE INSTRUCTIONS ON THE INSIDE OF COVER)

PROPOSAL COVER SHEET



Illinois Department of Transportation
DIVISION OF AERONAUTICS

AIRPORT Peoria International

MUNICIPAL DESIGNATION Peoria

COUNTY DESIGNATION Peoria

ILLINOIS PROJECT NO. PIA-3981

FEDERAL PROJECT NO. 3-17-0080-xx

For engineering information, contact Chuck Taylor of Crawford, Murphy & Tilly, Inc. at (217) 787-8050.

FAA rules prohibit the use of escalation clauses for materials. Therefore, the Division of Aeronautics cannot offer a bituminous material cost adjustment provision for projects utilizing federal funds.

PLEASE MARK THE APPROPRIATE BOX BELOW:

A Bid Bond is included.

A Cashier's Check or a Certified Check is included.

INSTRUCTIONS

ABOUT IDOT PROPOSALS: All proposals issued by IDOT are potential bidding proposals. Each proposal contains all Certifications and Affidavits, a Proposal Signature Sheet and a Proposal Bid Bond required for Prime Contractors to submit a bid after written **Authorization to Bid** has been issued by IDOT's Central Bureau of Construction. In addition, this proposal contains new statutory requirements applicable to the use of subcontractors and, in particular, includes the State Required Ethical Standards Governing Subcontractors to be signed and incorporated into all subcontracts.

WHO CAN BID?: Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction. To request authorization, a potential bidder must complete and submit Part B of the Request for Authorization to Bid/or Not For Bid Status form (BDE 124 INT) and submit an original Affidavit of Availability (BC 57).

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?: When a prospective prime bidder submits a "**Authorization to Bid or Not for Bid**" form, he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued a **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction, that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial. If a contractor has requested to bid but has not received a **Authorization to Bid or Not for Bid Report**, they should contact the Central Bureau of Construction in advance of the letting date.

WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

ABOUT SUBMITTING BIDS: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?

Questions Regarding	Call
Prequalification and/or Authorization to Bid	(217)782-3413
Preparation and submittal of bids	(217)782-7806



PROPOSAL

TO THE DEPARTMENT OF TRANSPORTATION

1. Proposal of _____

for the improvement officially known as:

(a) Peoria International Airport

(b) The proposed improvement shown in detail on the plans issued by the Department schedule and detail sheets included herein, includes, in general, the following described work:

Construct New Airfield Electrical Vault

2. The plans for the proposed work are those issued by the Department of Transportation to cover the work described above.

The specifications are those prepared by the Department of Transportation, Division of Aeronautics and designated as "Standard Specifications for Construction of Airports," the "Supplemental Specifications and Recurring Special Provisions," the "Interim Revisions to Supplemental Specifications and Recurring Special Provisions", latest editions located on the IDOT website at <http://www.dot.il.gov/aero/airspecs.html>, and the "Special Provisions" thereto, adopted and in effect on the date of invitation for bids.

3. **COMPLETION TIME/LIQUIDATED DAMAGES.** It being understood and agreed that the completion within the time limit is an essential part of the contract, the bidder agrees to complete the work within 182 calendar days, unless additional time is granted by the Engineer in accordance with the provisions of the specifications. In case of failure to complete the work on or before the time named herein, or within such extra time as may have been allowed by extensions, the bidder agrees that the Department of Transportation shall withhold from such sum as may be due him/her under the terms of this contract, the costs, as set forth below, which costs shall be considered and treated not as a penalty but as damages due to the State from the bidder by reason of the failure of the bidder to complete the work within the time specified in the contract. The following Schedule of Deductions supersedes the table given in Section 60-09 of the Division's Standard Specifications for Construction of Airports.

Schedule of Deductions for Each Day of Overrun in Contract Time			
Original Contract Amount		Daily Charges	
From More Than	To and Including	Calendar Day	Work Day
\$ 0	\$ 100,000	\$ 375	\$ 500
100,000	500,000	625	875
500,000	1,000,000	1,025	1,425
1,000,000	3,000,000	1,125	1,550
3,000,000	5,000,000	1,425	1,950
5,000,000	10,000,000	1,700	2,350
10,000,000	And over	3,325	4,650

A daily charge shall be made for every day shown on the calendar beyond the specified contract time in calendar days.

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- 7. COMBINATION BIDS.** The undersigned further agrees that if awarded the contract for the sections contained in the following combination, he/she will perform the work in accordance with the requirements of each individual proposal comprising the combination bid specified in the schedule below, and that the combination bid shall be prorated against each section in proportion to the bid submitted for the same. If an error is found to exist in the gross sum bid for one or more of the individual sections included in a combination, the combination bid shall be corrected as provided below.

A combination bid is a total bid received on 2 or more proposals. No combination bids other than those specifically set up by the Department will be considered. Separate proposal forms will be issued for each project in the combination so bids may be submitted on the combination as well as on separate units of the combination. The Department reserves the right to make awards on combination bids or separate bids to the best advantage of the Department.

If a combination bid is submitted on 2 or more proposals, separate proposals on each individual contract shall also be submitted, and unless separate proposals are so submitted, the combination bid will not be considered. If the bidder desires to submit a combination bid, the bidder shall state, in the place provided in the proposal form, the amount of the combination bid for the entire combination.

If a combination bid is submitted on any stipulated combination, and errors are found to exist in computing the gross sum bid on any one or more of the individual proposals, corrections shall be made, by the Department and the amount of the combination bid shall be corrected so that it will be in the same proportion to the sum of the corrected gross sum bid as the combination bid submitted was to the sum of the gross sum bid submitted.

The following provisions shall govern combination bidding:

- (a) A combination bid which is submitted for 2 or more proposals and awarded on that basis shall have the bid prorated against each proposal in proportion to the bid submitted for each proposal.
- (b) Separate contracts shall be executed for each individual proposal included in the combination.
- (c) The contract time for all contracts awarded on a combination bid shall be the sum of all calendar days contained within each contract included in the combination, unless otherwise provided in the contracts.
- (d) In the event the Contractor fails to complete any or all of the contracts on the combination bid within the contract time, including any authorized extension, the liquidated damages shall be determined from the schedule of deductions shown above in paragraph 3 for each day of overrun in contract time, based on the combination bid total, and shall be computed on the combination and prorated against the 2 or more individual contracts based on the dollar value of each contract.
- (e) The plans and Special Provisions for each separate contract shall be construed separately for all requirements, except as described in paragraphs (a) through (d) listed above.

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When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.

If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.

Schedule of Combination Bids

Combination No.	Sections Included in Combination	Combination Bid	
		Dollars	Cents

8. **SCHEDULE OF PRICES.** The undersigned submits herewith, in accordance with the rules and instructions, a schedule of prices for the items of work for which bids are sought. The unit prices bid are in U.S. dollars and cents, and all extensions and summations have been made. The bidder understands that the quantities appearing in the bid schedule are approximate and are provided for the purpose of obtaining a gross sum for the comparison of bids. If there is an error in the extension of the unit prices, the unit prices shall govern. Payment to the contractor awarded the contract will be made only for actual quantities of work performed and accepted or materials furnished according to the contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted as provided elsewhere in the contract.

9. **AUTHORITY TO DO BUSINESS IN ILLINOIS.** Section 20-43 of the Illinois Procurement Code (30 ILCS 500/20-43) provides that a person (other than an individual acting as a sole proprietor) must be a legal entity authorized to do business in the State of Illinois prior to submitting the bid.

STATE JOB #- - - -

ILLINOIS DEPARTMENT OF TRANSPORTATION
 SCHEDULE OF PRICES
 CONTRACT NUMBER - PE091

ECMS002 DTGECM03 ECMR003 PAGE 1
 RUN DATE - 05/06/10
 RUN TIME - 203052

COUNTY NAME	CODE	DIST	AIRPORT NAME	FED PROJECT	ILL PROJECT
PEORIA	143	04	PEORIA INTERNATIONAL	3-17-0080-XX	PI-A - 3981

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR108158	1/C #8 5 KV UG CABLE IN UD	L.F.	295.000	X	=		
AR109100	CONSTRUCT ELECTRICAL VAULT	L.S.	1.000	X	=		
AR109200	INSTALL ELECTRICAL EQUIPMENT	L.S.	1.000	X	=		
AR109321	10 KW REGULATOR, STYLE 1	EACH	4.000	X	=		
AR109341	20 KW REGULATOR, STYLE 1	EACH	2.000	X	=		
AR109342	20 KW REGULATOR, STYLE 2	EACH	1.000	X	=		
AR109362	30 KW REGULATOR, STYLE 2	EACH	1.000	X	=		
AR109902	REMOVE ELECTRICAL EQUIPMENT	L.S.	1.000	X	=		
AR110502	2-WAY CONCRETE ENCASED DUCT	L.F.	1,015.000	X	=		
AR110524	24-WAY CONCRETE ENCASED DUCT	L.F.	665.000	X	=		
AR110610	ELECTRICAL HANDHOLE	EACH	12.000	X	=		
AR125415	MITL-BASE MOUNTED	EACH	1.000	X	=		
AR125565	SPLICE CAN	EACH	12.000	X	=		
AR152411	UNCLASSIFIED EXCAVATION	L.S.	1.000	X	=		
AR156510	SILT FENCE	L.F.	500.000	X	=		

PEORIA INTERNATIONAL
PEORIA

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - PE091

ECMS002 DTGECM03 ECMR003 PAGE 2
RUN DATE - 05/06/10
RUN TIME - 203052

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR156520	INLET PROTECTION	EACH	3.000	X	=		
AR156540	RIPRAP	S.Y.	65.000	X	=		
AR201502	BITUMINOUS BASE COURSE - 2"	S.Y.	255.000	X	=		
AR209612	CRUSHED AGG. BASE COURSE - 12"	S.Y.	271.000	X	=		
AR401502	BITUMINOUS SURFACE COURSE-2"	S.Y.	255.000	X	=		
AR401910	REMOVE & REPLACE BIT. PAVEMENT	S.Y.	116.000	X	=		
AR501910	REMOVE & REPLACE PCC PAVEMENT	S.Y.	84.000	X	=		
AR602510	BITUMINOUS PRIME COAT	GAL.	110.000	X	=		
AR603510	BITUMINOUS TACK COAT	GAL.	26.000	X	=		
AR701004	4" PVC STORM SEWER	L.F.	385.000	X	=		
AR701212	12" CMP	L.F.	28.000	X	=		
AR701518	18" RCP, CLASS IV	L.F.	270.000	X	=		
AR751410	INLET	EACH	1.000	X	=		
AR752212	METAL END SECTION 12"	EACH	2.000	X	=		
AR800250	2-1/C #8 5 KV UG CABLE IN UD	L.F.	23,000.000	X	=		

PEORIA INTERNATIONAL
PEORIA

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - PE091

ECMS002 DTGECM03 ECMR003 PAGE 3
RUN DATE - 05/06/10
RUN TIME - 203052

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
AR800261	2-1/C #6 600V XLP-USE, 1-#8 GND I	L.F.	3,680.000				
AR800268	MODIFY SUPPLEMENTAL WIND CONES	EACH	4.000				
AR800273	6-STRAND FIBER OPTIC DATA CABLE	L.F.	3,500.000				
AR800275	6-1/C 750 MCM AL XHHW, 1-400 MCM	L.F.	4,000.000				
AR901510	SEEDING	ACRE	1.100				
AR908510	MULCHING	ACRE	1.100				
				TOTAL		\$	

NOTE:

1. EACH PAY ITEM SHOULD HAVE A UNIT PRICE AND A TOTAL PRICE.
2. THE UNIT PRICE SHALL GOVERN IF NO TOTAL PRICE IS SHOWN OR IF THERE IS A DISCREPANCY BETWEEN THE PRODUCT OF THE UNIT PRICE MULTIPLIED BY THE QUANTITY.
3. IF A UNIT PRICE IS OMITTED, THE TOTAL PRICE WILL BE DIVIDED BY THE QUANTITY IN ORDER TO ESTABLISH A UNIT PRICE.
4. A BID MAY BE DECLARED UNACCEPTABLE IF NEITHER A UNIT PRICE NOR A TOTAL PRICE IS SHOWN.

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THE PRECEDING SCHEDULE OF PRICES MUST BE

COMPLETED AND RETURNED.

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STATE REQUIRED ETHICAL STANDARDS GOVERNING CONTRACT PROCUREMENT: ASSURANCES, CERTIFICATIONS AND DISCLOSURES

I. GENERAL

A. Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

B. In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. Except as otherwise required in subsection III, paragraphs J-N, by execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances has been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

C. In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for the chief procurement officer to void the contract, or subcontract, and may result in the suspension or debarment of the bidder or subcontractor.

II. ASSURANCES

The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder.

A. Conflicts of Interest

1. The Illinois Procurement Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is \$177,412.00. Sixty percent of the salary is \$106,447.20.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

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B. Negotiations

1. The Illinois Procurement Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

C. Inducements

1. The Illinois Procurement Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

D. Revolving Door Prohibition

1. The Illinois Procurement Code provides:

Section 50-30. Revolving door prohibition. Chief procurement officers, State purchasing officers, procurement compliance monitors, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

E. Reporting Anticompetitive Practices

1. The Illinois Procurement Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, chief procurement officer, State purchasing officer, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offers, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the chief procurement officer.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

F. Confidentiality

1. The Illinois Procurement Code provides:

Section 50-45. Confidentiality. Any chief procurement officer, State purchasing officer, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

I. Insider Information

1. The Illinois Procurement Act provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

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III. CERTIFICATIONS

The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. Section 50-2 of the Illinois Procurement Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible chief procurement officer whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

A. Bribery

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

B. Felons

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any of the certifications required by this Section are false.

C. Debt Delinquency

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency. The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Procurement Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the chief procurement officer may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

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D. Prohibited Bidders, Contractors and Subcontractors

1. The Illinois Procurement Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or in violation of Subsection (c) for a period of five years from the date of conviction. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

E. Section 42 of the Environmental Protection Act

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Procurement Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the chief procurement officer may declare the contract void if this certification is false.

F. Educational Loan

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

G. Bid-Rigging/Bid Rotating

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

(b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

RETURN WITH BID

H. International Anti-Boycott

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or \$10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

I. Drug Free Workplace

1. The Illinois "Drug Free Workplace Act" applies to this contract and it is necessary to comply with the provisions of the "Act" if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of \$5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor's workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor's policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.

J. Disclosure of Business Operations in Iran

Section 50-36 of the Illinois Procurement Code, 30ILCS 50/50-36 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offeror, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

(1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.

(2) The Company has, on or after August 5, 1996, made an investment of \$20 million or more, or any combination of investments of at least \$10 million each that in the aggregate equals or exceeds \$20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms "Business operations", "Company", "Mineral-extraction activities", "Oil-related activities", "Petroleum resources", and "Substantial action" are all defined in the Code.

Failure to make the disclosure required by the Code shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

Company has no business operations in Iran to disclose.

Company has business operations in Iran as disclosed in the attached document.

RETURN WITH BID

K. Apprenticeship and Training Certification (Does not apply to federal aid projects)

In accordance with the provisions of Section 30-22 (6) of the Illinois Procurement Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontracted work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. **The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.**

N/A (Federal)

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

L. Political Contributions and Registration with the State Board of Elections.

Sections 20-160 and 50-37 of the Illinois Procurement Code regulate political contributions from business entities and any affiliated entities or affiliated persons bidding on or contracting with the state. Generally under Section 50-37, any business entity, and any affiliated entity or affiliated person of the business entity, whose current year contracts with all state agencies exceed an awarded value of \$50,000, are prohibited from making any contributions to any political committees established to promote the candidacy of the officeholder responsible for the awarding of the contracts or any other declared candidate for that office for the duration of the term of office of the incumbent officeholder or a period 2 years after the termination of the contract, whichever is longer. Any business entity and affiliated entities or affiliated persons whose state contracts in the current year do not exceed an awarded value of \$50,000, either alone or in combination with contracts not exceeding \$50,000, are prohibited from making any political contributions to any political committee established to promote the candidacy of the officeholder responsible for awarding the pending contract during the period beginning on the date the invitation for bids or request for proposals is issued and ending on the day after the date of award or selection if the entity was not awarded or selected. Section 20-160 requires certification of registration of affected business entities in accordance with procedures found in Section 9-35 of The Election Code

By submission of a bid, the contractor business entity acknowledges and agrees that it has read and understands Sections 20-160 and 50-37 of the Illinois Procurement Code, and that it makes the following certification:

The undersigned business entity certifies that it has registered as a business with the State Board of Elections and acknowledges a continuing duty to update the registration in accordance with the above referenced statutes. A copy of the certificate of registration shall be submitted with the bid. The bidder is cautioned that the Department will not award a contract without submission of the certificate of registration.

These requirements and compliance with the above referenced statutory sections are a material part of the contract, and any breach thereof shall be cause to void the contract under Section 50-06 of the Illinois Procurement Code. These provisions do not apply to federal-aid contracts.

RETURN WITH BID

M. Lobbyist Disclosure

Section 50-38 of the Illinois Procurement Code requires that any bidder or offeror on a State contract that hires a person required to register under the Lobbyist Registration Act to assist in obtaining a contract shall:

- (i) Disclose all costs, fees, compensation, reimbursements, and other remunerations paid or to be paid to the lobbyist related to the contract,
- (ii) Not bill or otherwise cause the State of Illinois to pay for any of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration, and
- (iii) Sign a verification certifying that none of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration were billed to the State.

This information, along with all supporting documents, shall be filed with the agency awarding the contract and with the Secretary of State. The chief procurement officer shall post this information, together with the contract award notice, in the online Procurement Bulletin.

Pursuant to Subsection (c) of this Section, no person or entity shall retain a person or entity to attempt to influence the outcome of a procurement decision made under the Procurement Code for compensation contingent in whole or in part upon the decision or procurement. Any person who violates this subsection is guilty of a business offense and shall be fined not more than \$10,000.

Bidder acknowledges that it is required to disclose the hiring of any person required to register pursuant to the Illinois Lobbyist Registration Act (25 ILCS 170) in connection with this contract.

Bidder has not hired any person required to register pursuant to the Illinois Lobbyist Registration Act in connection with this contract.

Or

Bidder has hired the following persons required to register pursuant to the Illinois Lobbyist Registration Act in connection with the contract:

Name and address of person: _____

All costs, fees, compensation, reimbursements and other remuneration paid to said person: _____

RETURN WITH BID

IV. DISCLOSURES

- A. The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The bidder further certifies that the Department has received the disclosure forms for each bid.

The chief procurement officer may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Procurement Code. Furthermore, the chief procurement officer may void the contract and the surety providing the performance bond shall be responsible for completion of the contract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all bids of more than \$10,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the contract. Furthermore, pursuant to Section 5-5, the Procurement Policy Board may review a proposal, bid, or contract and issue a recommendation to void a contract or reject a proposal or bid based on any violation of the Procurement Code or the existence of a conflict of interest as provided in subsections (b) and (d) of Section 50-35.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

C. Disclosure Form Instructions

Form A Instructions for Financial Information & Potential Conflicts of Interest

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES _____ NO _____
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than \$106,447.20? YES _____ NO _____
3. Does anyone in your organization receive more than \$106,447.20 of the bidding entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES _____ NO _____
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than \$106,447.20? YES _____ NO _____

(Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

RETURN WITH BID

Form B: Instructions for Identifying Other Contracts & Procurement Related Information

Disclosure Form B must be completed for each bid submitted by the bidding entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, checked, and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**Form A
Financial Information &
Potential Conflicts of Interest
Disclosure**

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of \$10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than \$106,447.20 (60% of the Governor's salary as of 7/1/2007). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

FOR INDIVIDUAL (type or print information)
NAME: _____
ADDRESS _____
Type of ownership/distributable income share:
stock _____ sole proprietorship _____ partnership _____ other: (explain on separate sheet)
% or \$ value of ownership/distributable income share: _____

2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services. Yes_____

No_____ If your answer is yes, please answer each of the following questions.

- Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes_____ No_____
- Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name of the State agency for which you are employed and your annual salary.

RETURN WITH BID

- 3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes _____ No _____
- 4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes _____ No _____

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment for services in the previous 2 years. Yes _____ No _____

If your answer is yes, please answer each of the following questions.

- 1. Is your spouse or any minor children currently an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority? Yes _____ No _____
- 2. Is your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name of your spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary.

- 3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) and amount in excess of the salary of the Governor? Yes _____ No _____
- 4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15% in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes _____ No _____

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes _____ No _____

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter Yes _____ No _____

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes _____ No _____

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes _____ No _____

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes _____ No _____

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes _____ No _____

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections Yes _____ No _____

RETURN WITH BID

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes____ No____

3. Communication Disclosure.

Disclose the name and address of each lobbyist and other agent of the bidder or offeror who is not identified in Section 2 of this form, who is has communicated, is communicating, or may communicate with any State officer or employee concerning the bid or offer. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the process and throughout the term of the contract. If no person is identified, enter "None" on the line below:

Name and address of person(s): _____

4. Debarment Disclosure. For each of the persons identified under Sections 2 and 3 of this form, disclose whether any of the following has occurred within the previous 10 years: debarment from contracting with any governmental entity; professional licensure discipline; bankruptcies; adverse civil judgments and administrative findings; and criminal felony convictions. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the procurement process and term of the contract. If no person is identified, enter "None" on the line below:

Name of person(s): _____

Nature of disclosure: _____

APPLICABLE STATEMENT

This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.

Completed by: _____ Date _____
Signature of Individual or Authorized Officer

NOT APPLICABLE STATEMENT

Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.

This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.

_____ Date _____
Signature of Authorized Officer

The bidder has a continuing obligation to supplement these disclosures under Sec. 50-35 of the Procurement Code.

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**Form B
Other Contracts &
Procurement Related Information
Disclosure**

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of \$10,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency:

Yes _____ No _____

If **“No” is checked**, the bidder only needs to complete the signature box on the bottom of this page.

2. If “Yes” is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

<input type="checkbox"/>	_____	_____
	Signature of Authorized Representative	Date

RETURN WITH BID

SPECIAL NOTICE TO CONTRACTORS

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION

- (a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.
- (b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.
- (c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.

RETURN WITH BID

PART II. WORKFORCE PROJECTION - continued

- B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) _____ new hires would be recruited from the area in which the contract project is located; and/or (number) _____ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

- C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) _____ persons will be directly employed by the prime contractor and that (number) _____ persons will be employed by subcontractors.

PART III. AFFIRMATIVE ACTION PLAN

- A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.
- B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company _____ Telephone Number _____

Address _____

NOTICE REGARDING SIGNATURE

<p>The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed if revisions are required.</p>
--

<p>Signature: <input type="checkbox"/> _____ Title: _____ Date: _____</p>

- Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.
- Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.
- Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.
- Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

RETURN WITH BID

CERTIFICATIONS REQUIRED BY STATE AND/OR FEDERAL LAW. The bidder is required by State and/or Federal law to make the below certifications and assurances as a part of the proposal and contract upon award. It is understood by the bidder that the certifications and assurances made herein are a part of the contract.

By signing the Proposal Signature Sheet, the bidder certifies that he/she has read and completed each of the following certifications and assurances, that required responses are true and correct and that the certified signature of the Proposal Signature Sheet constitutes an endorsement and execution of each certification and assurance as though each was individually signed:

A. By the execution of this proposal, the signing bidder certifies that the bidding entity has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This statement made by the undersigned bidder is true and correct under penalty of perjury under the laws of the United States.

B. CERTIFICATION, EQUAL EMPLOYMENT OPPORTUNITY:

1. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause.
YES_____ NO_____
2. If answer to #1 is yes, have you filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations? YES_____ NO_____

C. BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS FOR CONSTRUCTION CONTRACTS (JAN 1991)

(a) The Aviation Safety and Capacity Expansion Act of 1990 provides that preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to a grant issued under the Airport Improvement Program. The following terms apply:

1. Steel and manufactured products. As used in this clause, steel and manufactured products include (1) steel produced in the United States or (2) a manufactured product produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60 percent of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products referred to in subparagraphs (b)(1) or (2) shall be treated as domestic.
2. Components. As used in this clause, components means those articles, materials, and supplies incorporated directly into steel and manufactured products.
3. Cost of Components. This means the costs for production of the components, exclusive of final assembly labor costs.

(b) The successful bidder will be required to assure that only domestic steel and manufactured products will be used by the Contractor, subcontractors, materialmen, and suppliers in the performance of this contract, except those-

- (1) that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, are not produced in the United States in sufficient and reasonably available quantities of a satisfactory quality;
- (2) that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, that domestic preference would be inconsistent with the public interest; or
- (3) that inclusion of domestic material will increase the cost of the overall project contract by more than 25 percent.

(End of Clause)

RETURN WITH BID

D. BUY AMERICAN CERTIFICATE (JAN 1991)

By submitting a bid/proposal under this solicitation, except for those items listed by the offeror below or on a separate and clearly identified attachment to this bid/proposal, the offeror certifies that steel and each manufactured product, is produced in the United States (as defined in the clause Buy American - Steel and Manufactured Products or Buy American - Steel and Manufactured Products For Construction Contracts) and that components of unknown origin are considered to have been produced or manufactured outside the United States.

Offerors may obtain from (IDOT, Division of Aeronautics) lists of articles, materials, and supplies excepted from this provision.

PRODUCT

COUNTRY OF ORIGIN

E. NPDES CERTIFICATION

In accordance with the provisions of the Illinois Environmental Protection Act, the Illinois Pollution Control Board Rules and Regulations (35 Ill. Adm. Code, Subtitle C, Chapter I), and the Clean Water Act, and the regulations thereunder, this certification is required for all construction contracts that will result in the disturbance of one or more acres total land area.

The undersigned bidder certifies under penalty of law that he/she understands the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR100000) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

The Airport Owner or its Agent will:

- 1) prepare, sign and submit the Notice of Intent (NOI)
- 2) conduct site inspections and complete and file the inspection reports
- 3) submit Incidence of Non-Compliance (ION) forms
- 4) submit Notice of Termination (NOT) form

Prior to the issuance of the Notice-to-Proceed, for each erosion control measure identified in the Storm Water Pollution Prevention Plan, the contractor or subcontractor responsible for the control measure(s) must sign the above certification (forms to be provided by the Department).

F. NON-APPROPRIATION CLAUSE

By submitting a bid/proposal under this solicitation the offeror certifies that he/she understands that obligations of the State will cease immediately without penalty or further payment being required in any fiscal year the Illinois General Assembly fails to appropriate or otherwise make available sufficient funds for this contract.

- G. Contractor is not delinquent in the payment of any debt to the State (or if delinquent has entered into a deferred payment plan to pay the debt), and Contractor acknowledges the contracting state agency may declare the contract void if this certification is false (30 ILCS 500/50-11, effective July 1, 2002).

RETURN WITH BID

NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway in Springfield, Illinois until 10:00 o'clock a.m., June 11, 2010. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.
2. **DESCRIPTION OF WORK.** The proposed improvement, shown in detail on the plans issued by the Department includes, in general, the following described work:

Construct New Airfield Electrical Vault
3. **INSTRUCTIONS TO BIDDERS.**
 - (a) This Notice, the invitation for bids, proposal and award shall, together with all other documents in accordance with Article 10-15 of the Illinois Standard Specifications for Construction of Airports, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.
 - (b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.
4. **AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the proposal and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.
5. **PRE-BID CONFERENCE.** There will be a pre-bid conference held at N/A at the Peoria International Airport administration building. For engineering information, contact Chuck Taylor of Crawford, Murphy & Tilly, Inc. at (217) 787-8050.
6. **DISADVANTAGED BUSINESS POLICY.** The DBE goal for this contract is 0.0%.
7. **SPECIFICATIONS AND DRAWINGS.** The work shall be done in accordance with the Illinois Standard Specifications for Construction of Airports, the Illinois Division of Aeronautics Supplemental Specifications and Recurring Special Provisions, the Special Provisions dated April 30, 2010 and the Construction Plans dated April 30, 2010 as approved by the Department of Transportation, Division of Aeronautics.
8. **INSPECTION OF RECORDS.** The Contractor shall maintain an acceptable cost accounting system. The Sponsor, the FAA, and the Comptroller General of the United States shall have access to any books, documents, paper, and records of the Contractor which are directly pertinent to the specific contract for the purposes of making an audit, examination, excerpts, and transcriptions. The Contractor shall maintain all required records for three years after the Sponsor makes final payment and all other pending matters are closed.
9. **RIGHTS TO INVENTIONS.** All rights to inventions and materials generated under this contract are subject to Illinois law and to regulations issued by the FAA and the Sponsor of the Federal grant under which this contract is executed. Information regarding these rights is available from the FAA and the Sponsor.

RETURN WITH BID

10. TERMINATION OF CONTRACT.

1. The Sponsor may, by written notice, terminate this contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to the Sponsor.
2. If the termination is for the convenience of the Sponsor, an equitable adjustment in the contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.
3. If the termination is due to failure to fulfill the Contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the Contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.
4. If, after notice of termination for failure to fulfill contract obligations, it is determined that the Contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the contract price shall be made as provided in paragraph 2 of this clause.
5. The rights and remedies of the sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

11. BIDDING REQUIREMENTS AND BASIS OF AWARD. When alternates are included in the proposal, the following shall apply:

a. Additive Alternates

- (1) Bidders must submit a bid for the Base Bid and for all Additive Alternates.
- (2) Award of this contract will be made to the lowest responsible qualified bidder computed as follows:

The lowest aggregate amount of (i) the Base Bid plus (ii) any Additive Alternate(s) which the Department elects to award.

The Department may elect not to award any Additive Alternates. In that case, award will be to the lowest responsible qualified bidder of the Base Bid.

b. Optional Alternates

- (1) Bidders must submit a bid for the Base Bid and for either Alternate A or Alternate B or for both Alternate A and Alternate B.
- (2) Award of this contract will be made to the lowest responsible qualified bidder computed as follows:

The lower of the aggregate of either (i) the Base Bid plus Alternate A or (ii) the Base Bid plus Alternate B.

12. CONTRACT TIME. The Contractor shall complete all work within the specified contract time. Any calendar day extension beyond the specified contract time must be fully justified, requested by the Contractor in writing, and approved by the Engineer, or be subject to liquidated damages.

The contract time for this contract is 182 calendar days.

13. INDEPENDENT WEIGHT CHECKS. The Department reserves the right to conduct random unannounced independent weight checks on any delivery for bituminous, aggregate or other pay item for which the method of measurement for payment is based on weight. The weight checks will be accomplished by selecting, at random, a loaded truck and obtaining a loaded and empty weight on an independent scale. In addition, the department may perform random weight checks by obtaining loaded and empty truck weights on portable scales operated by department personnel.

14. GOOD FAITH COMPLIANCE. The Illinois Department of Transportation has made a good faith effort to include all statements, requirements, and other language required by federal and state law and by various offices within federal and state governments whether that language is required by law or not. If anything of this nature has been left out or if additional language etc. is later required, the bidder/contractor shall cooperate fully with the Department to modify the contract or bid documents to correct the deficiency. If the change results in increased operational costs, the Department shall reimburse the contractor for such costs as it may find to be reasonable.

RETURN WITH BID

- 15. ADDENDA AND REVISIONS:** It is the contractor's responsibility to determine which, if any, addenda or revisions pertain to any project they may be bidding. Failure to incorporate all relevant addenda or revisions may cause the bid to be declared unacceptable.

Each addendum will be placed with the contract number. Addenda and revisions will also be placed on the Addendum/Revision Checklist and each subscription service subscriber will be notified by e-mail of each addendum and revision issued.

The Internet is the Department's primary way of doing business. The subscription server e-mails are an added courtesy the Department provides. It is suggested that the bidder check IDOT's website at <http://www.dot.il.gov/desenv/delett.html> before submitting final bid information.

IDOT IS NOT RESPONSIBLE FOR ANY E-MAIL RELATED FAILURES.

Technical Questions about downloading these files may be directed to Tim Garman (217)524-1624 or Timothy.Garman@illinois.gov.

RETURN WITH BID

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 4 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

Firm Name _____

(IF AN INDIVIDUAL)

Signature of Owner _____

Business Address _____

Firm Name _____

By _____

(IF A CO-PARTNERSHIP)

Business Address _____

Name and Address of All Members of the Firm:

Corporate Name _____

Corporate Seal

By _____

President

(IF A CORPORATION)

Attest _____

Corporate Secretary

Business Address _____

Name of Corporate Officers:

President

Corporate Secretary

Treasurer

NOTARY CERTIFICATION

STATE OF ILLINOIS,

ALL SIGNATURES MUST BE NOTARIZED

COUNTY OF _____

I, _____, a Notary Public in and for said county, do hereby certify that _____

AND _____

(Insert names of individual(s) signing on behalf of bidder)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of the bidder, appeared before me this day in person and acknowledged that they signed, sealed, and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____, A.D. _____

My commission expires _____ (Seal)

Notary Public



Sponsor _____ Item No. _____

IL Proj. No. _____ AIP Proj. No. _____ Letting Date _____

KNOW ALL MEN BY THESE PRESENTS, That We _____

_____ as PRINCIPAL, and _____

_____ as SURETY, are held jointly, severally and firmly bound unto the SPONSOR identified above, in the penal sum of 5 percent of the total bid price, or for the amount specified in Section 6, Proposal Guarantee of the Proposal Document, whichever is the lesser sum, well and truly to be paid unto said SPONSOR, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, that whereas, the PRINCIPAL has submitted a bid proposal to the SPONSOR through its AGENT, the State of Illinois, Department of Transportation, Division of Aeronautics, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above.

NOW, THEREFORE, if the SPONSOR through its AGENT shall accept the bid proposal of the PRINCIPAL; and if the PRINCIPAL shall, and as specified in the bidding and contract documents, submit a DBE Utilization Plan that is accepted and approved by the AGENT; and if, after the award by AGENT on behalf of SPONSOR, the PRINCIPAL shall enter into a contract in accordance with the terms of the bidding and contract documents, including evidence of the required insurance coverages and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the SPONSOR the difference not to exceed the penalty hereof between the amount specified in the bid proposal and such larger amount for which the SPONSOR may contract with another party to perform the work covered by said bid proposal, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

IN THE EVENT the SPONSOR acting through its AGENT determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then SURETY shall pay the penal sum to the SPONSOR within fifteen (15) days of written demand therefor. If SURETY does not make full payment within such period of time, the AGENT may bring an action to collect the amount owed. SURETY is liable to the SPONSOR and to the AGENT for all its expenses, including attorney's fees, incurred in any litigation in which SPONSOR or AGENT prevail either in whole or in part.

In TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by their respective officers _____ day of _____ A.D., _____ .

PRINCIPAL

SURETY

(Company Name)

(Company Name)

By _____
(Signature & Title)

By: _____
(Signature of Attorney-in-Fact)

Notary Certification for Principal and Surety

STATE OF ILLINOIS,
County of _____

I, _____, a Notary Public in and for said County, do hereby certify that _____ and _____
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____ A.D. _____

My commission expires _____

Notary Public

In lieu of completing the above section of the Proposal Bid Form, the Principal may file an Electronic Bid Bond. By signing the proposal and marking the check box next to the Signature and Title line below, the Principal is ensuring the identified electronic bid bond has been executed and the Principal and Surety are firmly bound unto the SPONSOR through its AGENT under the conditions of the bid bond as shown above.

Electronic Bid Bond ID# _____ Company / Bidder Name _____ Signature and Title _____



PROPOSALS

for construction work advertised for bids by the Illinois Department of Transportation

Item No.	Item No.	Item No.

Submitted By:

Name:
Address:
Phone No.

Bidders should affix this form to the front of a 10" x 13" envelope and use that envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

Engineer of Design and Environment - Room 326
 Illinois Department of Transportation
 2300 South Dirksen Parkway
 Springfield, Illinois 62764

NOTICE

Individual bids, including Bid Bond and/or supplemental information if required, should be securely stapled.

CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

NOTICE

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.



Illinois Department of Transportation

SUBCONTRACTOR DOCUMENTATION

P.A. 96-0795, effective July 1, 2010, enacted substantial changes to the provisions of the Illinois Procurement Code (30 ILCS 500). Among the changes are provisions affecting subcontractors. The Contractor awarded this contract will be required as a material condition of the contract to implement and enforce the contract requirements applicable to subcontractors approved in accordance with article 108.01 of the Standard Specifications for Road and Bridge Construction.

If the Contractor seeks approval of subcontractors to perform a portion of the work, and approval is granted by the Department, the Contractor shall provide a copy of the subcontract to the Chief Procurement Officer within 20 calendar days after execution of the subcontract.

The subcontract shall contain the certifications required to be made by subcontractors pursuant to Article 50 of the Illinois Procurement Code. This Notice to Bidders includes a document incorporating all required subcontractor certifications and disclosures for use by the Contractor in compliance with this mandate. The document is entitled State Required Ethical Standards Governing Subcontractors.

RETURN WITH SUBCONTRACT

STATE ETHICAL STANDARDS GOVERNING SUBCONTRACTORS

Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

The certifications hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed should the Department approve the subcontractor. The chief procurement officer may terminate or void the subcontract approval if it is later determined that the bidder or subcontractor rendered a false or erroneous certification.

Section 50-2 of the Illinois Procurement Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible chief procurement officer whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

A. Bribery

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract to which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

B. Felons

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any of the certifications required by this Section are false.

RETURN WITH SUBCONTRACT

C. Debt Delinquency

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Procurement Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the chief procurement officer may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

D. Prohibited Bidders, Contractors and Subcontractors

1. The Illinois Procurement Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction.. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

E. Section 42 of the Environmental Protection Act

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Procurement Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the chief procurement officer may declare the contract void if this certification is false.

The undersigned, on behalf of the subcontracting company, has read and understands the above certifications and makes the certifications as required by law.

_____ Name of Subcontracting Company		
_____ Authorized Officer		_____ Date

RETURN WITH SUBCONTRACT

SUBCONTRACTOR DISCLOSURES

I. DISCLOSURES

- A. The disclosures hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed. The subcontractor further certifies that the Department has received the disclosure forms for each subcontract.

The chief procurement officer may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Procurement Code. Furthermore, the chief procurement officer may void the contract or subcontract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all subcontracts of more than \$10,000 shall be accompanied by disclosure of the financial interests of the subcontractor. This disclosed information for the subcontractor, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the Prime Contractor's contract. Furthermore, pursuant to this Section, the Procurement Policy Board may recommend to allow or void a contract or subcontract based on a potential conflict of interest.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the subcontracting entity or its parent entity, whichever is less, unless the subcontractor is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, subcontracts, proposals, leases, or other ongoing procurement relationships the subcontracting entity has with any other unit of state government and shall clearly identify the unit and the contract, subcontract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

C. Disclosure Form Instructions

Form A Instructions for Financial Information & Potential Conflicts of Interest

If the subcontractor is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a subcontractor is not subject to Federal 10K reporting, the subcontractor must determine if any individuals are required by law to complete a financial disclosure form. To do this, the subcontractor should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the subcontracting company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity?
YES _____ NO _____
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than \$106,447.20?
YES _____ NO _____
3. Does anyone in your organization receive more than \$106,447.20 of the subcontracting entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES _____ NO _____
4. Does anyone in your organization receive greater than 5% of the subcontracting entity's or parent entity's total distributive income, but which is less than \$106,447.20? YES _____ NO _____

(Note: Only one set of forms needs to be completed per person per subcontract even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The subcontractor must determine each individual in the subcontracting entity or the subcontracting entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The subcontractor is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

RETURN WITH SUBCONTRACT

Form B: Instructions for Identifying Other Contracts & Procurement Related Information

Disclosure Form B must be completed for each subcontract submitted by the subcontracting entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the subcontractor to ignore Form B. Form B must be completed, checked, and dated or the subcontract will not be approved.*

The Subcontractor shall identify, by checking Yes or No on Form B, whether it has any pending contracts, subcontracts, leases, bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the subcontractor only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the subcontractor must list all non-IDOT State of Illinois agency pending contracts, subcontracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts or subcontracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included.

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form A Subcontractor: Financial Information & Potential Conflicts of Interest Disclosure

Form with fields: Subcontractor Name, Legal Address, City, State, Zip, Telephone Number, Email Address, Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Subcontractors desiring to enter into a subcontract of a State of Illinois contract must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of \$10,000, and for all open-ended contracts. A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the SUBCONTRACTOR (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than \$106,447.20 (60% of the Governor's salary as of 7/1/07). (Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)

FOR INDIVIDUAL (type or print information)
NAME:
ADDRESS
Type of ownership/distributable income share:
stock sole proprietorship Partnership other: (explain on separate sheet):
% or \$ value of ownership/distributable income share:

2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services. Yes No

If your answer is yes, please answer each of the following questions.

- 1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes No
2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name the State agency for which you are employed and your annual salary

RETURN WITH SUBCONTRACT

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes _____ No _____
4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes _____ No _____

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment services in the previous 2 years. Yes _____ No _____

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes _____ No _____
2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60 % of the Governor's salary as of 7/1/07) provide the name of your spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. _____
3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the salary of the Governor as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes _____ No _____
4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes _____ No _____

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes _____ No _____

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes _____ No _____

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes _____ No _____

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes _____ No _____

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes _____ No _____

RETURN WITH SUBCONTRACT

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes _____ No _____

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes _____ No _____

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes _____ No _____

APPLICABLE STATEMENT

This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.

Completed by: _____ Date _____
Signature of Individual or Authorized Officer

NOT APPLICABLE STATEMENT

Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.

This Disclosure Form A is submitted on behalf of the SUBCONTRACTOR listed on the previous page.

_____ Date _____
Signature of Authorized Officer

RETURN WITH SUBCONTRACT

ILLINOIS DEPARTMENT
OF TRANSPORTATION

Form B
Subcontractor: Other Contracts &
Procurement Related Information
Disclosure

Subcontractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of \$10,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS, SUBCONTRACTS, AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The SUBCONTRACTOR shall identify whether it has any pending contracts, subcontracts, including leases, bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes _____ No _____

If "No" is checked, the subcontractor only needs to complete the signature box on the bottom of this page.

2. If "Yes" is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

<input type="checkbox"/>	_____	_____
	Signature of Authorized Officer	Date

CONTRACT REQUIREMENTS

(1) Airport Improvement Program projects. The work in this contract is included in the federal Airport Improvement Program and is being undertaken and accomplished by the Illinois Department of Transportation, Division of Aeronautics and the Municipality, hereinafter called the Co-Sponsors, in accordance with the terms and conditions of a Grant Agreement between the Co-Sponsors and the United States, under the Airport and Airway Improvement Act of 1982 (Public Law 97-248; Title V, Section 501 et seq., September 3, 1982; 96 Stat. 671; codified at 49 U.S.C Section 2201 et seq.) and Part 152 of the Federal Aviation Regulations (14 CFR Part 152), pursuant to which the United States has agreed to pay a certain percentage of the costs of the Project that are determined to be allowable Project costs under the Act. The United States is not a party to this contract and no reference in this contract to FAA or representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States, by the contract, makes the United States a party to this contract.

(2) Consent of Assignment. The Contractor shall obtain the prior written consent of the Co-Sponsors to any proposed assignment of any interest in or part of this contract.

(3) Convict Labor. No convict labor may be employed under this contract.

(4) Veterans Preference. In the employment of labor, except in executive, administrative, and supervisory positions, preference shall be given to veterans of the Vietnam era and disabled veterans as defined in Section 515(c) of the Airport and Airway Improvement Act of 1982. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

(5) Withholding: Sponsor from Contractor. Whether or not payments or advances to the Co-Sponsors are withheld or suspended by the FAA, the Co-Sponsors may withhold or cause to be withheld from the Contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the Contractor or any subcontractor on the work the full amount of wages required by this contract.

(6) Nonpayment of Wages. If the Contractor or subcontractor fails to pay any laborer or mechanic employed or working on the site of the work any of the wages required by this contract the Co-Sponsors may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment or advance of funds until the violations cease.

(7) FAA Inspection and Review. The Contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this contract.

(8) Subcontracts. The Contractor shall insert in each of his subcontracts the provisions contained in Paragraphs (1), (3), (4), (5), (6), and (7) above and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

(9) Contract Termination. A breach of Paragraph (6), (7), and (8) above may be grounds for termination of the contract.

PROVISIONS REQUIRED BY THE REGULATIONS
OF THE SECRETARY OF LABOR
29 CFR 5.5

(a) Contract Provisions and Related Matters.

(1) Minimum Wages.

Revised 1/92

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provision of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraph 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

- (1)The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2)The classification is utilized in the area by the construction industry; and
- (3)The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii)(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(ii)(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(ii)(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(2) Withholding. The Federal Aviation Administration shall upon its own action or written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such work, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office Management and Budget under OMB control numbers 1215-0140 and 1215-0017).

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph 5.5(a)(3)(i) of Regulations, 29 CFR Part 5. This information may be submitted in any form desired.

Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB control number 1215-0149).

(ii)(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor, or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under paragraph 5.5(a)(3)(i) of Regulations, 29 CFR Part 5 and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed as specified in the applicable wage determination incorporated into the contract.

(ii)(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(ii)(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and Trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as a apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage

determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contract will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(5) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained in paragraph (a)(1) through (10) of this contract and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by an subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract determination: debarment. A breach of these contract clauses paragraphs (a)(1) through (10) and the 2nd clause (b)(1) through (5) below may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by referenced in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of Eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) Contract Work Hours and Safety Standards Act. The Agency Head shall cause or require the contracting officer to insert the following clauses set forth in paragraphs (b)(1), (2), (3), (4) and (5) of this section in full in AIP construction contracts in excess of \$2,000. These clauses shall be inserted in addition to the clauses required by paragraph 5.5(a) or paragraph 4.6 of Part 4 of this title. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements: No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen or guards (including apprentices and trainees described in paragraphs 5 and 6 above) shall require or permit any laborer, mechanic, watchman or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman or guard receives compensation at a rate not less than one and one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violations: Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the Contractor and any subcontractor responsible therefore shall be liable to any affected employee for his/her unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman or guard employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10.00 for each calendar day on which such employee was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor

under any such contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

(5) Working Conditions. No Contractor or subcontractor may require any laborer or mechanic employed in the performance of any contract to work in surroundings or under working conditions that are unsanitary, hazardous, or dangerous to his health or safety as determined under construction safety and health standards (29 CFR 1926) issued by Department of Labor.

(c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in paragraph 5.1, the Agency Head shall cause or require the contracting officer to insert a clause requiring that the Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Agency Head shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the Contractor or subcontractor will permit such representatives to interview employees during working hours on the job. (Approved by the Office of Management and Budget under OMB control numbers 1215-0140 and 1215-0017).

FEDERAL REGULATIONS VOL. 40, #74,
WEDNESDAY, APRIL 16, 1975, PAGE 17124,
ADMINISTRATION OF THE CLEAR AIR ACT
& WATER POLLUTION CONTROL ACT
(with respect to Federal Grants)

In connection with the administration of the Clean Air Act and the Water Pollution Control Act with respect to Federal Grants, specific requirements have been imposed of any contract which is not exempt under the provisions of 40 CFR 15.5.

(1) Any facility listed on the EPA List of Violating Facilities pursuant to Paragraph 15.20 of 40 CFR as of the date of the contract award will not be utilized in the performance of any non-exempt contract or subcontract.

(2) The Contractor shall comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 USC 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq. relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in Section 114 and Section 308 of the Air Act and Water Act, respectively, and all regulations and guidelines issued thereunder after the award of the contract.

(3) Prompt notification shall be required prior to contract award to the awarding official by the Contractor who will receive the award of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that a facility to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

(4) The Contractor shall include or cause to be included the criteria and requirements in paragraphs 1 through 4 in any non-exempt subcontract and will take such action as the Government may direct as a means of enforcing such provisions.

Attachment No. 1

During the performance of the contract, the Contractor agrees as follows:

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The Contractor will, in all solicitations or advertisements for employees placed by or on the behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
- (3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or worker's representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of 24 September 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of 24 September 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of 24 September 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

ATTACHMENT NO. 2

EACH PRIME CONTRACTOR SHALL INSERT IN EACH SUBCONTRACT THE CERTIFICATION IN APPENDIX B, AND FURTHER, SHALL REQUIRE ITS INCLUSION IN ANY LOWER TIER SUBCONTRACT, PURCHASE ORDER, OR TRANSACTION THAT MAY IN TURN BE MADE.

- Appendix B of 49 CFR Part 29 -

This certification applies to subcontractors, material suppliers, vendors and other lower tier participants.

Appendix B--Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions

Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

STATE REQUIRED CONTRACT PROVISIONS
ALL FEDERAL-AID CONSTRUCTION CONTRACTS

Effective February 1, 1969
Revised January 2, 1973

The following provisions are State of Illinois requirements and are in addition to the Federal requirements.

"EQUAL EMPLOYMENT OPPORTUNITY"

In the event of the Contractor's noncompliance with any provisions of this Equal Employment Opportunity Clause, the Illinois Fair Employment Practices Act or the Fair Employment Practices Commission's Rules and Regulations for Public Contracts, the Contractor may be declared nonresponsible and therefore ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the contract may be canceled or avoided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

During the performance of this contract, the Contractor agrees as follows:

- (1) That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
- (2) That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (in accordance with the Commission's Rules and Regulations for Public Contracts) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
- (3) That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, national origin or ancestry.
- (4) That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts. If any such labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Fair Employment Practices Commission and the contracting agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder.
- (5) That it will submit reports as required by the Illinois Fair Employment Practices Commission's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Commission or the contracting agency, and in all respects comply with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
- (6) That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and the Illinois Fair Employment Practices Commission for purposes of investigation to ascertain compliance with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
- (7) That it will include verbatim or by reference the provisions of paragraphs 1 through 7 of this clause in every performance subcontract as defined in Section 2.10(b) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every subcontractor; and that it will also so include the provisions or paragraphs 1, 5, 6 and 7 in every supply subcontract as defined in Section 2.10(a) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every such subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by all its subcontractors; and further it will promptly notify the contracting agency and the Illinois Fair Employment Practices Commission in the event any subcontractor fails or refuses to comply therewith. In addition, no Contractor will utilize any subcontractor declared by the Commission to be nonresponsible and therefore ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

CONSTRUCTION CONTRACT PROCUREMENT POLICIES

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SECTION 1

PROPOSAL REQUIREMENTS AND CONDITIONS

1-01 ADVERTISEMENT (Notice to Bidders). The State of Illinois shall publish the advertisement at such places and at such times as are required by local law or ordinances. The published advertisement shall state the time and place for submitting sealed proposals; a description of the proposed work; instructions to bidders as to obtaining proposal forms, plans, and specifications; proposal guaranty required; and the Owner's right to reject any and all bids.

For Federally assisted contracts the advertisement shall conform to the requirements of local laws and ordinances pertaining to letting of contracts and, in addition, shall conform to the requirements of the appropriate parts of the Federal Aviation Regulations applicable to the particular contract being advertised.

1-02 PREQUALIFICATION OF BIDDERS.

- (a) When the awarding authority is the State of Illinois, each prospective bidder, prior to being considered for issuance of any proposal forms will be required to file, on forms furnished by the Department, an experience questionnaire and a confidential financial statement in accordance with the Department's Instructions for Prequalification of Contractors. The Statement shall include a complete report of the prospective bidder's financial resources and liabilities, equipment, past record and personnel, and must be submitted at least thirty (30) days prior to the scheduled opening of bids in which the Contractor is interested.

After the Department has analyzed the submitted "Contractor's Statement of Experience and Financial Condition" and related information and has determined appropriate ratings, the Department will issue to the Contractor a "Certificate of Eligibility". The Certificate will permit the Contractor to obtain proposal forms and plans for any Department of Transportation letting on work which is within the limits of the Contractor's potential as indicated on his "Certificate of Eligibility", subject to any limitations due to present work under contract or pending award as determined from the Contractor's submitted "Affidavit of Availability". Bidders intending to consistently submit proposals shall submit a "Contractor's Statement of Experience and Financial Condition" at least once a year. However, prequalification may be changed during that period upon the submission of additional favorable reports or upon reports of unsatisfactory performance.

Before a proposal is issued, the prospective bidder will be required to furnish an "Affidavit of Availability" indicating the location and amount of all uncompleted work under contract, or pending award, either as principal or subcontractor, as well as a listing of all subcontractors and value of work sublet to others. The prospective bidder may be requested to file a statement showing the amount and condition of equipment which will be available.

Before an award is made, the bidder may be required to furnish an outline of his plans for conducting the work.

- (b) When the awarding authority for contract construction work is the County Board of a county; the Council, the City Council, or the President and Board of Trustees of a city, village or town, each prospective bidder, in evidence of his competence, shall furnish the awarding authority as a prerequisite to the release of proposal forms by the awarding authority, a certified or photostatic copy of a "Certificate of Eligibility" issued by the Department of Transportation, in accordance with Section 1-02(a).

The two low bidders must file within 24 hours after the letting a sworn affidavit, in triplicate, showing all uncompleted contracts awarded to them and all low bids pending award for Federal, State, County, Municipal and private work, using the blank form made available for this affidavit. One copy shall be filed with the awarding authority and two copies with the District Highway Office.

1-03 CONTENTS OF PROPOSAL FORMS. Upon request, the Department will furnish the prequalified bidders a proposal form. This form will state the location and description of the contemplated construction and will show the estimate of the various quantities and kinds of work to be performed or materials to be furnished, and will have a schedule of items for which unit bid prices are invited. The proposal form will state the time in which work must be completed, the amount of the proposal guaranty, labor requirements, and date, time and place of the opening of proposals. The form will also include any special provisions or requirements which vary from or are not contained in these specifications.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. Any addenda officially issued by the Department, will be considered a part of the proposal whether attached or not.

For Federally assisted contracts, the proposal shall conform to the requirements of local laws and ordinances pertaining to letting of contracts and, in addition, shall conform to the requirements of the appropriate parts of the Federal Aviation Regulations pertaining to the particular contract being let.

1-04 ISSUANCE OF PROPOSAL FORMS. The Department shall refuse to issue a proposal form for any of the following reasons:

- (a) Lack of competency and adequate machinery, plant and other equipment, as revealed by the financial statement and experience questionnaires required under Section 1-02(a).
- (b) Uncompleted work which, in the judgment of the Department, might hinder or prevent the prompt completion of additional work if awarded.
- (c) False information provided on a bidder's "Affidavit of Availability".
- (d) Failure to pay, or satisfactorily settle, all bills due for labor and material on former contracts in force at the time of issuance of proposal forms.
- (e) Failure to comply with any prequalification regulations of the Department.
- (f) Default under previous contracts.
- (g) Unsatisfactory performance record as shown by past work for the Department, judged from the standpoint of workmanship and progress.
- (h) When the Contractor is suspended from eligibility to bid at a public letting where the contract is awarded by, or require approval of, the Department.
- (i) When any agent, servant, or employee of the prospective bidder currently serves as a member, employee, or agent of a governmental body that is financially involved in the proposed work.
- (j) When any agent, servant, or employee of the prospective bidder has participated in the preparation of plans or specifications for the proposed work.

1-05 INTERPRETATION OF QUANTITIES IN BID SCHEDULE. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly or by implication agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the subsection titled ALTERATION OF WORK AND QUANTITIES of Section 20 of the Illinois Standard Specifications for Construction of Airports without in any way invalidating the unit bid prices.

1-06 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. He shall satisfy himself as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans, and specifications.

Boring logs, underground utilities and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which he may make or obtain from his examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

1-07 PREPARATION OF THE PROPOSAL. The bidder shall submit his proposal on the form furnished by the Department. The proposal shall be executed properly, and bids shall be made for all items indicated in the proposal form, except that when alternate bids are asked, a bid on more than one alternate for each item is not required, unless otherwise provided. The bidder shall indicate, in figures, a unit price for each of the separate items called for in the proposal; he shall show the products of the respective quantities and unit prices in the column provided for that purpose, and the gross sum shown in the place indicated in the proposal shall be the summation of said products. All writing shall be with ink or typewriter, except the signature of the bidder which shall be written with ink.

If the proposal is made by an individual, his name and business address shall be shown. If made by a firm or partnership, the name and business address of each member of the firm or partnership shall be shown. If made by a corporation, the proposal shall show the names, titles, and business address of the president, secretary, and treasurer, and the seal of the corporation shall be affixed and attested by the secretary.

The proposal shall be issued to a prequalified bidder in the same name and style as the financial statement used for prequalification and shall be submitted in like manner.

1-08 REJECTION OF PROPOSALS. The Department reserves the right to reject proposals for any of the conditions in Article 1-04 or for any of the following reasons:

- (a) More than one proposal for the same work from an individual, firm, partnership, or corporation under the same or different names.
- (b) Evidence of collusion among bidders.
- (c) Unbalanced proposals in which the prices for some items are obviously out of proportion to the prices for other items.
- (d) If the proposal does not contain a unit price for each pay item listed except in the case of authorized alternate pay items or lump sum pay items.
- (e) If the proposal is other than that furnished by the Department; or if the form is altered or any part thereof is detached.
- (f) If there are omissions, erasures, alterations, unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
- (g) If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
- (h) If the proposal is not accompanied by the proper proposal guaranty.
- (i) If the proposal is prepared with other than ink or typewriter.
- (j) If the proposal is submitted in any other name other than that to whom it was issued by the Department.

1-09 PROPOSAL GUARANTY. Each Proposal shall be accompanied by either a bid bond on the Department of Transportation, Division of Aeronautics form contained in the proposal, executed by a corporate surety company satisfactory to the Department or by a bank cashier's check or a properly certified check for not less than 5 percent of the amount bid.

Bank cashier's checks, or properly certified checks accompanying proposals shall be made payable to the Treasurer, State of Illinois.

1-10 DELIVERY OF PROPOSALS. Each proposal should be submitted in a special envelope furnished by the Department. The blank spaces on the envelope shall be filled in correctly to clearly indicate its contents. When an envelope other than the special one furnished by the Department is used, it shall be of the same general size and shape and be similarly marked to clearly indicate its contents. When sent by mail, the sealed proposal shall be addressed to the Department at the address and in care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and place specified in the Notice to Bidders. Proposals received after the time for opening of bids will be returned to the bidder unopened.

1-11 WITHDRAWAL OF PROPOSALS. Permission will be given a bidder to withdraw a proposal if he makes his request in writing or by telegram before the time for opening proposals. If a proposal is withdrawn, the bidder will not be permitted to resubmit this proposal at the same letting. With the approval of the Engineer, a bidder may withdraw a proposal and substitute a new proposal prior to the time of opening bids.

1-12 PUBLIC OPENING OF PROPOSALS. Proposals will be opened and read publicly at the time and place specified in the Notice to Bidders. Bidders, their authorized agents, and other interested parties are invited to be present.

1-13 DISQUALIFICATION OF BIDDERS. A bidder shall be considered disqualified for any of the following reasons:

- (a) Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.
- (b) Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner.
- (c) If the bidder is considered to be in "default" for any reason specified in the Subsection 1-04 titled ISSUANCE OF PROPOSAL FORMS of this section.

1-14 WORKER'S COMPENSATION INSURANCE. Prior to the approval of his contract by the Division, the Contractor shall furnish to the Division certificates of insurance covering Worker's Compensation, or satisfactory evidence that this liability is otherwise taken care of in accordance with Section 4.(a) of the "Worker's Compensation Act of the State of Illinois" as amended.

SECTION 2

AWARD AND EXECUTION OF CONTRACT

2-01 CONSIDERATION OF PROPOSALS. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. In the event of a discrepancy between unit bid prices and extensions, the unit bid price shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

- (a) If the proposal is irregular as specified in the subsection titled REJECTION OF PROPOSALS of Section 1.
- (b) If the bidder is disqualified for any of the reasons specified in the subsection titled DISQUALIFICATION OF BIDDERS of Section 1.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals; waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable State and Local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise.

2-02 AWARD OF CONTRACT. The award of contract will be made within 60 calendar days after the opening of proposals to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed. The successful bidder will be notified by letter, that his bid has been accepted, and that he has been awarded the contract.

If a contract is not awarded within 60 days after the opening of proposals, a bidder may file a written request with the Division for the withdrawal of his bid and the Division will permit such withdrawal.

For Federally assisted contracts, unless otherwise specified in this subsection, no award shall be made until the Division has concurred in the Owner's recommendation to make such award and has approved the Owner's proposal contract to the extent that such concurrence and approval are required by Federal Regulations.

2-03 CANCELLATION OF AWARD. The Division reserves the right to cancel the award without liability to the bidder at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with the subsection titled APPROVAL OF CONTRACT of this section. The Division at the time of cancellation will return the proposal guaranty.

2-04 RETURN OF PROPOSAL GUARANTY. The proposal guaranties of all except the two lowest bidders will be returned promptly after the proposals have been checked, tabulated, and the relation of the proposals established. Proposal guaranties of the two lowest bidders will be returned as soon as the Construction Contract, Performance Bonds, and Payment Bonds of the successful bidder have been properly executed and approved.

If any other form of proposal guaranty is used, other than a bid bond, a bid bond may be substituted at the Contractor's option.

2-05 REQUIREMENT OF PERFORMANCE AND PAYMENT BONDS. The successful bidder for a contract, at the time of the execution of the contract, shall deposit with the Division separate performance and payment bonds each for the full amount of the contract. The form of the bonds shall be that furnished by the Division, and the sureties shall be acceptable to the Division.

2-06 EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the Contract and shall return the signed Contract to the Owner (Sponsor) for signature (execution) and subsequently return all copies to the Division. The fully executed surety bonds specified in the subsection title REQUIREMENTS OF PERFORMANCE AND PAYMENT BONDS of this section will be forwarded to the Division within 15 days of the date mailed or otherwise delivered to the successful bidder. If the Contract and Bonds are mailed, special handling is recommended.

If the bidder to whom award is to be made is a corporation organized under the laws of a State other than Illinois, the bidder shall furnish the Division a copy of the corporation's certificate of authority to do business in the State of Illinois, or provide evidence of the same, with the return of the executed contract and bond. Failure to furnish such evidence of a certificate of authority within the time required will be considered as just cause for the annulment of the award and the forfeiture of the proposal guaranty to the State, not as a penalty, but in payment of liquidated damages sustained as a result of such failure.

2-07 APPROVAL OF CONTRACT. Upon receipt of the contract and bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the contract to the Division for approval and execution by the Division. Delivery of the fully executed contract to the Contractor shall constitute the Department's approval to be bound by the successful bidder's proposal and the terms of the contract.

2-08 FAILURE TO EXECUTE CONTRACT. If the contract is not executed by the Division within 15 days following receipt from the bidder of the properly executed contracts and bonds, the bidder shall have the right to withdraw his bid without penalty.

Failure of the successful bidder to execute the contract and file acceptable bonds within 15 days after the contract has been mailed to him shall be just cause for the cancellation of the award and the forfeiture of the proposal guaranty which shall become the property of the State, not as a penalty, but as liquidation of damages sustained.

ILLINOIS DEPARTMENT OF TRANSPORTATION

DIVISION OF AERONAUTICS

The requirements of the following provisions written for Federally-assisted construction contracts, including all goals and timetables and affirmative action steps, shall also apply to all State-funded construction contracts awarded by the Illinois Department of Transportation.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

APPENDIX A

The following goal for female utilization in each construction craft and trade shall apply to all Contractors holding Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goal is applicable to the Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related construction contract or subcontract.

AREA COVERED (STATEWIDE)

Goals for Women apply nationwide.

GOAL

	Goal (percent)
Female Utilization.....	6.9

APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall apply to all Contractors holding Federal and federally-assisted construction contracts and subcontracts in excess of \$10,000. to be performed in the respective geographical areas. The goals are applicable to the Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally-assisted or nonfederally related construction contract or subcontract.

<u>Economic Area</u>	<u>Goal (percent)</u>
056 Paducah, KY:	
Non-SMSA Counties -	5.2
IL - Hardin, Massac, Pope	
KY - Ballard, Caldwell, Calloway, Carlisle, Crittenden,	
Fulton, Graves, Hickman, Livingston, Lyon, McCracken, Marshall	
080 Evansville, IN:	
Non-SMSA Counties -	3.5
IL - Edwards, Gallatin, Hamilton, Lawrence, Saline, Wabash, White	
IN - Dubois, Knox, Perry, Pike, Spencer	
KY - Hancock, Hopkins, McLean, Mublenberg, Ohio, Union, Webster	

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<u>Economic Area</u>	<u>Goal (percent)</u>
081 Terre Haute, IN:	
Non-SMSA Counties -	2.5
IL - Clark, Crawford	
IN - Parke	
083 Chicago, IL:	
SMSA Counties:	19.6
1600 Chicago, IL -	
IL - Cook, DuPage, Kane, Lake, McHenry, Will	
3740 Kankakee, IL -	9.1
IL - Kankakee	
Non-SMSA Counties	18.4
IL - Bureau, DeKalb, Grundy, Iroquois, Kendall, LaSalle, Livingston, Putnam	
IN - Jasper, Laporte, Newton, Pulaski, Starke	
084 Champaign - Urbana, IL:	
SMSA Counties:	
1400 Champaign - Urbana - Rantoul, IL -	7.8
IL - Champaign	
Non-SMSA Counties -	4.8
IL - Coles, Cumberland, Douglas, Edgar, Ford, Piatt, Vermilion	
085 Springfield - Decatur, IL:	
SMSA Counties:	
2040 Decatur, IL -	7.6
IL - Macon	
7880 Springfield, IL -	4.5
IL - Mendard, Sangamon	
Non-SMSA Counties	4.0
IL - Cass, Christian, Dewitt, Logan, Morgan, Moultrie, Scott, Shelby	
086 Quincy, IL:	
Non-SMSA Counties	3.1
IL - Adams, Brown, Pike	
MO - Lewis, Marion, Pike, Ralls	
087 Peoria, IL:	
SMSA Counties:	
1040 Bloomington - Normal, IL -	2.5
IL - McLean	
6120 Peoria, IL -	4.4
IL - Peoria, Tazewell, Woodford	
Non-SMSA Counties -	3.3
IL - Fulton, Knox, McDonough, Marshall, Mason, Schuyler, Stark, Warren	

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APPENDIX B (CONTINUED)

<u>Economic Area</u>	<u>Goal (percent)</u>
088 Rockford, IL:	
SMSA Counties:	
6880 Rockford, IL -	6.3
IL - Boone, Winnebago	
Non-SMSA Counties -	4.6
IL - Lee, Ogle, Stephenson	
098 Dubuque, IA:	
Non-SMSA Counties -	0.5
IL - JoDaviess	
IA - Atlamakee, Clayton, Delaware, Jackson, Winnesheik	
WI - Crawford, Grant, Lafayette	
099 Davenport, Rock Island, Moline, IA - IL:	
SMSA Counties:	
1960 Davenport, Rock Island, Moline, IA - IL -	4.6
IL - Henry, Rock Island	
IA - Scott	
Non-SMSA Counties -	3.4
IL - Carroll, Hancock, Henderson, Mercer, Whiteside	
IA - Clinton, DesMoines, Henry, Lee, Louisa, Muscatine	
MO - Clark	
107 St. Louis, MO:	
SMSA Counties:	
7040 St. Louis, MO - IL -	14.7
IL - Clinton, Madison, Monroe, St. Clair	
MO - Franklin, Jefferson, St. Charles, St. Louis, St. Louis City	
Non-SMSA Counties -	11.4
IL - Alexander, Bond, Calhoun, Clay, Effingham, Fayette, Franklin, Greene, Jackson, Jasper, Jefferson, Jersey, Johnson, Macoupin, Marion, Montgomery, Perry, Pulaski, Randolph, Richland, Union, Washington, Wayne, Williamson	
MO - Bollinger, Butler, Cape Girardeau, Carter, Crawford, Dent, Gasconade, Iron, Lincoln, Madison, Maries, Mississippi, Montgomery, Perry, Phelps, Reynolds, Ripley, St. Francois, St. Genevieve, Scott, Stoddard, Warren, Washington, Wayne	

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the provisions and specifications set forth in its federally assisted contracts, and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Illinois Division of Aeronautics will provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction contract and/or subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. This notification will list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is the entire State of Illinois for the goal set forth in APPENDIX A and the county or counties in which the work is located for the goals set forth in APPENDIX B.

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STANDARD FEDERAL EQUAL EMPLOYMENT
OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:
 - a) "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
 - d) "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000. the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction Contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

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7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
- a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working as such sites or in such facilities.
 - b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractors may have taken.
 - d) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
 - f) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreements; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
 - g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
 - h) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
 - i) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

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- j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
 - k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.
 - p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specified minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

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14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy his requirement, Contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

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ANNUAL EEO-1 REPORT TO JOINT REPORTING COMMITTEE AS REQUIRED AT

41 CFR 60-1.7(a)

Any Contractor having a Federal contract of \$50,000 or more and 50 or more employees is required to file annual compliance reports on Standard Form 100 (EEO-1) with the Joint Reporting Committee in accordance with the instructions provided with the form. The Contractor will provide a copy of such a report to the contracting agency within 30 days after the award of a contract.

The Contractor shall require its subcontractors to file an SF 100 within 30 days after award of the subcontract if (1) it is not exempt from the provisions of these regulations in accordance with 60-1.5, (2) has 50 or more employees, (3) first tier subcontractor, and (4) has a subcontract amounting to \$50,000 or more.

Subcontractors below the first tier which perform construction work at the site of construction shall be required to file such a report if (1) it is not exempt from the provisions of these regulations in accordance with 60-1.5, (2) has 50 or more employees and has a subcontract amounting to \$50,000 or more.

The SF 100 is available at the following address:

Joint Reports Committee
EEOC - Survey Division
1801 "L" Street N.W.
Washington, D.C. 20750

Phone (202) 663-4968

DISADVANTAGED BUSINESS POLICY

I. NOTICE

This proposal contains the special provision entitled "Required Disadvantaged Business Participation." Inclusion of this Special Provision in this contract satisfies the obligations of the Department of Transportation under federal law as implemented by 49 CFR 23 and under the Illinois "Minority and Female Business Enterprise Act."

II. POLICY

It is public policy that the businesses defined in 49 CFR Part 23 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with State or Federal funds. Consequently, the requirements of 49 CFR Part 23 apply to this contract.

III. OBLIGATION

The Contractor agrees to ensure that the businesses defined in 49 CFR Part 23 have the maximum opportunity to participate in the performance of this contract. In this regard, the Contractor shall take all necessary and reasonable steps, in accordance with 49 CFR Part 23, to ensure that the said businesses have the maximum opportunity to compete for and perform portions of this contract. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

The Contractor shall include the above Policy and Obligation statements of this Special Provision in every subcontract, including procurement of materials and leases of equipment.

IV. DBE/WBE CONTRACTOR FINANCE PROGRAM

On contracts where a loan has been obtained through the DBE/WBE Contractor Finance Program, the Contractor shall cooperate with the Department by making all payments due to the DBE/WBE Contractor by means of a two-payee check payable to the Lender (Bank) and the Borrower (DBE/WBE Contractor).

V. BREACH OF CONTRACT

Failure to carry out the requirements set forth above and in the Special Provision shall constitute a breach of contract and may result in termination of the contract or liquidated damages as provided in the special provision.

(Rev. 9/21/92)

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION
Effective: September 1, 2000
Revised: January 1, 2010

FEDERAL OBLIGATION: The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE: The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor:

The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

OVERALL GOAL SET FOR THE DEPARTMENT: As a requirement of compliance with 49 CFR part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR: This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. This determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **0.0%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set forth in this Special Provision:

- (a) The bidder documents that enough DBE participation has been obtained to meet the goal; or
- (b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES: Bidders may consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217)785-4611, or by visiting the Department's web site at www.dot.il.gov.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement. The failure of the bidder to comply will render the bid not responsive.

- (a) The bidder shall submit a Disadvantaged Business Utilization Plan on Department forms SBE 2025 and 2026 with the bid.
- (b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number and telefax number of a responsible official of the bidder designated for purposes of notification of plan approval or disapproval under the procedures of this Special Provision.
- (c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:
 - (1) The name and address of DBE firms that will participate in the contract;
 - (2) A description, including pay item numbers, of the work each DBE will perform;
 - (3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;
 - (4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;
 - (5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,
 - (6) If the contract goal is not met, evidence of good faith efforts.

GOOD FAITH EFFORT PROCEDURE. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document the good faith efforts of the bidder before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan commits sufficient commercially useful DBE work performance to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR part 26, Appendix A.

The Utilization Plan will not be approved by the Department if the Utilization Plan does not commit sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts that the bidder has made. Mere *pro forma* efforts, in other words, efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- (a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.
 - (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up on initial solicitations.
 - (2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into

economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.

- (3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.
b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable.

Also, the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable.

- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
 - (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.
 - (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
 - (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.
- (b) If the Department determines that the apparent successful bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision and that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons why good faith efforts have not been found.
 - (c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217)785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation and/or argument concerning the issue of whether an adequate good faith effort was made to meet the contract goal. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR part 26.55(c) on

questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR part 26.55, the provisions of which govern over the summary contained herein.

- (a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.
- (b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.
- (c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the prime Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.
- (d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:
 - (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
 - (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement.
- (e) DBE as a material supplier:
 - (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
 - (2) 100 percent goal credit for the cost of materials or supplies obtained from a DBE manufacturer.
 - (3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a regular dealer or manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal.

- (a) No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.
- (b) The Contractor must notify and obtain written approval from the Department's Bureau of Small Business Enterprises prior to replacing a DBE or making any change in the participation of a DBE. Approval for replacement will be granted only if it is demonstrated that the DBE is unable or unwilling to perform. The Contractor must make every good faith effort to find another certified DBE subcontractor to substitute for the original DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the original DBE, to the extent needed to meet the contract goal.
- (c) Any deviation from the DBE condition-of-award or contract specifications must be approved, in writing, by the Department. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract.
- (d) In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate

method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:

- (1) That the replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or
 - (2) That the DBE is aware that its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
 - (3) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonably competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.
- (e) Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A, must be signed and submitted.
- (f) If the commitment of work is in the form of additional tasks assigned to an existing subcontract, then a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.
- (g) All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the Participation Statement. The Contractor shall not terminate for convenience a DBE listed in the Utilization Plan and then perform the work of the terminated DBE with its own forces, those of an affiliate or those of another subcontractor, whether DBE or not, without first obtaining the written consent of the Bureau of Small Business Enterprises to amend the Utilization Plan. The Contractor shall notify the Bureau of Small Business Enterprises of any termination for reasons other than convenience, and shall obtain approval for inclusion of the substitute DBE in the Utilization Plan. If good faith efforts following a termination of a DBE for cause are not successful, the Contractor shall contact the Bureau of Small Business Enterprises and provide a full accounting of the efforts undertaken to obtain substitute DBE participation. The Bureau of Small Business Enterprises will evaluate the good faith efforts in light of all circumstances surrounding the performance status of the contract, and determine whether the contract goal should be amended.
- (h) The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than thirty calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Regional Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (j) of this part.
- (i) The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.
- (j) Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department.

Certification of Nonsegregated Facilities - as Required by 41 CFR 60-1.8

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000.00 which are not exempt from the provisions of the Equal Opportunity clause).

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments and that that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of his certification is a violation of the Equal opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000.00 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR
CERTIFICATIONS OF NONSEGREGATED FACILITIES**

A certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000.00 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C 1001.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS
Instructions for Certification

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction" "debarred" "suspended" "ineligible" "lower tier covered transaction" "participant" "person" "primary covered transaction" "principal" "proposal" and "voluntarily excluded" as used in this clause have the meaning set out in the Definitions and Coverage sections of the rules implementing Executive Order 12540. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.
6. The prospective primary participant agrees by submitting this proposal that should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the department or agency entering into this transaction.
7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Transaction", provided by the department or agency entering into this covered transaction without modification in all lower covered transactions and in all solicitations for lower covered transactions.
8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to check the Nonprocurement List (Tel. #).
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 8 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, and
Other Responsibility Matters - Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by an Federal department or agency;
 - b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (Federal, State or Local) transaction or contract under a public transaction: violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction or destruction of records, making false statements, or receiving stolen property;
 - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - d. Have not within a three-period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

CERTIFICATION REGARDING LOBBYING (Applicable to contracts in excess of \$100,000):

Certification for Contracts, Grants, Loans and Cooperative Agreements.

The undersigned bidder certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have paid or will be paid, by or behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an Officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

WORKERS' COMPENSATION INSURANCE

Prior to the execution of his construction contract by the Illinois Department of Transportation, Division of Aeronautics, hereinafter referred to as "Division", the Contractor shall furnish to the Division certificates of insurance covering Workers' Compensation, or satisfactory evidence that this liability is otherwise taken care of in accordance with Section 4.(a) of the "Workers' Compensation Act of the State of Illinois" as amended.

Such insurance, or other means of protection as herein provided, shall be kept in force until all work to be performed under the terms of the contract has been completed and accepted in accordance with the specifications, and it is hereby understood and agreed that the maintenance of such insurance or other protection, until acceptance of the work by the Division is a part of the contract. Failure to maintain such insurance, cancellation by the Industrial Commission of its approval of such other means of protection as might have been elected, or any other act which results in lack of protection under the said "Workers' Compensation Act" may be considered as a breach of the contract.

SPECIAL PROVISION FOR DOMESTIC SOURCE FOR STEEL

Control of Materials: All steel products, as defined by the Illinois Steel Products Procurement Act, incorporated into this project shall be manufactured or produced in the United States and, in addition, shall be domestically fabricated. The Contractor shall obtain from the steel producer and/or fabricator, in addition to the mill analysis, a certification that all steel products meet these domestic source requirements.

CLAUSE TO BE INCLUDED IN ALL SOLICITATIONS,
CONTRACTS, AND SUBCONTRACTS RESULTING FROM PROJECTS FUNDED UNDER THE AIP

The Contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

- a. is not owned or controlled by one or more citizens or nationals of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a Contractor that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list.
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a Contractor or subcontractor who is unable to certify to the above. If the Contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on the said list for use on the project, the Federal Aviation Administration may direct, through the sponsor, cancellation of the contract at no cost to the Government.

Further, the Contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The Contractor may rely upon the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The Contractor shall provide immediate written notice to the sponsor if the Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide immediate written notice to the Contractor, if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct, through this sponsor, cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a Contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

**MINIMUM WAGES FOR FEDERAL AND FEDERALLY
ASSISTED CONSTRUCTION CONTRACTS**

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.

NOTICE

The most current **General Wage Determination Decisions** (wage rates) are available on the IDOT web site. They are located on the Letting and Bidding page at <http://www.dot.state.il.us/desenv/delett.html>.

In addition, ten (10) days prior to the letting, the applicable Federal wage rates will be e-mailed to subscribers. It is recommended that all contractors subscribe to the Federal Wage Rates List or the Contractor's Packet through IDOT's subscription service.

PLEASE NOTE: if you have already subscribed to the Contractor's Packet you will automatically receive the Federal Wage Rates.

The instructions for subscribing are at <http://www.dot.state.il.us/desenv/subsc.html>.

If you have any questions concerning the wage rates, please contact IDOT's Chief Contract Official at 217-782-7806.

SECTION III

**Special Provisions
For**

Construct New Airfield Electrical Vault

**IL. PROJ. PIA-3981
AIP PROJ. 3-17-0080-XX**

At

**GENERAL WAYNE A. DOWNING
PEORIA INTERNATIONAL AIRPORT
PEORIA, ILLINOIS**

APRIL 30, 2010

Prepared By:

CRAWFORD, MURPHY & TILLY, INC.
2750 West Washington
Springfield, Illinois 62702
Job No. 09061-05-00

GENERAL

These Special Provisions, together with applicable Standard Specifications, Contract Requirements for Airport Improvement Projects, Rules and Regulations, Payroll Requirements and Minimum Wage Rates which are hereto attached or which by reference are herein incorporated, cover the requirements of the State of Illinois, Division of Aeronautics, and the representatives of the Metropolitan Airport Authority of Peoria for the improvements at the Greater Peoria Regional Airport Peoria, Illinois.

GOVERNING SPECIFICATIONS AND RULES AND REGULATIONS

The “**Standard Specifications for Construction of Airports**”, State of Illinois Department of Transportation, Division of Aeronautics, **dated November 2009**, shall govern the project except as otherwise noted in these Special Provisions. In the case of conflict with any part or parts of said specifications, the said Special Provisions shall take precedence and shall govern. As noted within the Special Provisions, the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction dated January 1, 2007 shall apply.

The Standard Specifications can be obtained from the Illinois Department of Transportation, Division of Aeronautics website at <http://www.dot.state.il.us/aero/PDF/New%20Spec%20Book%2011-02-2009.pdf> or from the Division.

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DIVISION I – GENERAL PROVISIONS

SECTION 20 – SCOPE OF WORK

20-05 MAINTENANCE OF TRAFFIC

ADD: The contractor's activity on the airfield shall be limited to the limits of construction as identified on the construction activity plan drawings. Beyond the limits of construction the contractor shall not have access to any part of the active airfield pavement with any equipment or personnel without the approval of airport management.

The contractor shall be required to provide radio control on this project; he shall, prior to construction initiation, schedule a meeting through Airport Operations with his personnel and the air traffic control tower supervisor (309-697-0751) in order for the contractor's personnel to become familiarized with ATCT communication practices, procedures, and requirements. The contractor shall provide his own radio capable of transmitting and receiving on the tower's control frequencies of 121.85 MHz and 119.1 MHz.

The Contractor shall provide and maintain construction entrance signage on all public use roads intended to be used by his operations as required by the City of Peoria, Limestone Township and Peoria County Highway Department. The Contractor shall be responsible for coordinating all hauling and access on City, township or county roads with the agency responsible for the roadway.

SECTION 30 – CONTROL OF WORK

30-04 COOPERATION OF CONTRACTOR

ADD: The completion of this project within the contract time is of extreme importance to the Airport. The Contractor shall update his progress schedule as required for the scheduled progress meetings.

30-05 COOPERATION BETWEEN CONTRACTORS

REVISE: The first sentence of the second paragraph to read:

The contractor shall plan and conduct his/her work so as not to interfere or hinder the progress of work being performed by other contractors or Airport personnel.

ADD: The Contractor shall acquaint himself with all other contracts prior to bidding and shall cooperate with Airport management and any other contractors who may be working on other contracts.

30-06 CONSTRUCTION LAYOUT

RESPONSIBILITY OF THE RESIDENT ENGINEER

DELETE: Paragraphs A and B of the Standard Specifications and replace with:

- A. The Resident Engineer will locate and reference four (4) control points within the limits of the project.
- B. A benchmark has been established along the project outside of construction lines.

ADD: As paragraph M:

- M. It is not the responsibility of the Resident Engineer to check the correctness of the Contractor's stakes or forms, except as provided herein; however, any errors that are apparent shall be immediately called to the Contractor's attention, and he shall be required to make the necessary correction before the stakes are used for construction purposes.

RESPONSIBILITY OF THE CONTRACTOR

ADD:

- H. The Contractor shall immediately notify the Resident Engineer of conflicts or discrepancies with the established control points.
- I. Construction layout shall not be paid for separately, but shall be considered incidental to the pay item for which the layout is required.

30-12 LOAD RESTRICTIONS

ADD: Access to the construction work area is limited to the haul routes as shown on the construction activity plan drawings. The use of existing airfield pavements by contractor construction traffic including all haul trucks is prohibited unless previously approved by the Airport Director. Any damage to existing airport pavement due to construction traffic operating beyond the approved work limits, hauling outside of the approved haul/access routes and construction traffic operating in prohibited areas shall be repaired by the Contractor at his own expense to the satisfaction of the owner.

The contractor shall coordinate construction hauling, construction access and load restrictions with the County Superintendent of Highways and/or the Township Road Commissioner and the City of Peoria. The Contractor shall be responsible for damage to any airfield pavement or public road caused by his construction operations. **Any damage to existing airfield pavements or public roads shall be replaced by the Contractor at his own expense to the satisfaction of the Owner.**

30-13 MAINTENANCE DURING CONSTRUCTION

ADD: Material tracked onto public streets shall be removed continuously during the work.

ADD: The contractor shall maintain the lighting system at the airport so as to provide constant power to the edge lighting circuits and other facilities during hours of darkness or during Instrument Flight Rules (IFR) weather; except as specified in the Sequence of Construction. Shutdowns of the individual circuits for switchover to the new regulators shall be closely coordinated with Airport Operations. The Contractor shall notify the Airport a minimum of 3 working days prior to the shutdown. Airport Operations maintains the authority to postpone or cancel shutdowns as necessary to maintain aircraft traffic.

Installation of the new control system between the Air Traffic Control Tower (ATCT) L-821 Lighting Panel and the new vault shall be closely coordinated with the ATCT through Airport Operations.

30-18 PLANS AND WORK DRAWINGS

EDIT: Information to be included on shop drawing submittals shall conform to the following:

**PROJECT LOCATION: General Wayne A. Downing Peoria International Airport,
Peoria, IL**

PROJECT TITLE: New Airfield Lighting Vault

**PROJECT NUMBERS: Illinois Project: PIA-3981
AIP Project: 3-17-0080-XX**

CONTRACT ITEM: (Pay Item Name & Number)

SUBMITTED BY: (Contractor/Subcontractor Name)

DATE:(Date of Submittal)

ADD:

30-20 SECURITY AND MAINTAINING THE EXISTING AIRPORT PERIMETER FENCE LINE

Maintaining the security requirements of the Airport shall be a primary concern for the Contractor.

The Contractor will be responsible for maintaining airport security by maintaining the airport perimeter fence line at all times during the course of the work. All work shall be approved by the TSA and the Airport Operations Office. The Contractor shall maintain the existing airport perimeter fence line during the course of the work .

The Contractor shall supply a 24-hour emergency contact that is capable of providing emergency fence repair.

Fines can be levied against the Contractor by the Transportation Security Administration (TSA) for negligence if the airport security is compromised and the airport perimeter fence line is not maintained as specified above. Fines can also be levied against the contractor for failure to cooperate with the airport management as required to maintain airport security.

SECTION 40 – CONTROL OF MATERIALS

ADD:

40-11 CERTIFICATION OF MATERIALS SUPPLIED TO THE CONTRACT

The Contractor shall certify all materials contained in the contract. Letters of certification intended to verify that materials conform to the requirements of the contract shall be submitted to the Resident Engineer. It shall be the sole responsibility of the Contractor to ensure the delivery of adequate and accurate documentation prior to the delivery of the materials to the project site.

The certifications shall be submitted as a part of the shop drawing submittal.

As a guide to the certification process and requirements, the Contractor shall use the Illinois Department of Transportation/Division of Aeronautics MANUAL FOR DOCUMENTATION OF AIRPORT MATERIALS (latest edition). Copies of this manual are available from the Illinois Division of Aeronautics. The MANUAL OF DOCUMENTATION OF AIRPORT MATERIALS defines the Resident Engineer's/Contractor's responsibilities (Sections 300/400). The Contractor shall have the sole responsibility to provide the Resident Engineer with appropriate documentation to satisfy the contract certification requirements prior to the delivery of materials.

The cost of providing the required material documentation and certifications shall not be paid for separately, but shall be considered incidental to the associated item.

All submittals shall contain the following information:

PROJECT LOCATION: General Wayne A. Downing Peoria International Airport
PROJECT TITLE: Construct Perimeter Road and Fence- Project 4
PROJECT NUMBERS: Illinois Project: PIA-3981
 AIP Project: 3-17-0080-XX
CONTRACT ITEM: (i.e., AR751410 - Inlet)
SUBMITTED BY: (Contractor/Subcontractor Name)
DATE: (Date of Submittal)

SECTION 50 – LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

50-10 BARRICADES, WARNING SIGNS & HAZARD MARKERS

ADD: After the second paragraph:

Barricades shall be provided and be low profile barricades as detailed in the plans or conform to IDOT Division of Highways Specifications and Standards 702001-02 and 702001-03 for Type I barricades. The barricades shall be lighted with a flashing red light and be marked with 20" x 20" orange colored flags. Barricades for the roadway work shall be as specified by the township or as required by IDOT standards.

The Contractor shall be required to provide a 24-hour phone number for emergency barricades and barricade lighting maintenance.

Contractor identification shall be displayed on both sides of all contractor vehicles by labeling painted on the vehicles or by magnetically attached signs as in conformance to FAA Advisory Circular 150/5370-2 (latest revision).

The contractor shall provide, install and maintain any warning signs (trucks entering highway, etc) as required by the County Superintendent of Highways, the Township Road Commissioner and the City of Peoria and/or the responsible agency that maintains the roadway. The cost to the warning signage as required by the agency responsible for the roadway for the duration of the contract shall be at no additional cost to the contract.

50-17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS

ADD: Should any utilities or cables require location, the following people shall be contacted:

Utility Service or Facility	Person to Contact	Contact Phone
FAA Control & Communications Cable	Airways Facility Unit	1-309-697-1363
Airfield Lighting Cables	Tyler Setchell	1-309-697-8272
Sanitary Sewer	Greater Peoria Sanitary District	1-309-637-3511
Electric Cables	JULIE	1-800-892-0123
Water	Tyler Setchell	1-309-697-8272
Telephone Cables	JULIE	1-800-892-0123

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Gas Lines	JULIE	1-800-892-0123
Water Lines	JULIE	1-800-892-0123
ILANG Communications Cables	Capt. Alan Knabe	1-309-633-3014

Special care shall be taken on all operations and particularly near pavement edges to avoid damage to edge lights and all underground electrical cable on the airport. The approximate location of existing underground cable is shown on drawings. Any airfield lights or cable that are broken and require replacement because of the Contractor's operations will be replaced by the contractor at his own expense.

Any airfield cable repairs or replacement to any part of the electrical system made necessary by the Contractor's operations will be made by him in the manner specified in Sections 108 and 125 at no cost to the airport. Cost of replacement to be borne by the Contractor shall include any expense incurred in locating as well as repairing or replacing damaged parts of the system by the owning agency.

SECTION 60 – PROSECUTION AND PROGRESS

60-05 **LIMITATION OF OPERATIONS**

ADD: A minimum distance of 115' shall be maintained between construction operations and the centerline of all active taxiways and taxilanes; 200' from centerline of active runways and 600' from the end of active runways. If work occurs within these limits, the pavement shall be closed prior to the work commencing.

It is intended to plan, conduct, and complete the work in these critical traffic areas in such a manner that the length and amount of interruption to aircraft traffic at the Airport is minimized.

60-13 **CONTRACTOR'S ACCESS TO AIRFIELD**

ADD: The Contractor activity on the airfield shall be limited to the limits of construction identified on the construction activity plan and site plan drawings. Beyond the limits of construction, the Contractor shall not have access to any part of the active airfield pavements (runways, aprons or taxiway) with any equipment or by any personnel without the approval of the Airport management.

ADD:

60-14 **SECURITY DURING CONSTRUCTION**

The Contractor shall maintain security on the Airport as specified or as directed by Airport Operations including adhering to all provisions of federal security regulations and all security requirements in the Airport Security Program and airport policies.

The project area lies entirely within the airport's security fence. Access to this area is only by airport issued access cards. No access point may be left unsecured and unattended at any time. During hauling operations and those construction operations requiring the access gate to remain open a security guard must be posted to maintain the security of the airport perimeter. The security guard must obtain an airport issued ID as specified below. The security guard must verify each vehicle and persons in the vehicle are necessary to the completion of the work and are authorized by the Contractor for entry to the airport. The Guard shall be issued authorized access lists and stop lists provided by the Contractor. This list shall be provided to Airport Operations. Airport Operations maintains the authority to restrict access to any individual.

Once inside the AOA, the contractor must individually escort vehicles and personnel in accordance with the Airport's Security Requirements for the entire duration that person/vehicle remains inside the AOA. The Contractor must provide sufficient escorts.

The Contractor's Superintendent, Foremen, Security Guards, Flagmen, escorts and any other employee directed by Airport Management, must display a current photo I.D. badge, issued by the Airport. To obtain the photo I.D. badge for any of the Contractor's employees, the following is required:

- a. The Contractor will be responsible for certifying that all employees needing access and requesting an access ID are currently employed and require access by providing authorized signature forms and authorized subcontractor and employee lists directly to the Airport Security Coordinator.
- b. Each ID applicant must submit to a fingerprint based FBI Criminal History Records Check and successfully pass with no disqualifying crimes or the applicant will be prohibited from working in the secured area of the airport. A fingerprint fee will apply for each applicant
- c. The employee must complete an Airport Safety and Security Training Session before issue of their ID.
- d. The contractor will be responsible for all fees and costs associated with fingerprinting, issue of cards, and required security training for each applicant.

All ID applicants must complete their fingerprint checks and training before reporting for work. Due to the nature of the CHRC process and training requirements the contractor is urged to have employees report to the Operations Office as soon as practical.

The Contractor shall submit a list of subcontractor a minimum of 10 days prior to the preconstruction meeting. Subcontractor shall have the same badging requirements as the prime contractor.

In addition, the Airport Security Coordinator will require that all Security Guards undergo additional training necessary to meet the Airport's security needs.

The Contractor is responsible for payment of Transportation Security Administration fines and penalties resulting from security infractions perpetrated by, caused by, or permitted by his personnel or work forces of his subcontractors or suppliers.

All costs relating to the Contractor's security shall be the responsibility of the Contractor.

ITEM 108 – INSTALLATION OF UNDERGROUND CABLE FOR AIRPORTS

DESCRIPTION

108-1.1 ADD: This item of work shall include the following:

Installation of:

1. 1/C #8 5KV Underground Cable in Unit Duct (series circuit cable).
2. 2/C #8 5KV Underground Cable in Unit Duct (series circuit homerun cable)
3. 2-1/C #6 600V XLP-USE, 1-#8 Ground in Unit Duct (Primary Wind Cone power cable).
4. 6-Strand Fiber Optic Data Cable (PLC).
5. 6-1/C 750 MCM Aluminum XHHW, 1-400 MCM Ground (New Vault 480V 3PH Service).

EQUIPMENT AND MATERIALS

108-2.2 CABLE

REPLACE: All references to L-824, 1/C, Type C, 600V cable with:

RHW-2 / USE-2 WIRE

Cable shall be 600 Volt rated, type RHW-2 & USE-2 sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 44 (for Type RHW-2) and U.L. 854 (for Type USE-2) and shall pass the IEEE 383, 70,000 BTU/hr and VW-1 Flame Tests. Cables shall be rated for use at 90°C in both wet and dry locations and be suitable for use in conduit, underground service entrance cable and direct burial applications.

600V ALUMINUM XHHW WIRE

Cable shall be 600 Volt rated, sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 44 (for Type XHHW-2) and Federal specifications JC-30B NEC, ASTM B 800, B 801, B 836 as applicable. Cable insulation shall be abrasion, moisture, heat and moisture resistant black cross-linked polyethylene (XLP). Cables shall be rated for use at 90°C in both wet and dry locations and be suitable for use in conduit and other recognized raceways.

ADD:

6-STRAND FIBER OPTIC DATA CABLE

6-Strand Fiber Optic Data Cable shall comply with the following:

1. Multi-mode Breakout Riser Rated - ONFR
2. Nominal Operating Temperature –40°C to +85°C
3. 12 Fiber Construction around center strength member
4. Elastomeric PVC Black outer jacket suitable for indoor or outdoor use
5. 62.5/125 micron core/cladding

6. Attenuation: At 850 nm; 3.5 dB/km 220 MHz-km. At 1310 nm; 1.0 dB/km 500 MHz-km
7. Optical Cable Corporation Part Number BX06-125D-WLS-900-ONFR, or equivalent

Furnish and install fiber optic terminators (connectors) style SMA or ST as required to match equipment. Connectors shall be designed for field assembly and be self-aligning and self-centering. Comply with manufacturers requirements. Include terminators on all fibers, including spares.

Splice Closures: Splice closures shall protect the spliced fibers from moisture and to prevent physical damage. The splice closure shall provide strain relief for the cable and the fibers at the splice points.

108-2.4 CABLE CONNECTIONS

ADD:

(g) Above-Grade 600V Splice. For splices of 600V cable above grade in junction boxes or equipment enclosures, the connectors shall be Buchanan B-Cap "Twist & Seal" wire connectors, or equivalent. Connectors shall be rated for 600 Volt maximum. Connectors shall be pre-filled with an epoxy sealant that hardens after twisting/mixing to form a permanent bond. Connectors shall be water, vibration, and corrosion resistant. Connector shall utilize a live-action, square-wire spring. Connector Shell shall be rated for 105° C. Connector shell shall be flame-retardant nylon.

108-2.12 LINE MARKING TAPE

DELETE: This section.

108-2.13 UNIT DUCT

ADD: Unit duct shall be 3/4" minimum.

CONSTRUCTION METHODS

108-3.5 SPLICING

ADD: Splices of 600V cables shall be installed per manufacturer's instructions.

108-3.8 TESTING

DELETE: This section.

ADD: All testing shall be performed in the presence of the Engineer.

The existing field circuits within the working limits of this contract, which are not scheduled to be added or deleted from, shall be meggered BEFORE any work is performed in the presence of the Engineer. Any subsequent damage to these existing circuits shall be immediately repaired at no cost to the contract such that megger readings taken after completion of the repair shall be, as a minimum, equal to the reading taken before the work began.

Two types of tests are to be conducted on each existing circuit, which is to be added to or modified before any work is performed, as follows:

(a) Disconnect the cables from the constant current regulator and measure the end to end conductor resistance of the airfield lighting cable loop using an ohmmeter and record the measured value. Compare the measured value with the value calculated by multiplying the total cable length (in thousand feet) times the published cable resistance in Ohms per thousand feet. Large discrepancies, 1k Ohms or more, indicate faulty connections, splices, or bad cable.

(b) With the airfield lighting cables disconnected, measure the cable insulation resistance, from the conductor to ground, using a 500V minimum megohm meter (megger). Test each cable for a minimum of one minute to allow readings to stabilize before recording the test values. For new cable, insulation resistance should be 50 megohms for cable less than 10,000 feet long, 40 megohms for cable 10,000 to 20,000 feet long and 30 megohms for cable over 20,000 feet long. For cables 20 years old, the values would be approximately 0.5 megohms, 0.4 megohms and 0.3 megohms respectively and values less than these indicate faulty cable insulation, connectors, splices or a damaged cable.

If test measurements indicate a faulty existing cable, notify the Owner so repairs can be made.

New cables or cable segments shall be tested after installation as defined in (a) and (b) above. New cable insulation resistance should measure a minimum of 50, 40, or 30 megohms, depending upon length, as described in (b) above.

New cables for visual NAVAIDS and other devices shall be tested after installation, but before connection to those devices.

New cables installed by the Contractor that do not meet the requirements above shall be replaced by the Contractor at his expense.

ADD:

108-3.12

RESTORATION

Restoration and turfing of disturbed areas beyond the limits shown in the plans shall be incidental to the project.

BASIS OF PAYMENT

108-5.1

Payment will be made under:

- Item AR108158 1/C #8 5KV UG Cable In UD - per per lineal foot.
- Item AR108258 2/C #8 5KV UG Cable In UD - per per lineal foot.
- Item AR800261 2-1/C #6 600V XLP-USE, 1-#8 GND In UD - per per lineal foot.
- Item AR800273 6-Strand Fiber Optic Data Cable - per per lineal foot.
- Item AR800275 6-1/C 750 MCM AL XHHW, 1-400 MCM GND - per per lineal foot.

ITEM 109 – INSTALLATION OF AIRPORT TRANSFORMER VAULT AND VAULT EQUIPMENT

DESCRIPTION

- 109-1.1 ADD: This item shall consist of a New Airport Regulator Vault Building and equipment, furnished and installed in conformance with the Plans and Specifications. The following major items of work will be included under this Item:
- A. Installation of New Regulator Vault Building and foundation as detailed and specified herein.
 - B. Installation of New Regulator Vault Building HVAC equipment as detailed and specified herein.
 - C. Connection of New Regulator Vault Building electrical distribution equipment to New Electrical Service from New Terminal Building, including, but not limited to, 6" conduit stubouts, power distribution blocks, pull box and copper service conductors inside building. Contractor shall note that the furnishing and installation of the New Electrical Service from the New Terminal Building to the New Regulator Vault Building is specified elsewhere in Item 108.
 - D. Installation of New Regulator Vault Building electrical distribution system, including, but not limited to, panelboards, conduits, building ground ring and ground rods, wireways and wiring as detailed and specified herein. Note that this work shall also include the installation of 2" GRS Conduit from Vault to 10' minimum beyond edge of pavement as detailed on the Plans.
 - E. Installation of New Regulator Vault Building electrical equipment, including, but not limited to, lighting, receptacles, conduits and wiring.
 - F. Installation of Eight (8) constant current regulators, including, but not limited to, regulators, isolation transformers and NEMA 1 enclosures to house them, Runway or Taxiway edge lights, series circuit cutouts, grounding disconnects, L-823 connectors, mounting panels, conduits and wiring as detailed and specified herein.
 - G. Installation of Programmable Logic Controllers (PLCs) in existing vault and New Regulator Vault Building as detailed on the plans and specified herein. Contractor shall note that the furnishing and installation of the fiber optic PLC Data Cable from the existing vault in the basement of the Old Terminal Building to the New Regulator Vault Building is specified elsewhere in Item 108.
 - H. Disconnection and relocation or disposal of existing regulators, indicating edge lights, plug cutouts, grounding disconnects, series circuit wiring, control wiring and related hardware in existing vault in basement of Old Terminal Building as detailed on the plans and specified herein.
 - I. This specification Item shall also incorporate the included CSI (Construction Specifications Institute) formatted New Vault Building Specifications, which include Architectural Specifications, Structural Specifications, Mechanical Specifications and Electrical Specifications Sub-Sections. These specifications shall cover all labor, material, equipment and incidentals necessary to construct the New Regulator Vault Building.

Exterior field installed cable from airfield edge lights and visual nav aids and new vault will be paid for separately under applicable unit prices of Item 108, "Installation of Underground Cable for Airports" up to the connection to vault equipment.

Items of underground duct work shall be paid for under applicable unit prices of Item 110, "Airport Underground Electrical Duct Banks and Conduits."

EQUIPMENT AND MATERIALS

109.2.1 GENERAL

REVISE: Paragraph (a) as follows:

Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall have the prior approval of the FAA, and shall be listed in Advisory Circular (AC) 150/5345-53, Current Edition, Airport Lighting Equipment Certification Program, including the current Addendum. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. The Contractor is responsible for using the latest editions of the referenced FAA Advisory Circulars, including any changes, in effect at the time of bidding. The advisory circulars may be obtained free of charge on the internet at the following address:

http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/

The Contractor shall ascertain that all lighting system components furnished by him (including FAA approved equipment) are compatible in all respects with each other and the remainder of the new/existing system. Any non-compatible components furnished by the Contractor shall be replaced by him at no additional cost to the airport sponsor with a similar unit, approved by the Engineer (different model or different manufacturer) that is compatible with the remainder of the airport lighting system.

All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals (five (5) copies) shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

109-2.2 Through 109-2.17

DELETE: These Sections.

109-2.18 FAA-APPROVED EQUIPMENT

DELETE: This Section.

ADD: The following FAA approved equipment is to be used on this project:

- a. L-828, Constant Current Regulator, 30 KW, 240V, single phase primary, 6.6 AMP maximum, 5-Step Brightness secondary, as manufactured by Flight Light (formerly Sola/Hevi-Duty), Model # 30-L828-I-5-D-6-IA, or equivalent. One (1) regulator will be required. Regulator shall be Ferroresonant or Saturable Reactor design. All-Solid-State design regulators are not acceptable. Regulator shall be a self-contained unit of the static type with no moving parts requiring attention or service. Internal input fusing shall be provided. Positive open circuit and over-current protection in the event of a fault shall be provided. All control circuitry shall be behind a hinged door for accessibility. Input and output lightning arrestors shall be included. Power factor capacitor shall be provided and provide a power factor of 96% or better, at full load and maximum brightness. All controls, including brightness relays, shall be in the air-filled control cabinet. Regulator shall have provision for both external 120V control and internal 120V control. Regulator shall be equipped with internally mounted remote control operated primary contractor with 120VAC operating coil.
- b. L-828, Constant Current Regulator, 20 KW, 240V, single phase primary, 6.6 AMP maximum, 5-Step Brightness secondary, as manufactured by Flight Light (formerly Sola/Hevi-Duty), Model # 20-L828-I-5-D-6-IA, or equivalent. One (1) regulator will be required. Regulator shall be Ferroresonant or Saturable Reactor design. All-Solid-State design regulators are not acceptable. Regulator shall be a self-contained unit of the static type with no moving parts requiring attention or service. Internal input fusing shall be provided. Positive open circuit and over-current protection in the event of a fault shall be provided. All control circuitry shall be behind a hinged door for accessibility. Input and output lightning arrestors shall be included. Power factor capacitor shall be provided and provide a power factor of 96% or better, at full load and maximum brightness. All controls, including brightness relays, shall be in the air-filled control cabinet. Regulator shall have provision for both external 120V control and internal 120V control. Regulator shall be equipped with internally mounted remote control operated primary contractor with 120VAC operating coil.
- c. L-828, Constant Current Regulator, 20 KW, 240V, single phase primary, 6.6 AMP maximum, 3-Step Brightness secondary, as manufactured by Flight Light (formerly Sola/Hevi-Duty), Model # 20-L828-H-5-D-6-IA, or equivalent. Two (2) regulators will be required. Regulator shall be Ferroresonant or Saturable Reactor design. All-Solid-State design regulators are not acceptable. Regulator shall be a self-contained unit of the static type with no moving parts requiring attention or service. Internal input fusing shall be provided. Positive open circuit and over-current protection in the event of a fault shall be provided. All control circuitry shall be behind a hinged door for accessibility. Input and output lightning arrestors shall be included. Power factor capacitor shall be provided and provide a power factor of 96% or better, at full load and maximum brightness. All controls, including brightness relays, shall be in the air-filled control cabinet. Regulator shall have provision for both external 120V control and internal 120V control. Regulator shall be equipped with internally mounted remote control operated primary contractor with 120VAC operating coil.
- d. L-828, Constant Current Regulator, 10 KW, 480V, single phase primary, 6.6 AMP maximum, 3-Step Brightness secondary, as manufactured by Flight Light (formerly

Sola/Hevi-Duty), Model # 10-L828-H-5-D-6-IA, or equivalent. Four (4) regulators will be required. Regulator shall be Ferroresonant or Saturable Reactor design. All-Solid-State design regulators are not acceptable. Regulator shall be a self-contained unit of the static type with no moving parts requiring attention or service. Internal input fusing shall be provided. Positive open circuit and over-current protection in the event of a fault shall be provided. All control circuitry shall be behind a hinged door for accessibility. Input and output lightning arrestors shall be included. Power factor capacitor shall be provided and provide a power factor of 96% or better, at full load and maximum brightness. All controls, including brightness relays, shall be in the air-filled control cabinet. Regulator shall have provision for both external 120V control and internal 120V control. Regulator shall be equipped with internally mounted remote control operated primary contractor with 120VAC operating coil.

- e. Airfield edge light and isolation transformer used as indicator lights at each regulator shall comply with requirements of Item MO-125 of these specifications.
- f. Series cutout, Siemens SCO, Order #1475.92.030.
- g. Plug cutout used as grounding disconnect, Crouse-Hinds Type S-1, Catalog #30775.

109-2.19 OTHER ELECTRICAL EQUIPMENT

This Equipment and Materials section shall also include equipment and materials as specified in the New Vault Building Specifications, which include Architectural, Structural, Mechanical and Electrical Specification Sub-Sections, located elsewhere.

109-2.20 Through 109-2.21

DELETE: These Sections.

109-2.23 SHOP DRAWINGS

In addition to the requirements of Section 60 Paragraph 60-09 of the General Provisions of Division 1 of these specifications, shop drawings shall also be submitted for review for all items specified in Item 109, including the New Vault Building Specifications, which include Architectural, Structural, Mechanical and Electrical Specification Sub-Sections, located elsewhere.

CONSTRUCTION METHODS

109-3.1 REVISE:

This Construction Methods section shall also include construction methods as specified in the New Vault Building Specifications, which include Architectural, Structural, Mechanical and Electrical Specification Sub-Sections, located elsewhere.

109-3.2 Through 109-3.9

DELETE: These Sections.

109-3.11 DELETE: This Section.

ADD: Constant current regulators, isolation transformers and NEMA 1 enclosures to house them, Runway or Taxiway edge lights, series circuit cutouts, grounding disconnects, L-823 connectors, mounting panels, conduits and wiring shall be installed per manufacturer's instruction and as detailed and specified herein.

109-3.12 Through 109-3.16

DELETE: These Sections.

109-3.18 TESTING

ADD: Prior to commencing work in the existing Vault in the basement of the Old Terminal Building, the Contractor shall measure the input Voltage and Amperage to each Runway and Taxiway regulator with each existing regulator at full brightness (Step 5 for Runway regulators and Step 3 for Taxiway regulators), using a True RMS meter, Fluke 87, or equivalent. At this time, the number of edge lights that are "Out" at the time of testing shall also be recorded. The amperage and voltage readings for each runway and taxiway regulator and number of edge lights out of service shall be recorded and turned over to the Resident Inspector.

METHOD OF MEASUREMENT

109-4.1 THRU 109-4.3

DELETE: These Sections.

ADD:

109-4.1 CONSTRUCT ELECTRICAL VAULT

The quantity of Electrical Vault to be paid for shall consist of the Vault structure installed on concrete foundation in compliance with CSI formatted Architectural Specifications and Structural Specifications, incorporated into Item 109, in place, and all labor and materials necessary for a complete and accepted New Regulator Vault Building installation.

109-4.2 INSTALL ELECTRICAL EQUIPMENT

The quantity of vault electrical to be paid for shall consist of furnishing and installation of all vault electrical and HVAC equipment, except for the new regulators, in compliance with Mechanical Specifications and Electrical Specifications, appended to Item 109, in place, and all labor and materials necessary for a complete and accepted installation. Note that this work shall also include the installation of four 2" GRS Conduit from Vault to 10' minimum beyond edge of pavement as detailed on the Plans.

109-4.3 REGULATORS

The quantity of regulators to be paid for shall consist of furnishing and installation of regulators of each size, and all labor and materials necessary for a complete and accepted installation. Note that this pay item is for the regulators only. Associated equipment (series cutouts, plug cutouts, indicating lights, enclosures, mounting panels, etc.) and all conduit and wiring are part of Install Electrical Equipment pay item.

109-4.4 REMOVE ELECTRICAL EQUIPMENT

The quantity of electrical equipment removal in the existing Vault in the basement of the Old Terminal Building shall consist of disconnection and removal of existing regulators, plug cutouts, grounding disconnects, indicating lights, power and control wiring in basement of the Old Terminal Building as detailed on the plans, including relocation to New Regulator Vault Building, or storage elsewhere on airport property, or disposal offsite as required, and all labor and materials necessary for a complete and accepted electrical equipment removal.

BASIS OF PAYMENT

109-5.1 Payment will be made under:

- Item AR109100 - Construct Electrical Vault – per lump sum
- Item AR109200 – Install Electrical Equipment – per lump sum.
- Item AR109321 – 10 KW Regulator, Style 1 – per each.
- Item AR109341 – 20 KW Regulator, Style 1 – per each.
- Item AR109342 – 20 KW Regulator, Style 1 – per each.
- Item AR109362 – 30 KW Regulator, Style 2 – per each.
- Item AR109902- Remove Electrical Equipment- per lump sum.

ITEM AR110000 – INSTALLATION OF AIRPORT UNDERGROUND ELECTRICAL DUCT

DESCRIPTION

110-1.1 ADD: This item shall consist of the installation of the following:

- Concrete Encased Duct
- Electrical Handhole

EQUIPMENT AND MATERIALS

110-2.2 DELETE: This Sections.

110-2.3 PLASTIC CONDUIT

ADD: Except for conduits for 480V service to new Vault, conduits for concrete encased ducts shall be 2" inside diameter, PVC, Schedule 40 unless otherwise noted on the plans.

Concrete encased conduits for 480V service to new Vault shall be 6" inside diameter, PVC, Schedule 40.

ADD:

110-2.9 ELECTRICAL HANDHOLE

ADD: The electrical handhole shall be a 4'x4'x4' electrical handhole structure. These structures are intended for access for an electrician working from the ground above the handhole. The round cast iron lid shall be installed for ease of visual access to the structure and casual maintenance of wiring. For working with the circuits, pulling cable or accessing the duct ends it is intended that the entire PCC precast top shall be capable of being lifted off and removed, using supplied lifting eyes. The structure shall be designed to allow the top to lifted with a boom truck, backhoe or other common construction equipment. The contractor shall provide a system to secure the top to the lower section(s) of the structure when not working on the structure.

CONSTRUCTION METHODS

110-3.2 DUCTS ENCASED IN CONCRETE

ADD:

- a. 2-Way Concrete Encased Duct shall consist of two 6" PVC conduits.
- b. 24-Way Concrete Encased Duct shall consist of twenty-four 2" PVC conduits.

110-3.5 BACKFILLING

ADD: Backfill for duct banks under proposed pavements shall be as shown in the plans. Backfill under the detailed pavements shall be paid for under the specified removal and replacement items.

METHOD OF MEASUREMENT

110-4.1 throughout 110-4.2

DELETE: These Sections.

ADD:

110-4.1 The quantity of concrete encased duct to be paid for shall be the number of lineal feet installed, measured in place, completed and accepted. No separate measurements will be made for individual ducts in a multi-way duct system.

110-4.2 The quantity of electrical handholes to be paid for shall be the number of each handhole, installed, measured in place, completed and accepted.

BASIS OF PAYMENT

110-5.1

ADD:

Payment will be made under:

Item AR110502 – 2-Way Concrete Encased Duct – per lineal foot.
Item AR110524 – 24-Way Concrete Encased Duct – per lineal foot.
Item AR110610 – Electrical Handhole – per each.

ITEM AR125000 – INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1

ADD: New L-867 splice cans shall be installed and connected to the edge lighting conduits at the locations and per the details presented in the plans. L-867 splice cans shall be used for new installations in shoulder or turf. The contractor shall provide a reinforced concrete ring or pad around the junction can installed in turf as detailed in the plans.

New taxiway edge light fixture shall be installed on new bases including new concrete encased light can(s), base plate(s) and L-823 connectors at the location as shown on the plans. New lights shall meet current FAA requirements. The new lights shall utilize transformers of the size recommended by the manufacturer to provide the luminance standards according to AC 150/5345-46A.

This item shall include the installation of new ground rods and bare copper wire to ground all electrical equipment including new and relocated lights, signs and can plaza's in pavement, shoulder and turf. This work shall be included in the cost of each item and not measured for payment separately.

This item shall include the modification of four existing Supplemental Wind Cones as specified herein.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL

ADD: Shop drawings and certifications shall be submitted for all components of this section. Included with the shop drawing submittal, the contractor shall submit all Buy American Certifications.

The Contractor shall provide a complete itemized listing of equipment and materials proposed for incorporation into the work. Each itemization shall include an item number, the quantity of items proposed, and the name of the manufacturer. Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents shall be provided.

Special tools and test equipment required for maintenance and testing of the products shall be supplied by the Contractor.

Instructions necessary to check out, troubleshoot, repair, and replace components of the systems, including integrated electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting after acceptance of the system shall be provided.

125-2.8 LIGHT CANS (NON LOAD BEARING).

ADD:

The light bases for the splice cans located in the turf areas (all considered non-load bearing) shall conform to the requirements of AC 150/5345-42 and be listed in appendix 3 to AC 150/5345-53. Light bases shall be Class 1A (steel), size D as detailed on the drawings and shall be provided as indicated or as required to accommodate the fixture or device installed

theron. Base plates, cover plates, and adapter plates shall be provided to accommodate various sized of fixtures.

125-2.14 ACCESSORIES

Base plates, cover plates, adapter plates and other required accessories shall be provided to accommodate various sizes of fixtures. Bolts shall be stainless steel.

Each splice can including each individual can in new can plazas shall have a brass marker inserted into the surface of the adjacent PCC indicating the Circuit number for each individual can. Brass inserts shall be considered incidental to the cost of the splice can. The lids of the splice cans shall be numbered from 1 through 24. These numbers shall be engraved into the top of the lid and shall correspond with the number marked on the capped duct for future use.

125-2.15 SUPPLEMENTAL WIND CONE MODIFICATIONS

The Supplemental Wind cones shall be modified to replace the existing lighting system with an LED lighting system. The replacement LED light kit shall be Hali-Brite Item # 8700-0084, L806/L807 External LED Light Kit, 6.6 Amp, which normally includes an L-810 Obstruction Light. For this project, delete the L-830 isolation transformer when ordering the light kit. The existing wind cone lighting system's 300W L-830 isolation transformer shall be reused.

METHOD OF MEASUREMENT

125-4.1 DELETE: Entire Section.

ADD: The quantities to be paid for under this item shall consist of:

- The quantity of Splice Cans to be paid for shall be the number of new Splice Cans installed as completed units in place, ready for operation, and accepted by the Engineer/
- The quantity of Medium Intensity Base Mounted Taxiway Lights to be paid for under this item shall be the number of each type installed as completed units in place, ready for operation, and accepted by the Engineer.
- The quantity of Supplemental Wind Cones modified as completed units in place, ready for operation, and accepted by the Engineer.

BASIS OF PAYMENT

125-5.1 Payment will be made at the contract unit price for each complete Splice Can, Can Plaza, Base Mounted Taxiway Light, or Supplemental Wind Cone Modification, furnished and installed in place by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, removals, modifications, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

- Item AR125415 – MITL – Base Mounted – per each.
- Item AR125565 – Splice Can - per each.
- Item AR800268 – Modify Supplemental Wind Cones – per each

ITEM AR152000 - EXCAVATION AND EMBANKMENT

DESCRIPTION

Excavation and Embankment required for this project includes:

- Excavation and Embankment necessary for the construction of the proposed Airport Vault Building and associated sitework
- Excavation, Embankment, Subgrade Preparation and compaction necessary to construct proposed roadways, parking lots, erosion control, building foundations and floors.
- Excavation and Embankment (including top soil as specified in Item 905) necessary to re-grade the area of the existing infield bounded by Taxiway E, Runway 13-31, Taxiway E3 and Taxiway E4 for the purpose of providing positive drainage in the proposed conduit system away from the proposed Airport Vault Building
- Incidental excavations and embankment operations related to installation of various underground facilities.

For the purpose of this project, all Excavation and Embankment (including but not limited to the major items above or incidental to other pay items) shall be considered a single item for which the contractor will be paid a lump sum in accordance with 152-4.1.

The lump sum payment for this item shall not restrict the Owner or the Engineer from modifying or altering the proposed work to better accommodate the proposed improvements or to account for inconsistencies with existing conditions. Revisions to the grading shown in the contract documents or other facets of the work shall be considered incidental to this item as long as the increased effort necessary to complete those revisions remains less than the limits specified in the general provisions under negotiation of new unit prices for revisions to major pay items.

The contractor shall be responsible for tracking the equipment and personnel efforts on the project associated with the as-bid grading operations and verify this effort on a weekly basis. Effort associated with alterations and or modifications to the as-bid plans shall also be tracked. Effort exceeding the specification limit shall be paid for on a time and materials basis.

Excavation related to the construction of foundations or floors for the proposed Vault Building shall be governed by the specification for that component of the work.

CONSTRUCTION METHODS

152-2.2 EXCAVATION

Excavation and embankment shall be compacted to a density of not less than the percentage of the maximum density, at optimum moisture, shown in TABLE 1 as determined by the compaction control tests cited in Division VII for ASTM D 698 (Standard Proctor) for Aircraft weights of less than 60,000 pounds.

152-2.14 DUST CONTROL WATERING

ADD: This work shall consist exclusively of applying water to control dust resulting from construction operations and is not intended for use in compaction of earth embankment. The Contractor shall take measures to control dust.

Dust shall be controlled by a uniform application of sprinkled water and shall be applied as directed by the Resident Engineer or Airport, in a manner meeting their approval.

Dust control watering shall not be paid for separately, but shall be considered incidental to the item requiring the dust control.

METHOD OF MEASUREMENT

152-3.1-3.3 DELETE: These sections.

ADD:

152-3.1 The yardage of excavation and embankment shall not be measured but shall be considered a lump sum.

When the project is constructed essentially to the lines, grades, or dimensions shown on the Plans no measurement will be required and payment will be made at the lump sum price bid

When the Plans have been altered it will be the responsibility of the contractor to track both the original effort and the additional effort based upon normal time and materials procedures to determine the extent of the additional effort. This monitoring shall be verified on a weekly basis with the resident engineer. Work that exceeds the limits specified herein as a change to a major pay item prior to re-negotiation of a major pay item shall be paid for on a time and materials basis.

Dust control watering will not be measured for payment, but shall be considered incidental to the contract items for which dust control is required.

BASIS OF PAYMENT

152-4.1- 4.4

DELETE: These sections.

ADD:

152-4.1 Payment for this item shall be at the contract lump sum for the completed work. This price shall be full compensation for furnishing all material, for all preparation, assembly and installation of materials, for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item AR152411 – Unclassified Excavation – per lump sum.

**ITEM AR156000 TEMPORARY AIR AND WATER POLLUTION,
SOIL EROSION, AND SILTATION CONTROL**

DESCRIPTION

156-1.1 ADD: The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control through the construction period.

Contractor's temporary control should include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

MATERIALS

156-2.1 SILT FENCE

ADD: In lieu of silt fence, the Contractor may substitute 20 in. min. diameter Rolled Excelsior meeting the requirements of Section 1081.15(f), Temporary Erosion Control Materials.

BASIS OF PAYMENT

156-5.1 ADD:

Payment will be made under:

Item AR156510 – Silt Fence – per linear foot.

Item AR156520 – Inlet Protection – per each.

ITEM 156540 – RIP RAP

MATERIALS

156-2.1 The Rip Rap shall meet IDOT Gradation 4.

BASIS OF PAYMENT

Payment will be made under:

Item AR156540 – RIP RAP – per square yard.

ITEM 209000 - CRUSHED AGGREGATE BASE COURSE

MATERIALS

209-2.1

ADD: The aggregate shall be an IDOT Highways approved CA-6 gradation.

CONSTRUCTION METHODS

209-3.6 FINISHING AND COMPACTING

ADD: The crushed aggregate base course shall be compacted to not less than 95% of maximum density at optimum moisture as determined by compaction control tests specified in Division VII for aircraft with gross weights of less than 60,000.

The contractor shall closely monitor the surface grade for the aggregate base so as to maintain the thickness requirements and limits on paving tonnages specified in Section 401.

The Resident Engineer shall have the authority to approve or disapprove of any placement methods in order to protect the underlying grade.

METHOD OF MEASUREMENT

209-4.1 DELETE: This section.

ADD: Only the crushed aggregate base course used in the project for the roadway/parking areas adjacent to the proposed vault building shall be measured for payment under this item. The amount of crushed aggregate base course constructed under the new bituminous pavement for the parking structure adjacent to the new electrical vault building shall be measured by the square yard based upon the theoretical areas depicted in the plans of the thickness specified in the typical sections, completed and accepted.

BASIS OF PAYMENT

209-5.1 Payment shall be made under the following:

Item AR209612 – Crushed Agg. Base Course- 12” – per square yard.

ITEM AR401000 – BITUMINOUS SURFACE COURSE – METHOD I
(Under 2,500 tons/pay item/location)

COMPOSITION

401-1.1 REVISE: 2nd Paragraph to read:

Each course shall be constructed to the depth, typical section, or elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course. The Contractor shall be responsible for the Quality Control in the production and construction of the HMA(Hot Mix Asphalt) surface course. The HMA surface course shall be laid in a maximum of four (4) inch lifts.

401-3.2 JOB MIX FORMULA (JMF)

ADD: Marshall Design Criteria in Table 1 for over 60,000 lbs. shall apply.

401-4.12 SHAPING EDGES

ADD: At any time during the bituminous surface course paving operation it becomes necessary to end a paving lane at a location other than the proposed finished pavement edge because of ending a day's paving, machinery breakdown, etc., the lane end will be sawed back a sufficient distance to provide a smooth, neat appearing joint from which to resume paving. The sawed face will be painted with a liquid asphalt and this work shall be considered incidental to Item 401, Bituminous Surface Course, and no additional compensation will be allowed.

METHOD OF MEASUREMENT

401-5.1 DELETE: The first, second and third sentences of the first paragraph of the Standard Specifications.

ADD: Bituminous base course in locations of specified thickness will be measured by the number of square yards of bituminous pavements of the thickness specified, in place, completed and accepted.

BASIS OF PAYMENT

401-6.1 Payment will be made under:

Item AR401502 – Bituminous Surface Course – 2" – per square yard.

ITEM AR401900 - REMOVE HMA PAVEMENT

DESCRIPTION

401-1.1 ADD: This work shall include the following:

- Remove and Replace Bituminous Taxiway Pavement for placement of new Duct Bank

CONSTRUCTION METHODS

401-2.1 ADD: The pavement sections to be removed and replaced for the installation of the underground ducts shall be removed and reconstructed as shown in the plans. The materials required to complete the replacement of the pavement structure shall be completed as follows:

- The crushed aggregate base course shall be placed and compacted in accordance with Item 209.
- The bituminous prime coat shall be placed in accordance with Item 602.
- The bituminous base course shall be placed and compacted in accordance with Item 403.
- The bituminous tack coat shall be placed in accordance with Item 603.
- The bituminous surface course shall be placed and compacted in accordance with Item 401.
- Controlled Low Strength Material (CLSM), Mix 1, otherwise known as "flowable fill", shall meet IDOT standards; Section 1019 Standard Specifications as currently modified by reoccurring special provisions. The contractor shall provide IDOT approved Mix Design Number prior to providing material for incorporation into the work.
- The crack control material to be used for this project shall be the ISAC fabric, or approved equal.
- Pavement marking shall be similar to the in-place materials and operations.

401-2.2 The contractor shall coordinate the closure of the taxiway with Airport Operations a minimum of 3 working days in advance of said closure. The contractor shall expedite the work so as to minimize the closure time of the taxiway. It is anticipated that the contractor will be allowed four calendar days to complete each full closure as specified under this item. The contractor shall provide additional equipment and crews as necessary to re-open the pavement within the specified time.

401-2.3 The contractor will not be required to compact the bottom of the excavation if the earth is not disturbed.

401-2.4 The conduits shall be installed and the PCC placed immediately following the excavation. The CLSM may be placed immediately following the initial set of the PCC encasement. The pavement layers may be constructed as soon as the CLSM has achieved its initial set. Upon completion of the work the contractor shall re-mark the taxiway centerline.

METHOD OF MEASUREMENT

401-3.1 DELETE: This section.

ADD: The quantity to be paid for shall be the number of square yards of removal and replacement measured in the field, completed and accepted. The quantity of crushed aggregate base course, bituminous prime coat, bituminous base course, bituminous tack coat, and bituminous surface course required to reconstruct the pavement section shall be considered incidental to the Remove and Replace Bituminous Pavement Item.

BASIS OF PAYMENT

401-4.1 DELETE: This section.

ADD: The accepted quantities of Remove and Replace Bituminous Pavement will be paid for at the contract unit price per square yard which price and payment shall be full compensation for furnishing all materials, equipment, labor, hauling, disposal, and all incidental items necessary to complete the work to the satisfaction of the Engineer.

Payment will be made under:

Item AR401910 – Remove and Replace Bituminous Pavement – per square yard.

ITEM 403001 – BITUMINOUS BASE COURSE – METHOD I
(Under 2,500 tons/pay item/location)

COMPOSITION

403-1.1 REVISE: 2nd Paragraph to read:

Each course shall be constructed to the depth, typical section, or elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course. The Contractor shall be responsible for the Quality Control in the production and construction of the HMA (Hot Mix Asphalt) base course. The HMA base course shall be laid in a maximum of four (4) inch lifts.

403-3.2 JOB MIX FORMULA (JMF)

ADD: Marshall Design Criteria in Table 1 for greater than 60,000 lbs. shall apply.

CONSTRUCTION METHODS

403-4.11 JOINTS

ADD: The following as the fourth paragraph for this section.

At any time during the bituminous base course paving operation it becomes necessary to end a paving lane at a location other than the proposed finished pavement edge because of ending a day's paving, machinery breakdown, etc., the lane end will be sawed back a sufficient distance to provide a smooth, neat appearing joint from which to resume paving. The sawed face will be painted with a liquid asphalt and this work shall be considered incidental to Item 403, Bituminous Base Course, and no additional compensation will be allowed.

METHOD OF MEASUREMENT

403-5.1 DELETE: The first, second and third sentences of the first paragraph of the Standard Specifications.

ADD: Bituminous base course in locations of specified thickness will be measured by the number of square yards of bituminous pavements of the thickness specified, in place, completed and accepted.

BASIS OF PAYMENT

403-6.1 CHANGE: "Ton" to "Square Yard".

Payment will be made under:

Item AR201502 – Bituminous Base Course – 2" – per square yard.

ITEM AR501001 – PORTLAND CEMENT CONCRETE PAVEMENT – METHOD I

501-1.1 ADD:

The proposed PCC pavement is to be constructed over the proposed conduits/ ducts installed below existing pavements at the locations shown in the plans.

MATERIALS

501-2.9 COVER MATERIAL FOR CURING

(a) ADD: Add after Type 2: White Pigmented.

DELETE: (b), (c) & (d).

CONSTRUCTION METHODS

501-3.1(d) CONCRETE SAW

ADD: Only self-propelled, water cooled and lubricated saws with diamond blades shall be used on this project.

501-3.1(g) DRILLING MACHINE

The machine used for drilling the holes for dowel bars in the face of the pavement shall be capable of drilling the size and depth of holes as shown on the plans. A drill support system using the pavement surface as a reference shall be required to assure hole alignment at the specified depth of the PCC pavement. Hand-held tools will not be allowed.

501-3.2 FORM SETTING

ADD: No formed areas shall be poured until the Resident Engineer has checked and accepted the form work for both alignment and elevation.

501-3.3 CONDITIONING OF UNDERLYING COURSE, SIDE-FORM CONSTRUCTION

ADD: to minimize the potential for settlement of the proposed pavements, all over excavation shall be filled with material meeting the requirements of ITEM 209 or as specified in the plans. Any grading, compacting, or furnishing and installing stabilizing materials shall be considered incidental to the project and no separate payment will be made. All areas shall be constructed true to grade and acceptable to the Resident Engineer prior to paving.

501-3.6(a) PROPORTIONS

Delete: This section.

501-3.6(b) PROPORTIONS

ADD: For the text batch, beams shall be made for testing at 21 days in addition to 3, 7, 14, and 28 days.

501-3.12(a)(1) LONGITUDINAL AND TRANSVERSE JOINTS

ADD: New pavement slabs that are broken or contain random cracks shall be removed and replaced at the Contractor's expense. Removal of partial slabs is not permitted. Panel removal and replacement shall be full depth, shall be full width of the slab and the limits of removal shall be perpendicular to the paving lane and to each original transverse joint. Removal and replacement methods shall be approved by the Engineer prior to initiation of the repairs.

501-3.12(b) INSTALLATION

ADD: All joints shall be sawcut. Only self-propelled diamond blade saws with water cooling shall be used on this project. No dry sawing or inserts will be allowed.

After each joint is sawed, the sawcut and the adjacent concrete surface shall be thoroughly cleaned to remove all extraneous material including slurry.

501-3.12(c)(4) DOWELED

ADD:

Dowel holes shall be drilled at the specified depth of the existing pavement, parallel to the grade and perpendicular to the centerline of the pavement with a tolerance of 1/8-inch. The drilling operation shall not crack or excessively spall the pavement.

Immediately prior to installing the dowel bars, the dowel holes shall be thoroughly cleaned of drilling debris. Dust and debris shall be blown from the joint or crack with a power brush/blower or with compressed air. If compressed air is used, the pneumatic tool lubricator must be bypassed and a filter installed on the discharge valve to keep water and oil out of the lines. The dowel bars shall be clean and free from rust.

The adhesive shall be of a consistency such that the dowel may be easily inserted into the hole, with adhesive flow completely surrounding the dowel, and without appreciable runout of adhesive after the dowel is fully inserted. (The consistency of the adhesive should be thicker than the consistency recommended by the manufacturer's directions.) The adhesive shall be injected or rodded to the back of the dowel hole to eliminate air pockets prior to inserting the dowel. The dowel shall not be used to push the adhesive to the back of the hole. The quantity of adhesive used shall be such that the adhesive is dispersed along the entire length of the dowel and voids are completely filled. After the adhesive has been positioned at the back of the hole, the dowel shall be fully inserted, using a back-and-forth twisting motion, leaving half of the dowel exposed. If it is necessary to use a hammer to aid in seating the dowel, the exposed end of the dowel shall be protected with a wood block.

501-3.14 SURFACE TEXTURE

ADD: The surface of the pavement shall be finished with a broom finish.

501-3.16 SURFACE TEST

ADD: The Contractor shall furnish the Engineer with the size and type of straightedge required to check the pavement components as directed in the various sections of these specifications.

501-3.17 CURING

(a) Impervious Membrane Method shall be utilized for this project.

ADD: The approved curing media shall be applied uniformly to all surfaces of the pavement, including exposed edges. Membrane curing compounds shall be applied on all concrete surfaces from a suitable mechanical application device.

Care shall be taken when this method of curing is used. Should conditions prevail such that curing material is being blown toward buildings or aircraft, appropriate measures shall be taken to eliminate the problems as directed by the Resident Engineer. The curing membrane shall be sprayed as soon as possible without damage to the pavement surface. Excessive delays in application of the membrane resulting in shrinkage cracking will be cause for rejection of the affected pavement necessitating removal.

501-3.21 SEALING JOINTS

DELETE: This section.

ADD: The contractor shall saw all construction and contraction joints to provide a satisfactory sealant reservoir. The contractor shall seal all sawed joints with a sealant approved by the engineer.

501-3.21 OPENING TO TRAFFIC

DELETE: This section.

ADD: The Resident Engineer shall decide when the pavement shall be opened to vehicle traffic. The pavement may be opened to light vehicles when test specimens molded and cured in accordance with ASTM C31 have attained a compressive strength of 3,000 psi. All other vehicles and aircraft shall not be allowed on the pavement until test specimens molded and cured in accordance with ASTM C31 have attained a flexural strength of 650 psi.

Prior to opening, the pavement shall be cleaned of all deleterious material. Sweeping shall be conducted in such a manner that dust will not affect operations at the airport.

501-3.25 PROTECTION OF PAVEMENT AGAINST RAIN

In order that the concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all times materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of standard metal forms or wood plank having a nominal thickness of not less than 2 inches and a nominal width of not less than the thickness of the pavement at its edge for the protection of the pavement edges, and covering material such as curing paper or polyethylene sheeting material for the protection of the surface of the pavement. The metal forms, wood planks and curing paper shall be kept on trucks or towable vehicles, within reasonable hauling distance, at a site shown on the plans, or as designated by the Resident Engineer.

As an alternate, rolled polyethylene sheeting of sufficient length and width may be used without the temporary side forms and if properly anchored, to cover the plastic concrete slab and exposed edge. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface.

When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering.

METHOD OF MEASUREMENT

ADD:

501-4.1 DELETE: This section.

Special Provisions
Peoria International Airport
Peoria, Illinois

A.I.P. Project No. 3-17-0080-XX
IL. Project No. PIA-3981

ADD: This item shall be considered incidental to the Remove and Replace PCC Pavement item.

BASIS OF PAYMENT

501-5.1 GENERAL

DELETE: This section.

ADD: Payment shall be made under the Remove and Replace PCC Pavement Item as outline in these Special Provisions under Item AR501910.

501-5.2 DELETE: This section.

501-5.3 Price Adjustment

Delete: This section

ITEM 501900 – REMOVE PCC PAVEMENT

DESCRIPTION

501-1.1 ADD: This items shall consist of the Removal and Replacement of PCC Pavement as shown in the plans.

CONSTRUCTION METHODS

501-3.1 GENERAL

REVISE: The first sentence to read:

The Contractor shall saw cut the existing pavement structure full depth as shown in the plans at locations determined by the Resident Engineer prior to begin removal operations.

ADD: After the third paragraph:

If the Contractor elects to break the pavement in-situ before removal, he shall do so in a manner that will not damage either the surrounding pavement or structures. The Resident Engineer shall have the ability to reject any demolition methods that he feels will result in damage to the aforementioned structures.

ADD: The pavement sections to be removed and replaced for the installation of the underground ducts shall be removed and reconstructed as shown in the plans. The materials required to complete the replacement of the pavement structure shall be completed as follows:

- The PCC Pavement shall be construction in accordance with Item 501.
- Controlled Low Strength Material (CLSM), Mix 1, otherwise known as "flowable fill", shall meet IDOT standards; Section 1019 Standard Specifications as currently modified by reoccurring special provisions. The contractor shall provide IDOT approved Mix Design Number prior to providing material for incorporation into the work.
- Pavement marking shall be similar to the in-place materials and operations.

501-3.2 The contractor shall coordinate the closure of the taxiway with Airport Operations a minimum of 3 working days in advance of said closure. The contractor shall expedite the work so as to minimize the closure time of the taxiway. It is anticipated that the contractor will be allowed four calendar days to complete each full closure as specified under this item. The contractor shall provide additional equipment and crews as necessary to re-open the pavement within the specified time.

501-3.3 The contractor will not be required to compact the bottom of the excavation if the earth is not disturbed.

501-3.4 The conduits shall be installed and the PCC placed immediately following the excavation. The CLSM may be placed immediately following the initial set of the PCC encasement. The pavement layers may be constructed as soon as the CLSM has achieved its initial set. Upon completion of the work the contractor shall re-mark the taxiway centerline.

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METHOD OF MEASUREMENT

501-4.1 DELETE: This section.

Special Provisions
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Peoria, Illinois

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ADD: The quantity to be paid for shall be the number of square yards of removal and replacement measured in the field, completed and accepted. The quantity of bituminous base course and PCC Pavement required to reconstruct the pavement section shall be considered incidental to the Remove and Replace PCC Pavement Item.

BASIS OF PAYMENT

501-4.1 DELETE: This section.

ADD: The accepted quantities of Remove and Replace PCC Pavement will be paid for at the contract unit price per square yard which price and payment shall be full compensation for furnishing all materials, equipment, labor, hauling, disposal, and all incidental items necessary to complete the work to the satisfaction of the Engineer.

Payment will be made under:

Item AR501910 – Remove and Replace PCC Pavement – per square yard.

ITEM AR602000 – BITUMINOUS PRIME COAT

602-3.3 APPLICATION OF BITUMINOUS MATERIAL

ADD: Prime coat shall be allowed to cure for a minimum of 48 hours. Prime Coat used for the Removal and Replacement items shall not require cure time, in these areas the application rate may be reduced to expedite construction.

BASIS OF PAYMENT

602-5.1 Payment will be made under:

Item AR602510 – Bituminous Prime Coat – per gallon

Special Provisions
Peoria International Airport
Peoria, Illinois

A.I.P. Project No. 3-17-0080-XX
IL. Project No. PIA-3981

ITEM AR60300 – BITUMINOUS TACK COAT

BASIS OF PAYMENT

603-5.1 Payment will be made under:

Item AR603510 – Bituminous Tack Coat – per gallon.

ITEM AR610000 – STRUCTURAL PORTLAND CEMENT CONCRETE

DESCRIPTION

610-1.1 ADD: This item shall include concrete used for the purpose of splice cans, duct banks, vault construction and any other miscellaneous structural Portland cement concrete uses. The PCC mix used for structural PCC in the Vault Building shall meet the strength requirements of the Architectural Specifications but the individual components shall meet the material specifications for Item 610.

610-5.1 ADD: The cost of furnishing and install structural concrete shall be considered incidental to the contract unit price for the item utilizing Item 610 Structural Portland Cement Concrete. The prices shall be full compensation for furnishing all materials and or preparation, delivering and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete the item.

If, upon delivery and incorporation of any materials, the Contractor has failed to provide the necessary submittals as required by Sections 30-18, 40-01, 40-03 and 40-11 of the Standard and Special Provisions, the pay item shall not be included on the Construction Progress Payment report until such submittals have been furnished.

ITEM 701000 – PIPE FOR STORM SEWERS AND CULVERTS

MATERIALS

701-2.1 ADD: Pipe for storm drains shall be new reinforced concrete pipe meeting the requirements of ASTM C76. All reinforced concrete pipes shall be Class IV.

ADD:

701-2.9 TRENCH BACKFILL

Foundation, bedding, cradle material shall meet the gradation requirements of an IDOT CA-6 or CA-10. This material shall meet the material requirements of Item 209. Backfill outside of pavement limits shall be with earth excavated from the trenching operations.

CONSTRUCTION METHODS

701-3.2 CRADLE

DELETE: This section.

ADD: Granular cradle shall be constructed and compacted prior to the placement of the storm sewer for the entire length of the pipe as detailed in the plans.

Material for the cradle shall meet the requirements of 701-2.7.

Moist cradle materials shall be compacted to the Engineer's satisfaction by ramming or tamping with tools approved by the Engineer.

701-3.4 PIPE JOINTS

DELETE: Paragraphs (a), (b) and (d) of the Standard Specifications.

701-3.5 BACKFILLING

DELETE: This section.

ADD: As soon as the condition of the pipe will permit, the entire width of the trench shall be backfilled with moist fine aggregate meeting the requirements specified in 701-2.9 to a height of at least the elevation of the center of the pipe. The fine aggregate shall be placed longitudinally along the pipe. The elevation of the backfill material on each side of the pipe shall be the same. Special care shall be taken to completely fill the space under the pipe. The fine aggregate backfill material shall be placed in 8-inch layers, loose measurement and compacted to the satisfaction of the Engineer by ramming or tamping with tools approved by the Engineer. The fine aggregate used for backfilling shall meet the approval of the Engineer.

The remainder of the trench and excavation shall be backfilled to the natural line or finished surface as rapidly as the condition of the sewer will permit. The backfill material shall consist of the excavated material or of trench backfill, as herein specified. All backfill material shall be deposited in the trench or excavation in such a manner as not to damage the sewer. The filling of the trench shall be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressures do not occur. The backfill for trenches and excavation made in the subgrade of the proposed improvement shall be made with trench backfill material.

All backfill material up to a height of 12 inches above the pipe shall be carefully deposited in uniform layers not exceeding 8 inches thick (loose measure). The material in each layer shall be firmly compacted by ramming or tamping with tools approved by the Engineer in such a manner as not to disturb or injure the pipe. For backfilling above this height, the material shall continue to be deposited in uniform layers not exceeding 8 inches thick (loose measure), and each layer shall be compacted by ramming or tamping with tools approved by the Engineer.

METHOD OF MEASUREMENT

701-4.2 DELETE: This item.

701-4.3 DELETE: This item.

BASIS OF PAYMENT

ADD:

701-5.2 Payment will be made under:

Item AR701212 – 12” CMP – per linear foot.
Item AR701401 – 4” PVC Storm Sewer – per linear foot.
Item AR701518 – 18” RCP, Class IV – per linear foot.

ITEM AR751000 - MANHOLES, CATCH BASINS, INLETS & INSPECTION HOLES

DESCRIPTION

751-1.1 ADD: This item shall include the construction of new inlets.

BASIS OF PAYMENT

751-5.1 Payment will be made under:

Item AR751410 – Inlet – per each.

**ITEM 752000 – CONCRETE CULVERTS, HEADWALLS,
AND MISCELLANIOUS DRAINAGE STRUCTURES**

DESCRIPTION

752-1.1 ADD: This item consists of the installation of Metal Flared End Sections.

CONSTRUCTION METHODS

752-3.9 BACKFILLING

DELETE: Paragraph (a) of the Standard Specifications.

ADD: Backfill materials shall be an IDOT Division of Highways CA-06 or CA-10 conforming to IDOT D quality.

BASIS OF PAYMENT

752-5.1 ADD:

Payment will be made under:

Item AR752212 - Metal End Section 12" – per each.

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Peoria, Illinois

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ITEM AR901510 – SEEDING

BASIS OF PAYMENT

Payment will be made under:

Item AR901510 - Seeding – per acre.

ITEM AR90500 - TOPSOILING

DESCRIPTION

905-1.1 DELETE: This Section

ADD:

This item shall consist of

- Stockpiling of acceptable topsoil material from the initial excavations in sufficient quantity to cover disturbed areas scheduled for seeding and mulching
- Over excavation of cut areas and under building of embankment/ shoulder areas to allow for application of topsoil material and incorporation into final cross sections.

Including but not limited to preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Resident Engineer.

Topsoil shall be stripped from cut areas and below proposed pavements and stockpiled outside of the grading limits. Topsoil shall be utilized in shoulders adjacent to the proposed pavements. In addition, the surface of all disturbed areas shall be covered with a layer of topsoil, as needed, to facilitate drainage and the growth of turf.

No separate payment shall be made for stockpiling or excavation from the stockpile. Costs associated with stockpiling and/or excavation from the stockpile shall be considered incidental to Item 152.

ITEM AR908510 – MULCHING

MATERIALS

908-2.3 Material used for mulching shall be Manufactured hydraulic mulch.

BASIS OF PAYMENT

Payment will be made under:

Item AR908510 - Mulching – per acre.

Special Provisions
Peoria International Airport
Peoria, Illinois

A.I.P. Project No. 3-17-0080-XX
IL. Project No. PIA-3981

APPENDIX 1
Policy Memorandum 96-2
Requirements for Laboratory, Testing, Quality Control,
and Paving of Bituminous Concrete Mixtures
20 Pages

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 15, 2007

Springfield, Illinois

Number 96-2

TO: CONTRACTORS

SUBJECT: REQUIREMENTS FOR LABORATORY, TESTING, QUALITY CONTROL, AND PAVING OF BITUMINOUS CONCRETE MIXTURES

I. SCOPE

The purpose of this policy memorandum is to define to the Contractor the requirements concerning the laboratory, testing, Quality Control, and paving of bituminous concrete mixtures. References are made to the most recent issue of the Standard Specifications for Construction of Airports and to American Society for Testing and Materials (ASTM) testing methods. The Quality Assurance and acceptance responsibilities of the Engineer are described in Policy Memorandum 96-3.

II. LABORATORY

The Contractor shall provide a laboratory located at the plant and approved by the Illinois Division of Aeronautics (IDA). The laboratory shall be of sufficient size and be furnished with the necessary equipment and supplies for adequately and safely performing the Contractor's Quality Control testing as well as the Engineer's acceptance testing as described in Policy Memorandum 96-3.

The effective working area of the laboratory shall be a minimum of 600 square feet with a ceiling height of not less than 7.5 feet. Lighting shall be adequate to illuminate all working areas. It shall be equipped with heating and air conditioning units to maintain a temperature of 70° F ± 5° F.

The laboratory shall have equipment that is in good working order and that meets the requirements set forth in the following ASTM test standards:

ASTM C 117	Test Method for Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	Sieve or Screen Analysis of Fine and Coarse Aggregate
ASTM C 566	Total Moisture Content of Aggregate by Drying
ASTM D 75	Sampling Aggregates
ASTM D 1559	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D 2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
IDOT	Ignition Method for Determining Asphalt Content

ASTM D 2726	Bulk Specific Gravity of Compacted Bituminous Mixtures using Saturated Surface Dry Specimens
ASTM D 3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D 2950	Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 4125	Asphalt Content of Bituminous Mixtures by Nuclear Method
ASTM C 127	Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	Standard Test Method for Specific Gravity and Absorption of Fine Aggregate

The Asphalt Institute's *Mix Design Methods for Asphalt Concrete Manual No. 2 (MS-2)*

The laboratory and equipment furnished by the Contractor shall be properly calibrated and maintained. The Contractor shall maintain a record of calibration results at the laboratory. The Engineer may inspect measuring and testing devices at any time to confirm both calibration and condition. If the Resident Engineer determines that the equipment is not within the limits of dimensions or calibration described in the appropriate test method, the Engineer may stop production until corrective action is taken. If laboratory equipment becomes inoperable or insufficient to keep up with mix production testing, the Contractor shall cease mix production until adequate and/or sufficient equipment is provided.

III. MIX DESIGN SUBMITTAL

Based upon data and test results submitted by the Contractor, the Illinois Division of Aeronautics Engineer of Construction & Materials shall issue the final Job Mix Formula approval letter that concurs or rejects the Contractor's proposed JMF. The Contractor will be required to perform the sampling and laboratory testing and develop a complete mix design, according to the following guidelines: [Note: A testing summary chart can be found in Appendix B.]

- A. Material sources meeting the requirements of the contract shall be submitted in writing at or before the preconstruction conference (see BITUMINOUS WORKSHEET in Appendix A) in the following format:
 1. To: Steve Long, Acting Chief Engineer
Attn: Mike Wilhelm, Engineer of Construction & Materials
Division of Aeronautics
One Langhorne Bond Drive
Springfield, Illinois 62707
 2. Producer name and location of each aggregate
 3. Producer # for each aggregate (producers are assigned this number by IDOT Central Bureau of Materials)
 4. Material code for each aggregate
 5. Gradation and Quality designation for each aggregate (i.e. CA-11, etc.)
 6. Producer, producer #, and specific gravities of asphalt cement

7. Performance Graded Binder 64-22 shall be used unless otherwise approved by the IDA Engineer of Materials.
- B. The Contractor shall obtain representative samples of each aggregate. The individual obtaining samples shall have successfully completed the IDOT Aggregate Technician Course under the IDOT Division of Highways, QC/QA program. The sample size shall be approximately 280 lb. for each coarse aggregate, 150 lb. for each fine aggregate, 15 lb. for the mineral filler or collected dust, and 1 gallon of asphalt cement.
- C. The Contractor shall split the aggregate samples down and run gradation tests according to the testing methods referenced in Appendix B of this memorandum. The remaining aggregates shall be set aside for further Mix Design testing. The results of the gradation tests, along with the most recent stockpile gradations, shall be reported by fax to the IDA Engineer of Materials for engineering evaluation. If the gradation results are deemed non-representative or in any way unacceptable, new representative samples may be required at the direction of the IDA Engineer of Materials. Only composite gradations are required under this procedure.
- D. Based on the accepted gradation results, the Contractor will determine blend percentages in accordance with the contract specifications (see Section 201/401 – 3.2 JOB MIX FORMULA under Table 4) for each aggregate to be used in determining the Job Mix Formula, as well as mix temperature and asphalt content(s), and number of Marshall Blows for preparation of the Marshall Mix Design, or number of gyrations for Superpave Mix Design, depending on which design method is specified in the contract. The Contractor will verify the aggregate percentages, mix temperatures, asphalt content(s), and number of Marshall blows (or gyrations) with the IDA Engineer of Construction & Materials before beginning any testing.
- E. After verification of the information from step D., the Contractor shall make specimens and perform the following tests at various asphalt contents in order to obtain the optimum mix design. [Note: Actual test designation is referenced in Appendix B of this memorandum.]

Marshall Tests

Maximum Specific Gravity -- " G_{mm} "

Bulk Specific Gravity -- " G_{sb} "

Marshall Stability

Marshall Flow

% air voids

The JMF will be designed in accordance with Table 4 as modified in the Recurring Special Provisions for the type of mix being produced. Appendix C contains a copy of the Table 4 targets and ranges for the JMF.

- F. All technicians who will be performing mix design testing and plant sampling/testing shall have successfully completed the IDOT Division of Highways Bituminous Concrete Level 1 Technician Course "Bituminous Concrete Testing". The Contractor may also provide a Gradation Technician who has successfully completed the Department's "Gradation Technician Course" to run gradation tests only under the supervision of a Bituminous Concrete Level 2 Technician.
- G. The mix design testing results and resulting optimal JMF shall be reported to the IDA Engineer of Construction & Materials with the following data included:
- a) Aggregate & liquid asphalt material codes
 - b) Aggregate & liquid asphalt producer numbers, names, and locations
 - c) Aggregate Blend of each aggregate
 - d) Optimum Blend % for each sieve
 - e) AC Specific Gravity
 - f) Bulk Specific Gravity and Absorption for each aggregate
 - g) Summary of Marshall Design Data: AC % Mix, Stability, Flow, G_{mb} , G_{mm} , VMA, Voids (Total Mix), Voids Filled

- h) Optimum design data listing AC % Mix, Stability, Flow, G_{mb} , G_{mm} , VMA, Voids (Total Mix), Voids Filled
- i) Percent of asphalt that any RAP will add to the mix
- j) Graphs for the following: gradation on 0.45 Power Curve, AC vs. Voids (Total Mix), AC vs. Specific Gravities, AC vs. Voids Filled, AC vs. Stability, AC vs. Flow and VMA

H. The IDA Engineer of Construction & Materials shall generate and issue a concurrence or rejection of the Contractor's proposed Mix Design with the JMF for the manufacture of bituminous mixtures based upon the Contractor's submitted testing and complete mix design results. The Contractor shall not be permitted to use the proposed HMA mix in production for the project until this concurrence letter is issued to the Contractor by the IDA Engineer of Construction & Materials, and the mix passes all test section requirements, when a test section is specified.

I. The above procedure, III. MIX DESIGN SUBMITTAL shall be repeated for each change in source or gradation of materials.

IV. MIX PRODUCTION TESTING

The Quality Control of the manufacture and placement of bituminous mixtures is the responsibility of the Contractor. The Contractor shall perform or have performed the inspection and tests required to assure conformance to contract requirements. Quality Control includes the recognition of defects and their immediate correction. This may require increased testing, communication of test results to the plant or the job site, modification of operations, suspension of bituminous mix production, rejection of material, or other actions as appropriate. The Resident Engineer shall be immediately notified of any failing tests and subsequent remedial action. Form AER M-14 shall be reported to the Engineer and Resident Engineer no later than the start of the next work day. In addition, AER M-9 and M-11 shall be given to the Resident Engineer daily (Appendix A). The Contractor shall provide a Quality Control (QC) Manager who will have overall responsibility and authority for Quality Control. This individual shall have successfully completed the IDOT Division of Highways Bituminous Concrete Level II Technician Course "Bituminous Concrete Proportioning and Mixture Evaluation." In addition to the QC Manager, the Contractor shall provide sufficient and qualified personnel to perform the required visual inspections, sampling, testing, and documentation in a timely manner. The following plant tests and documentation shall be required: [Note: A summary chart of testing can be found in Appendix B.]

- A. Minimum of one (1) complete hot bin or combined belt analysis per day of production or every 1,000 tons, whichever is more frequent.
- B. Minimum one (1) stockpile gradation for each aggregate and/or mineral filler per week when a batch plant is utilized. Minimum of one (1) gradation for each aggregate per day of production or every 1,000 tons when a drum plant is used, and one (1) gradation per week for mineral filler when a drum plant is used.
- C. A certification from the quarry for the total quantity of aggregate listing the source, gradation type, and quality designation of aggregate shipped.
- D. Original asphalt shipping tickets listing the source and type of asphalt shipped.
- E. One mix sample per 1,000 tons of mix. The sample shall be split in half. One half shall be reserved for testing by the Engineer. The other half shall be split and tested by the Contractor for Marshall, Extraction, Gradation, Maximum Specific Gravity, and Air Void tests in accordance with the appropriate ASTM standard referenced herein. [See Appendix B.]
 - 1. In place of the extraction test, the Contractor may provide the asphalt content by a calibrated ignition oven test using the IDOT Division of Highways' latest procedure. The correction (calibration) factor for aggregate type shall be clearly indicated in the reported test results.

From these tests, the Contractor shall interpret the test data and make necessary adjustments to the production process in order to comply with the approved JMF.

V. QUALITY CONTROL

A. Control Limits

Target values shall be determined from the approved JMF. The target values shall be plotted on the control charts within the following control limits:

<u>Parameter</u>	<u>Control Limits</u>	
	<u>Individual Test</u>	<u>Moving Avg. of 4</u>
% Passing		
1/2 in.	± 7 %	± 4 %
No. 4	± 7 %	± 4 %
No. 8	± 5 %	± 3 %
No. 30	± 4 %	± 2.5 %
No. 200 *	± 2.0 % *	± 1.0 % *
Asphalt Content	± 0.45 %	± 0.2 %

* No. 200 material percents shall be based on washed samples. Dry sieve gradations (-200) shall be adjusted based on anticipated degradation in the mixing process.

B. Control Charts

Standardized control charts shall be maintained by the Contractor at the field laboratory. The control charts shall be displayed and be accessible at the field laboratory at all times for review by the Engineer. The individual required test results obtained by the Contractor shall be recorded on the control chart immediately upon completion of a test, but no later than 24 hours after sampling. Only the required plant tests and resamples shall be recorded on the control chart. Any additional testing of check samples may be used for controlling the Contractor's processes, but shall be documented in the plant diary.

The results of assurance tests performed by the Engineer will be posted as soon as available.

The following parameters shall be recorded on control charts:

1. Combined Gradation of Hot-Bin or Combined Belt Aggregate Samples (Drier Drum). (% Passing 1/2 in., No. 4., No. 8, No. 30, and No. 200 Sieves)
2. Asphalt Content
3. Bulk Specific Gravity of Marshall Sample
4. Maximum Specific Gravity of Mixture

C. Corrective Action for Required Plant Tests

Control Limits for each required parameter, both individual tests and the average of four tests, shall be exhibited on control charts. Test results shall be posted within the time limits previously outlined.

1. Individual Test Result. When an individual test result exceeds its control limit, the Contractor shall immediately resample and retest. If at the end of the day no material remains from which to resample, the first sample taken the following day shall serve as the resample as well as the first sample of the day. This result shall be recorded as a retest. If the retest passes, the Contractor may continue the required plant test frequency. Additional check samples should be taken to verify mix compliance.
2. Asphalt Content. If the retest for asphalt content exceeds control limits, mix production shall cease and immediate corrective action shall be instituted by the Contractor. After corrective action, mix production shall be restarted, the mix production shall be stabilized, and the Contractor shall immediately resample and retest. Mix production may continue when approved by the Engineer. The corrective action shall be documented.

Inability to control mix production is cause for the Engineer to stop the operation until the Contractor completes the investigation identifying the problems causing failing test results.

3. Combined Aggregate/Hot-Bin. For combined aggregate/hot-bin retest failures, immediate corrective action shall be instituted by the Contractor. After corrective action, the Contractor shall immediately resample and retest. The corrective action shall be documented.
 - a. Moving Average. When the moving average values trend toward the moving average control limits, the Contractor shall take corrective action and increase the sampling and testing frequency. The corrective action shall be documented.

The Contractor shall notify the Engineer whenever the moving average values exceed the moving average control limits. If two consecutive moving average values fall outside the moving average control limits, the Contractor shall cease operations. Corrective action shall be immediately instituted by the Contractor. Operations shall not be reinstated without the approval of the Engineer. Failure to cease operations shall subject all subsequently produced material to be considered unacceptable.
 - b. Mix Production Control. If the Contractor is not controlling the production process and is making no effort to take corrective action, the operation shall stop.

VI. TEST SECTION AND DENSITY ACCEPTANCE **(Note: Applies only when specified.)**

- A. The purpose of the test section is to determine if the mix is acceptable and can be compacted to a consistent passing density.

A quick way to determine the compactibility of the mix is by the use of a nuclear density gauge in the construction of a growth curve. An easy way to construct a growth curve is to use a good vibratory roller. To construct the curve, an area the width of the roller in the middle of the mat is chosen and the roller is allowed to make one compactive pass. With the roller stopped some 30 feet away, a nuclear reading is taken and the outline of the gauge is marked on the pavement. The roller then makes a compaction pass in the opposite direction and another reading is taken. This scenario is continued until at least two (2) passes are made past the maximum density obtained.

The maximum laboratory density potential of a given mix is a direct function of the mix design air voids. Whereas, the actual maximum field density is a function of the type of coarse aggregates, natural or manufactured sands, lift thickness, roller type (static or vibratory), roller and paver speed, base condition, mix variation, etc. All of these items are taken into consideration with the growth curve.

1. High Density in the Growth Curve. If the growth curve indicates a maximum achievable field density of between 95 to 98 percent of the Theoretical Maximum Density (D), you can proceed with the Rolling Pattern. On the other hand, if the maximum achievable density is greater than 98 percent, a quick evaluation (by use of an extractor, hot bin gradations, nuclear asphalt determinator, etc.) must be made of the mix. When adjustments are made in the mix, a new growth curve shall be constructed.
2. Low Density in the Growth Curve. If the growth curve indicates the maximum achievable density is below 94 percent, a thorough evaluation of the mix, rollers, and laydown operations should be made. After a thorough evaluation of all factors (mix, rollers, etc.), asphalt or gradation changes may be in order as directed by the Engineer. Again, any changes in the mix will require a new growth curve. Note that the nuclear density test is a quality control tool and not an acceptance test. All acceptance testing is to be conducted by the use of cores, unless otherwise specified.
3. Acceptance of Test Section. The Contractor may proceed with paving the day after the test section provided the following criteria have been met:
 - a. Four random locations (2 cores per location cut longitudinally and cored by the Contractor) will be selected by the Engineer within the test strip. No individual core can be below a minimum of 94% density.
 - b. All Marshall and extraction test results from mix produced for the test section must be within the tolerances required by specification.
 - c. The Contractor shall correlate his nuclear gauge to the cores taken in the test section. Additional cores may be taken at the Contractor's expense for this purpose within the test section area, when approved by the Engineer.
4. Density Acceptance under Production Paving. The responsibility for obtaining the specified density lies with the Contractor. Therefore, it is important that the nuclear density gauge operator communicate with the roller operators to maintain the specified density requirements. The Contractor shall provide a Bituminous Concrete Density Tester who has successfully completed the Department's "Bituminous Concrete Nuclear Density Testing Course" to run all required density tests on the job site. Density acceptance testing, unless otherwise specified, is described as follows:
 - a. The Contractor shall cut cores at random locations within 500 ton sublots as directed by the Resident Engineer.
 - b. The cores should be extracted so as not to damage them, since they are used to calculate the Contractor's pay.
 - c. The Engineer will run preliminary G_{mb} tests on the cores to give the Contractor an indication of how compaction is running for the next day's paving.

- d. A running average of four (4) Maximum Theoretical Gravities (G_{mm}) will be used for calculating percent compaction.
- e. Final core density tests and pay calculations will be performed by the Resident Engineer and delivered to the Contractor.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 96-2 dated April 1, 2004

APPENDIX A

BITUMINOUS WORKSHEET

Airport: _____ Project No.: _____ AIP No.: _____

Mix Design #: _____ Material Code: _____ Producer: _____

Prod. #: _____

AGGREGATE

Mat'l. Code: _____

Producer #: _____

Prod. Name _____

Location: _____

Percent Passing

Sieve Size

1 inch	_____	_____	_____	_____	_____
3/4 inch	_____	_____	_____	_____	_____
1/2 inch	_____	_____	_____	_____	_____
3/8 inch	_____	_____	_____	_____	_____
No. 4	_____	_____	_____	_____	_____
No. 8	_____	_____	_____	_____	_____
No. 16	_____	_____	_____	_____	_____
No. 30	_____	_____	_____	_____	_____
No. 50	_____	_____	_____	_____	_____
No. 100	_____	_____	_____	_____	_____
No. 200	_____	_____	_____	_____	_____
Washed (y/n)	_____	_____	_____	_____	_____
O.D. Gravity	_____	_____	_____	_____	_____
App. Gravity	_____	_____	_____	_____	_____
Absorption	_____	_____	_____	_____	_____
Asphalt Gravity	_____	Asphalt Source	_____	Asphalt Producer No.	_____

MARSHALL DATA

% Asphalt _____

M. Stability _____

Flow _____

D _____

0 _____

% Air Voids _____

Q.C. Manager Name: _____ Phone number: _____

Laboratory Location: _____ Fax Number: _____

Remarks: _____

Bituminous Mixtures Extraction

Date: _____

Airport: _____ Consultant: _____

Illinois Project: _____ Contractor: _____

AIP Project No.: _____ Producer: _____

Mix #: _____ Dry Time: _____ Lot: _____ Sublot: _____

Type: _____ Washed: _____

Sieve	Wt.	Accum. Wt.	% Passing	Mix Formula	Tolerance	Spec Range
1.5						
1						
3/4						
1/2						
3/8						
4						
8						
16						
30						
50						
100						
200						
Tot Agg						
Bit						

Extraction Data	
Pan, New Filter & Sample	g _____
Pan & New Filter	g _____
Sample	g _____
Pan, Used Filter, Aggregate	g _____
Pan & New Filter	g _____
Aggregate	g _____
Pan & Used Filter	g _____
Pan & New Filter	g _____
Dust in Filter	g _____
Sample	g _____
Aggregate	g _____
Bitumen	g _____

New Bit:	Marshall Stab:	Blows:	Gyro:	Flow:	TSR:
Bulk SPGR:	Max SPGR:	% Voids:	DEN (PCF):		

Remarks: _____

CC: _____ Tested by: _____

APPENDIX B

QUALITY CONTROL TESTING (PLANT)

PARAMETER	FREQUENCY	SAMPLE SIZE	TEST METHOD	REPORT FORM
Aggregate Gradations: Hot bins for batch and continuous plants--- Individual cold-feeds or combined belt-feeds for drier drum plants.	Minimum 1 per day of production and at least 1 per 1000 tons.	CA07/11: 5000 gm CA13: 2000 gm CA16: 1500 gm Fine agg: 500 gm 1 gallon asphalt cement	ASTM C 136	AER M-9
Aggregate gradations: Stockpiles	Minimum 1 per aggregate per week per stockpile.	CA07/11: 5000 gm CA13: 2000 gm CA16: 1500 gm Fine agg: 500 gm *Note: The above test sample sizes are to be obtained from splitting down a larger sample from the stockpiles.	ASTM C 136	AER M-9
Maximum Specific Gravity	Minimum 1 per 1000 tons	1200 gm per test	ASTM D 2041	AER M-11 and AERM-14
Bulk Specific Gravity	Minimum 1 per 1000 tons	1250 gm per briquette	ASTM D 2726	AER M-11 and AERM-14
Marshall Stability and Flow	Minimum 1 per 1000 tons	1250 gm per briquette	ASTM D 1559	AER M-11 and AERM-14
% Air Voids	Minimum 1 per 1000 tons		ASTM D 3203	AER M-11 and AERM-14
Extraction	Minimum 1 per 1000 tons	1000 gm (surface) 1500 gm (base)	ASTM D 2172	AER M-11 and AERM-14
Ignition Oven Test	Minimum 1 per 1000 tons	1500 gm		AER M-14
Nuclear Asphalt Gauge	Minimum 1 per 1000 tons	1000-1100 gm	ASTM D 2145	AER M-14

MIX DESIGN TESTING

PARAMETER	FREQUENCY	SAMPLE SIZE	TEST METHOD	REPORT FORM
Representative samples of each aggregate and asphalt cement.	1 per aggregate and 1 asphalt cement.	280 lb. (coarse) 150 lb. (fine) 15 lb. (min. filler) 1 gallon asphalt cement	ASTM D 75	N/A
Aggregate Gradation	1 per aggregate	CA07/11: 5000 gm CA13: 2000 gm CA16: 1500 gm Fine agg: 500 gm	ASTM C 136	Bituminous Worksheet (Appendix A)
Maximum Specific Gravity	2 per specified asphalt content	1200 gm per test	ASTM D 2041	Bituminous Worksheet (Appendix A)
Bulk Specific Gravity	3 briquettes per specified asphalt content	1250 gm per briquette	ASTM D 2726	Bituminous Worksheet (Appendix A)
Marshall Stability and Flow	3 briquettes	1250 gm per briquette	ASTM D 1559	Bituminous Worksheet (Appendix A)
% Air Voids	1 per specified asphalt content (Avg. of G_{sb}/G_{mm})		ASTM D 3203	Bituminous Worksheet (Appendix A)

QUALITY CONTROL TESTING (PAVER)

PARAMETER	FREQUENCY	SAMPLE SIZE	TEST METHOD	REPORT FORM
Nuclear Density Test	As required by the Contractor to maintain consistent passing density	Various locations	ASTM D 2950	

APPENDIX C

AGGREGATE BITUMINOUS BASE COURSE

Percentage by Weight Passing Sieves Job Mix Formula (JMF)		
Sieve Size	Gradation B Range 1" Maximum	Ideal Target
1-1/4 in.	---	---
1 in.	100	100
3/4 in.	93 – 97	95
1/2 in.	75 – 79	77
3/8 in.	64 – 68	66
No. 4	45 – 51	48
No. 8	34 – 40	37
No. 16	27 – 33	30
No. 30	19 – 23	21
No. 100	6 – 10	8
No. 200	4 – 6	5
Bitumen %:		
Stone	4.5 – 7.0	5.5

AGGREGATE BITUMINOUS SURFACE COURSE

Percentage by Weight Passing Sieves Job Mix Formula (JMF)		
Sieve Size	Gradation B Range ¾" Maximum	Ideal Target
1 in.	100	---
¾ in.	100	100
½ in.	99 - 100	100
¾ in.	91 - 97	94
No. 4	56 – 62	59
No. 8	36 - 42	39
No. 16	27 - 32	30
No. 30	19 - 25	22
No. 100	7 – 9	8
No. 200	5 – 7	6
Bitumen %: Stone	5.0 – 7.0	6.0

APPENDIX 2

Policy Memorandum 96-1
Item 610, Structural Portland Cement Concrete:
Job Mix Formula Approval & Production Testing
2 Pages

State of Illinois
Department of Transportation
Division of Aeronautics

POLICY MEMORANDUM

January 1, 2004

Springfield

Number 96-1

TO: CONSULTING ENGINEERS

SUBJECT: ITEM 610, STRUCTURAL PORTLAND CEMENT CONCRETE:
JOB MIX FORMULA APPROVAL & PRODUCTION TESTING.

- I. This policy memorandum addresses the Job Mix Formula (JMF) approval process and production testing requirements when Item 610 is specified for an airport construction contract.
- II. PROCESS
 - a. The contractor may submit a mix design with recent substantiating test data or he may submit a mix design generated by the Illinois Division of Highways with recent substantiating test data for approval consideration. The mix design should be submitted to the Resident Engineer.
 - b. The Resident Engineer should verify that each component of the proposed mix meets the requirements set forth under Item 610 of the *Standard Specifications for Construction of Airports* and/or the contract special provisions.
 - c. The mix design should also indicate the following information:
 1. The name, address, and producer/supplier number for the concrete.
 2. The source, producer/supplier number, gradation, quality, and SSD weight for the proposed coarse and fine aggregates.
 3. The source, producer/supplier number, type, and weight of the proposed flyash and/or cement.
 4. The source, producer/supplier number, dosage rate or dosage of all admixtures.
 - d. After completion of Items b and c above, the mix with substantiating test data shall be forwarded to the Division of Aeronautics for approval. Once the mix has been approved the production testing shall be at the rate in Section III as specified herein.

III. PRODUCTION TESTING

- a. One set of cylinders or beams, depending on the strength specified, shall be cast for acceptance testing for each day the mix is used. In addition, at least one slump and one air test shall be conducted for each day the mix is used. If more than 100 c.y. of the mix is placed in a given day, additional tests at a frequency of 1 per 100 c.y. shall be taken for strength, slump, and air. In **no** case will concrete with a slump greater than 4 inches be allowed for use on the project.
- b. If the total proposed amount of Item 610 Structural Portland Cement Concrete as calculated by the Resident Engineer is less than 50 c.y. for the entire project, the following shall apply:
 - The Resident Engineer shall provide a copy of the calculations of the quantity of Item 610 to the Division of Aeronautics.
 - One set of cylinders or beams, depending the strength specified, shall be cast for acceptance testing.
 - One air content and one slump test shall be taken for acceptance testing.
 - In no case will concrete with a slump greater than 4 inches be allowed for use on the project.
- c. The Resident Engineer shall collect actual batch weight tickets for every batch of Item 610 concrete used for the project. The actual batch weight tickets shall be kept with the project records and shall be available upon request of the Department of Transportation.

Steven J. Long, P.E.
Acting Chief Engineer

Supersedes Policy Memorandum 96-1 dated January 1, 2003

APPENDIX 3
Storm Water Pollution Prevention Plan (SWPPP)
7 Pages

Special Provisions
Peoria International Airport
Peoria, Illinois

A.I.P. Project No. 3-17-0080-XX
IL. Project No. PIA-3981



Storm Water Pollution Prevention Plan

Route _____ Marked _____
 Section Peoria International Airport Project No. PIA-3981
 County Peoria

This plan has been prepared to comply with the provisions of the NPDES Permit Number ILR10, issued by the Illinois Environmental Protection Agency for storm water discharges from Construction Site Activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

 Signature _____ Date _____

 Title _____

1. Site Description

- a. The following is a description of the construction activity which is the subject of this plan (use additional pages, as necessary):

The Metropolitan Airport Authority of Peoria and the Illinois Department of Transportation - Division of Aeronautics propose to construct a new airfield electrical vault with associated improvements at General Wayne A. Downing Peoria International Airport in Peoria, IL. The project includes site grading for the construction of the electrical vault, construction of new electrical ducts and electrical handholes, storm sewer construction, site grading for the installation of a storm sewer inlet and electrical handhole, and other incidental work as shown in the plans.

- b. The following is a description of the intended sequence of major activities which will disturb soils for major portions of the construction site, such as grubbing, excavation and grading (use additional pages, as

The improvements will consist of the following:

- Site grading for the construction of the new airfield electrical vault and adjacent parking area.
- Site grading for the installation of a new electrical handole plaza and storm sewer inlet.

- c. The total area of the construction site is estimated to be 3± acres.

The total area of the site that it is estimated will be disturbed by excavation, grading or other activities 1± acres.

- d. ~~The estimated runoff coefficients of the various areas of the site after construction activities are completed are contained in the project drainage study which is hereby incorporated by reference in this plan. Information describing the soils at the site is contained either in the Soils Report for the project, which is hereby incorporated by reference, or in an attachment to this plan.~~
- e. The design/project report, hydraulic report, or plan documents, hereby incorporated by reference, contain site map(s) indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of major soil disturbance, the location of major structural and nonstructural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to a surface water.
- f. ~~The names of receiving water(s) and areal extent of wetland acreage at the site are in the design/project report or plan documents which are incorporated by reference as a part of this plan.~~

2. Controls

This section of the plan addresses the various controls that will be implemented for each of the major construction activities described in 1.b. above. For each measure discussed, the contractor that will be responsible for its implementation is indicated. Each such contractor has signed the required certification on forms which are attached to, and a part of, this plan:

a. Erosion and Sediment Controls

- (i) Stabilization Practices. Provided below is a description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided in 2.a.(i).(A) and 2.b., stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased on all disturbed portions of the site where construction activity will not occur for a period of 21 or more calendar days.
 - (A) Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as practicable thereafter.

Description of Stabilization Practices (use additional pages, as necessary):

1. **Temporary Stabilization** - In areas of new soil embankments, existing vegetation and inlet protection will serve to intercept the waterborne silts and prevent it from entering the storm drain system or leaving the site.
2. **Permanent Stabilization** - All areas disturbed by construction operations will be stabilized with permanent seeding and mulching following final grading. Excelsior blanket will be placed in problem locations as needed.
 - **Excelsior Blanket** - A preformed protective blanket of straw or other plant residue, or plastic fibers formed into a mat, usually with a plastic mesh on one or both sides. The purposes of this practice are to protect the soil surface from raindrop impacts and overland flow during the establishment of grass or other vegetation, and to reduce soil moisture loss due to evaporation.
 - **Mulching** - The application of plant residues and other suitable materials to the soil surface. The purposes of this practice are to prevent erosion and prevent surface compaction or crusting, foster growth of vegetation, improve aesthetics, and control weeds.
 - **Temporary Seeding** - Planting rapid-growing annual grasses or small grains to provide initial, temporary cover for erosion control on disturbed areas. The purpose of this practice is to temporarily stabilize denuded areas that will not be brought to final grade or on which construction will be stopped for a period of more than 14 working days. It helps reduce runoff and erosion until permanent vegetation or other erosion control measures can be established and provides seedbed preparation and reduces problems of mud and dust production from bare soil surfaces during construction.

- (ii) **Structural Practices.** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

Description of Structural Practices (use additional pages, as necessary):

- **Inlet Protection** - In-place before all earthmoving activities to prevent waterborne silts from entering the existing storm drain system. The purpose of this practice is to help prevent sediment from entering storm drains until the contributing watershed is stabilized and allows early use of the storm drainage system.
- **Silt Fence** - A temporary barrier of entrenched geotextile fabric stretched across and attached to supporting posts used to intercept sediment-laden runoff from small drainage areas of disturbed soil. The purpose of this practice is to cause deposition of transported sediment load from sheet flows leaving disturbed areas.

b. Storm Water Management

Provided below is a description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water Act.

- (l) Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff on site; and sequential systems (which combine several practices).

The practices selected for implementation were determined on the basis of the technical guidance in Section 10-300 (Design Considerations) in Chapter 10 (Erosion and Sedimentation Control) of the Illinois Department of Transportation Drainage Manual. If practices other than those discussed in Section 10-300 are selected for implementation or if practices are applied to situations different from those covered in Section 10-300, the technical basis for such decisions will be explained below.

- (ii) Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., maintenance of hydrologic conditions, such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Description of Storm Water Management Controls (use additional pages, as necessary):

The existing storm water management system will continue to be utilized after construction.

c. Other Controls

- (i) Waste Disposal. No solid materials, including building materials, shall be discharged into Waters of the State, except as authorized by a Section 404 permit.
- (ii) The provisions of this plan shall ensure and demonstrate compliance with applicable State and/or local waste disposal, sanitary sewer or septic system regulations.
- (iii) Prevent offsite tracking of sediments and generation of dust. Stabilized construction entrances or vehicle washing racks should be installed at locations where vehicles leave the site. Where dust may be a problem, implement dust control measures such as irrigation.

d. Approved State or Local Plans

The management practices, controls and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the Illinois Environmental Protection Agency's Illinois Urban Manual, 1995. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans or site permits or storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI to be authorized to discharge under permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

Not applicable.

3. Maintenance

The following is a description of procedures that will be used to maintain, in good and effective operating conditions, vegetation, erosion and sediment control measures and other protective measures identified in this plan (use additional pages, as necessary):

During construction, the contractor shall:

- **Clean up, stabilize and grade work area to eliminate concentration of runoff.**
- **Cover the open end of pipe and/or inlets in trenches at the end of each work day.**
- **Maintain or replace erosion control items as directed by the Resident Engineer.**

All maintenance of erosion control systems will be the responsibility of the contractor. All locations where vehicles enter and exit the construction site and all other areas subject to erosion should also be inspected periodically. Inspection of these areas shall be made at least once every seven days and within 24 hours of the end of each 0.5 inches or greater rainfall, or an equivalent snowfall.

Contractor shall follow inspection procedures as described in the Inspections section below. The contractor's responsibility shall end *after* final acceptance of the project.

4. Inspections

Qualified personnel shall inspect disturbed areas of the construction site which have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site. Such inspections shall be conducted at least once every seven (7) calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater or equivalent snowfall.

- a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off site sediment tracking.
- b. Based on the results of the inspection, the description of potential pollutant sources identified in section 1 above and pollution prevention measures identified in section 2 above shall be revised as appropriate as soon as practicable after such inspection. Any changes to this plan resulting from the required inspections shall be implemented within 7 calendar days following the inspection.
- c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of this storm water pollution prevention plan, and actions taken in accordance with section 4.b. shall be made and retained as part of the plan for at least three (3) years after the date of the inspection. The report shall be signed in accordance with Part VI. G of the general permit.
- d. If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the Resident Engineer or Resident Technician shall complete and file an "Incidence of Noncompliance" (ION) report for the identified violation. The Resident Engineer or Resident Technician shall use forms provided by the Illinois Environmental Protection Agency and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of noncompliance shall be signed by a responsible authority in accordance with Part VI. G of the general permit.

The report of noncompliance shall be mailed to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Compliance Assurance Section
1021 North Grand East
Post Office Box 19276
Springfield, Illinois 62794-9276

5. Non-Storm Water Discharges

Except for flows from fire fighting activities, sources of non-storm water that is combined with storm water discharges associated with the industrial activity addressed in this plan must be described below. Appropriate pollution prevention measures, as described below, will be implemented for the non-storm water component(s) of the discharge. (Use additional pages as necessary to describe non-storm water discharges and applicable pollution control measures).

Not applicable.



Contractor Certification Statement

This certification statement is a part of the Storm Water Pollution Prevention Plan for the project described below, in accordance with NPDES Permit No. ILR10, issued by the Illinois Environmental Protection Agency on May 14, 1998.

Project Information: Construct New Airfield Electrical Vault

Route _____ Marked _____
Section Peoria International Airport Project No. PIA-3981
County Peoria

I certify under penalty of law that I understand the terms of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR 10) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Signature

Date

Title

Name of Firm

Street Address

City State

Zip Code

Telephone Number

NEW VAULT BUILDING
ARCHITECTURAL SPECIFICATIONS

CONSTRUCT NEW AIRFIELD ELECTRICAL VAULT

DIVISION 4 – MASONRY

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DIVISION 4 - MASONRY
Section 04810 - Unit Masonry Assemblies

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
1. Concrete masonry units (CMUs).
 2. Face Brick.
 3. Mortar and grout.
 4. Reinforcing steel.
 5. Masonry joint reinforcement.
 6. Ties and anchors.
 7. Embedded flashing.
 8. Miscellaneous masonry accessories.
- B. Related Sections include the following:
1. Division 7 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.

1.3 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection: For the following:
1. Face Brick.
 2. Colored mortar.
 3. Weep holes/vents.

- D. Samples for Verification: For each type and color of the following:
1. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
 2. Weep holes/vents.
- E. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Reinforcing bars.
 6. Joint reinforcement.
 7. Anchors, ties, and metal accessories.
- F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- G. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- H. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for

these characteristics, through one source from a single manufacturer for each product required.

- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- E. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects.
 - 1. Build sample panels for typical exterior wall in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness.
 - 2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
 - 3. Clean one-half of exposed faces of panels with masonry cleaner indicated.
 - 4. Protect approved sample panels from the elements with weather-resistant membrane.
 - 5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
 - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.3 CONCRETE MASONRY UNITS (CMUs)

- A. Shapes: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners, unless otherwise indicated.
- B. Concrete Masonry Units: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (13.1 MPa).
 2. Weight Classification: Normal weight.
 3. Nominal Size: 8" x 16" and 6" x 16", Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 3. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick 1/3 Running Bond: Match brick of new Terminal Building. Facing brick complying with ASTM C 216 – Norman Size (3 5/8 x 2 1/4 x 11 5/8). Provide tolerance length of brick.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Belden Brick Company; Color: 470-479 Medium A.
 - b. Or a comparable product as approved by the Architect.
 2. Grade: SW
 3. Type: FBS.

4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Application: Use where brick is exposed unless otherwise indicated.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- D. Mortar Pigments: As required to match mortar at new Terminal Building, natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
 1. Products:
 - a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
 - b. Davis Colors; True Tone Mortar Colors.
 - c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.
- E. Aggregate for Mortar: ASTM C 144.
 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C 404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 1. Products:
 - a. Addiment Incorporated; Mortar Kick.
 - b. Euclid Chemical Company (The); Accelguard 80.
 - c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.

d. Sonneborn, Div. of ChemRex; Trimix-NCA.

H. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Masonry Joint Reinforcement, General: ASTM A 951.

1. Interior Walls: Mill galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
4. Wire Size for Cross Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
5. Wire Size for Veneer Ties: W1.7 or 0.148-inch (3.8-mm) diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

D. Masonry Joint Reinforcement for Multiwythe Masonry:

1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

E. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.188-inch- (4.8-mm-) diameter, hot-dip galvanized, carbon-steel continuous wire.

2.7 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.

1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641/A 641M, Class 1 coating.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
3. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
4. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.

5. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
 6. Stainless-Steel Sheet: ASTM A 666, Type 304.
 7. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 8. Stainless Steel bars: ASTM A 276 or ASTM a 666, Type 304.
- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
 2. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
 3. Wire: Fabricate from 3/16-inch- (4.8-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire ties may be used in interior walls, unless otherwise indicated.
- D. Partition Top anchors: 0.097-inch- (2.5-mm-) thick metal plate with 3/8-inch- (10-mm-) diameter metal rod 6 inches (150 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.4 mm) thick.
 2. Copper: ASTM B 370, Temper H00 or H01, cold-rolled copper sheet, 10-oz./sq. ft. (3-kg/sq. m) weight or 0.0135 inch (0.34 mm) thick for fully concealed flashing; 16-oz./sq. ft. (5-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick elsewhere.
 3. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.6 m). Provide splice plates at joints of formed, smooth metal flashing.
 4. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond.
 - a. Products:

- 1) Cheney Flashing Company; Cheney Flashing (Dovetail) or Cheney 3-Way Flashing (Sawtooth).
 - 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
 6. Fabricate through-wall flashing with drip edge, unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees[and hemmed].
 7. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (75 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
 8. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees[and hemmed].
 9. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
 10. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Flexible Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
1. Copper-Laminated Flashing 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products:
 - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
 - 2) AFCO Products Inc.; Copper Fabric.
 - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
 - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 5) Polytite Manufacturing Corp.; Copper Fabric Flashing.
 - 6) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
 - 7) York Manufacturing, Inc.; York Copper Fabric Flashing.
- C. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use one of the following, unless otherwise indicated:
1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 1/4 to 3/8 inch (6 to 10 mm) in diameter, in length required to produce 2-inch (50-mm) exposure on exterior and 18 inches (450 mm) in cavity between wythes. Use only for weeps.
 2. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch (9-mm) OD by 4 inches (100 mm) long.
 3. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 inches (9 by 38 by 89 mm) long.

2.10 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, closed-cell product extruded with an integral skin.
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
 2. Limit cementitious materials in mortar to portland cement and lime.
 3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.
 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 4. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
 1. Pigments shall not exceed 10 percent of portland cement by weight.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

2.13 SOURCE QUALITY CONTROL

- A. Concrete Masonry Unit Test: For each type of unit furnished, per ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

- H. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm). Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.
 7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 8-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 8-inches (100-mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors [48 inches (1200 mm)] o.c., unless otherwise indicated.
 - 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section "Fire-Resistive Joint Systems."

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. (0.25 sq. m) of wall area spaced not to exceed 16 inches (406 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
 - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
- B. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.6 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
 - 1. Provide an open space not less than [1/2 inch (13 mm)] [1 inch (25 mm)] in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 - 1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 - 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick made from clay or shale as follows:
 - 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
 - 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 - 3. Build in compressible joint fillers where indicated.
 - 4. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch (13 mm) for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants."
- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section "Joint Sealants," but not less than 3/8 inch (10 mm).

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows, unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), and through inner wythe to within 1/2 inch (13 mm) of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches (50 mm) on interior face.
 3. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), and 1-1/2 inches (38 mm) into the inner wythe.
 4. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
 6. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.

7. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 8. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 9. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep/vent products to form weep holes.
 2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 3. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.
 4. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
 5. Trim wicking material flush with outside face of wall after mortar has set.
- F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.11 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than [60 inches (1520 mm)].

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 - 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
 - 8. Clean stone trim to comply with stone supplier's written instructions.
 - 9. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 04810

CONSTRUCT NEW AIRFIELD ELECTRICAL VAULT

DIVISION 6 – WOOD AND PLASTICS

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DIVISION 6 - WOOD AND PLASTIC
Section 06105 - Miscellaneous Carpentry

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rough carpentry work not specified elsewhere and generally intended for support of other work.
- B. Miscellaneous blocking, grounds, nailers and panels.
- C. Plywood.

1.02 REFERENCE TO STANDARDS

- A. ALSC - American Lumber Standards Committee, Softwood Lumber Standards.
- B. APA - American Plywood Association.
- C. AWWA - American Wood Preservers Association.
- D. NFPA - National Forest Products Association.
- E. SPIB - Southern Pine Inspection Bureau.
- F. WWPA - Western Wood Products Association.

1.03 SUBMITTALS

- A. Submit under the provisions of Special Conditions - Section 01300.
 - 1. Material certificates for dimension lumber indicated for compliance with selected minimum design values.
 - 2. Wood treatment data including treatment plant's certification of compliance with indicated requirements.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with the Lumber Grading Agency certified by ALSC and Plywood Grading Agency certified by APA.
- B. Submit manufacturer's certificates that materials used comply with selected minimum design values.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack material above ground level on uniformly spaced supports to prevent deformation.
- B. For material pressure treated with waterborne chemicals, place spacers between each bundle for air circulation.

PART 2 PRODUCTS

2.01 LUMBER, GENERAL

- A. Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Grade Stamps: Furnish lumber with each piece factory-marked with grade stamp of inspection agency that indicates grading agency, grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber, furnish pieces marked on ends or back of each piece.
- C. Sizes: Provide nominal sizes indicated, complying with PS 20 except where actual sizes are specifically noted as being required.
- D. Surfacing: Dressed lumber, S4S, unless otherwise indicated.
- E. Provide lumber with 15% moisture content at time of dressing and shipment for sizes 2" or less in thickness.

2.02 CONCEALED BOARDS

- A. Standard grade, any species graded under WWPA rules or No. 3 grade Southern Pine graded under SPIB rules.

2.03 LUMBER FOR MISCELLANEOUS USES

- A. Unless otherwise indicated, provide Standard grade lumber for support of other work, including bucks, nailers, blocking, furring, grounds, stripping and similar members.

2.04 PLYWOOD

- A. Exposed Plywood

1. Where plywood will be exposed in finished work, provide exterior type plywood for exterior use and interior type plywood with exterior glue for interior use.
 2. Where transparent or natural finish or no finish is indicated, provide Exterior Type plywood for exterior use and Interior Type with exterior glue for interior use of species indicated.
 3. Where painted finish is indicated, provide Medium Density Overlay (MDO/EXT-APA).
- B. Concealed Plywood
1. Where plywood will be concealed by other work, provide Interior Type plywood C-D Plugged Grade, unless otherwise specified.
 2. For backing panels for electrical or telephone equipment, provide fire-retardant treated Standard grade plywood with exterior glue.

2.05 FASTENERS

- A. General: Where miscellaneous carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.
- B. Nails, Wire, Brads and Staples: FS FF-N-105.
- C. Bolts: ASTM A 307, Grade A; with ASTM A 563 hex nuts and flat washers.

2.06 PRESERVATIVE WOOD TREATMENT

- A. General: Obtain preservative-treated lumber complying with AWPA Standard C2. Mark each treated item with AWPB or SPIB Quality Mark Requirements. Coat surfaces cut after treatment to comply with AWPA M4.
- B. Above-Ground Wood Treatment: Pressure treat with waterborne preservatives to a minimum retention of 0.25 pcf.
1. Kiln-dry interior dimension lumber after treatment to 19 percent maximum moisture content.
 2. Kiln-dry interior construction panels after treatment to 15 percent maximum moisture content.
 3. Treat wood items indicated and in the following circumstances:
 - a. In contact with roofing, flashing, or waterproofing.
 - b. In contact with masonry or concrete.
 - c. Within 18 inches of grade.

- C. Ground-Contact Wood Treatment: Pressure treat with waterborne preservatives to a minimum retention of 0.40 pcf.

2.07 FIRE-RETARDANT TREATMENT

- A. All wood and plywood used for interior framing construction to receive fire-retardant treatment shall comply with the AWPA standards for pressure impregnation with fire-retardant chemicals to achieve a flame spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E84 or NFPA Test 355.
- B. Where treated items are indicated to receive transparent or paint finish, use fire-retardant treatment which will not bleed through or adversely affect bond of finish.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of miscellaneous carpentry and in sizes that would require an excessive number or poor arrangement of joints.
- B. Cut and fit miscellaneous carpentry accurately. Install members plumb and true to line and level.
- C. Coat cut edges of preservative-treated wood to comply with AWPA M4.
- D. Securely fasten miscellaneous carpentry as indicated and according to applicable codes and recognized standards.
- E. Countersink nail heads on exposed carpentry work and fill holes.
- F. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

3.02 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

- A. Install where shown and where required for screeding or attachment of other work. Cut and shape to required size. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.

END OF SECTION 06105

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DIVISION 7 – THERMAL AND MOISTURE PROTECTION

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DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07210 – Building Insulation

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Insulation required for work is indicated on drawings and includes, but is not necessarily limited to:
 - 1. Rigid wall insulation.
 - 2. Rigid foundation and slab insulation.
- B. Rigid roof insulation is specified in Section 07531.

1.02 RELATED WORK

- A. Section 04200 - Unit Masonry.

1.03 QUALITY ASSURANCE

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value of 75°F), specified for each material. Provide adjusted thicknesses as directed for use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide thickness required to achieve indicated value.
- B. Fire Performance Characteristics
 - 1. Provide insulation materials identical to those who indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
 - a. ASTM E 84 - Surface Burning Characteristic
 - b. ASTM E 119 - Fire Resistance Ratings
 - c. ASTM E 136 - Combustion Characteristics
 - 2. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated and comply with governing regulations as interpreted by authorities.

1.04 SUBMITTALS

- A. All submittals shall be in accordance with Section 01300 of Division 1 of these Specifications.
- B. Product Data: Submit manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that materials comply with specified requirements. Indicate by copy of transmittal form that installer has received copy of manufacturer's instructions.

1.05 PRODUCT HANDLING

- A. Protection from Deterioration: Do not allow insulation materials to become wet or soiled or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

1.06 JOB CONDITIONS

- A. Do not proceed with installation of insulation until subsequent work that conceals insulation is ready to be performed.

PART 2 PRODUCTS

2.01 INSULATING MATERIALS

General: Provide insulating materials that comply with requirements and with referenced standards for preformed units, provide sizes to fit applications indicated, selected from manufacturers standard thickness, width and lengths.

- A. Extruded Polystyrene Board Insulation
 - 1. Rigid, polystyrene thermal insulation board with closed-cells formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 type IV 1.60 lb/cu. ft; 25 p.s.i. min. compressive strength.

2.02 MANUFACTURERS

- A. Subject to compliance with requirements, provide board insulation products from the following manufactures:
 - 1. Dow: Dow Chemical Company
 - 2. Owens-Corning Co.
 - 3. Guardian Company
 - 4. Johns/Manville Corp.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

- A. Install insulation to comply with manufacturer's written instructions applicable to products and applications indicated. If printed instructions are not available or do not apply to project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with work.

3.02 INSTALLATION OF RIGID INSULATION

- A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.
- B. Protect below-grade insulation on vertical surfaces (from damage during backfilling)

by application of protection board. Set in adhesive in accordance with recommendations of manufacturer of insulation.

END OF SECTION 07210

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07531 - EPDM Membrane Roofing

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes adhered membrane roofing system.
- B. Roof insulation.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples: For each product included in membrane roofing system.
- D. Research/evaluation reports.
- E. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.
- C. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

1.4 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing

system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 EPDM ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type I, nonreinforced uniform, flexible sheet made from EPDM, and as follows:
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
 - a. Carlisle SynTec Incorporated.
 - b. Celotex Corporation.
 - c. ERSystems.
 - d. Firestone Building Products Company.
 - e. GenFlex Roofing Systems.
 - f. International Diamond Systems.
 - g. Johns Manville International, Inc.
 - h. Mule-Hide Products Co., Inc.
 - i. Protective Coatings, Inc.
 - j. Roofing Products International, Inc.
 - k. Stafast Roofing Products.
 - l. Versico Inc.
 3. Thickness: 60 mils (1.5 mm), nominal.
 4. Exposed Face Color: Black.

2.2 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard bonding adhesive.
- D. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 3-inch- (75-mm-) wide minimum, butyl splice tape with release film.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

- F. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type as required by roofing manufacturer.
- B. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.4 INSULATION ACCESSORIES

- A. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- B. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

PART 3 EXECUTION

3.1 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.2 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry. Do not apply bonding adhesive to splice area of roofing membrane.

- D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- E. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
- F. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
- G. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.3 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars, as shown on drawings.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

END OF SECTION 07531

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07710 - Manufactured Roof Specialties

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Copings.
 2. Metal fascia and miscellaneous metal trim.
 3. Roof edge drainage systems.

1.2 PERFORMANCE REQUIREMENTS

- A. FMG Listing: Manufacture and install copings that are listed in FMG's "Approval Guide" and approved for Windstorm Classification, Class 1-90. Identify materials with FMG markings.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work.
- C. Samples: For each type of manufactured roof specialty indicated with factory-applied color finishes.
- D. Product Test Reports: Verifying compliance of copings with performance requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

2.2 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for use and finish indicated, finished as follows:
1. Surface: Smooth, flat finish.
 2. High-Performance Organic Finish: Two-coat, thermocured system with color coats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.

- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
 - 1. High-Performance Organic Finish: Two-coat, thermocured system with color coats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.

2.3 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- D. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- C. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 COPINGS

- A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage, concealed splice plates with same finish as coping caps, mitered corner units, and end cap units.
1. Available Manufacturers:
 - a. Architectural Products Co.
 - b. ATAS International, Inc.
 - c. Castle Metal Products.
 - d. Cheney Flashing Company.
 - e. Hickman, W. P. Company.
 - f. Metal-Era, Inc.
 - g. Metal-Fab Manufacturing LLC.
 - h. Petersen Aluminum Corp.
 - i. Firestone/UNA-Clad
 2. Coping Caps: Snap-on, fabricated from the following exposed metal:
 - a. Aluminum: 0.050 inch (1.2 mm).
 3. Coping Cap Color: Match new Terminal Building coping or Firestone/UNA-Clad Colonial Red.
 4. Corners: Continuously welded.
 5. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches (300 mm) wide, 0.028 inch (0.7 mm) thick, with integral cleats.

2.6 METAL FASCIA AND MISCELLANEOUS METAL TRIM

- A. Manufactured and finished aluminum sheets of same specifications as gutter and downspouts.
1. Provide metal sheets with smooth finish, no striations for rigidity.
 2. Configure metal as indicated on drawings.

2.7 ROOF EDGE DRAINAGE SYSTEMS

- A. Manufacturers:
1. Architectural Products Co.
 2. ATAS International, Inc.
 3. Berger Bros. Co.
 4. Castle Metal Products.
 5. Cheney Flashing Company.
 6. Hickman, W. P. Company.
 7. Metal-Era, Inc.
 8. Metal-Fab Manufacturing LLC.
 9. MM Systems Corporation.

10. Petersen Aluminum Corp.
 11. Firestone/UNA Clad
- B. Gutters and Downspouts: Manufactured formed gutter in uniform section lengths not exceeding 16 feet (3.6 m) , with mitered and welded or soldered corner units, end caps, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front gutter rim. Furnish with flat-stock gutter straps and gutter support brackets and expansion joints and expansion-joint covers fabricated from same metal as gutters.
1. Fabricate gutter from the following exposed metal:
 - a. Aluminum: 0.050 inch (1.2 mm) thick.
 2. Gutter Style: Beveled 6" x 6".
 3. Downspouts: Rectangular closed-face 4" x 5" with mitered elbows, manufactured from the following exposed metal. Furnish wall brackets, from same material and finish as downspouts, with anchors.
 - a. Formed Aluminum: 0.050 inch (1.2 mm) thick.
 4. Color: Match coping.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
1. Install manufactured roof specialties with provisions for thermal and structural movement.
 2. Torch cutting of manufactured roof specialties is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
- C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.
- D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

- E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet (3.6 m) with no unplanned joints within 18 inches (450 mm) of corners or intersections.
- F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- G. Seal joints with sealant as required by manufacturer of roofing specialties.

3.2 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings to resist uplift and outward forces according to performance requirements.
 - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at 30-inch (760-mm) centers.

3.3 ROOF EDGE DRAINAGE SYSTEM INSTALLATION

- A. General: Install gutters and downspouts to produce a complete roof drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Gutters: Join and seal gutter lengths. Attach gutters to firmly anchored gutter brackets spaced not more than 36 inches (900 mm) apart. Slope gutters to downspouts.
 - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.2 m) apart. Install expansion joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. in between.

END OF SECTION 07710

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07920 - Joint Sealants

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:
 - 1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 2. Exterior joints in horizontal traffic surfaces.
 - 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 4. Interior joints in horizontal traffic surfaces.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Compatibility and adhesion test reports.

1.4 QUALITY ASSURANCE

- A. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates according to the method in ASTM C 1193 that is appropriate for the types of Project joints.

1.5 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to re-

pair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Architectural Sealants: 250 g/L.
 2. Nonmembrane Roof Sealants: 300 g/L.
 3. Single-Ply Roof Membrane Sealants: 450 g/L.
 4. Sealant Primers for Nonporous Substrates: 250 g/L.
 5. Sealants Primers for Porous Substrates: 775 g/L.
 6. Modified Bituminous Sealant Primers: 500 g/L.
- C. Colors of Exposed Joints Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Multicomponent Nonsag Polysulfide Sealant:
1. Available Products:
 - a. Pacific Polymers, Inc.; Elasto-Seal 227 Type II (Gun Grade).
 - b. Pecora Corporation; Synthacalk GC-2+.
 - c. Polymeric Systems Inc.; PSI-350.
 - d. PolySpec Corp.; T-2235-M.
 - e. PolySpec Corp.; T-2282.
 - f. PolySpec Corp.; Thiokol 2P.
 - g. Sonneborn, Division of ChemRex Inc.; Sonolastic Polysulfide Sealant.
 2. Type and Grade: M (multicomponent) and NS (nonsag).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic), NT (nontraffic), T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- F. Multicomponent Nonsag Immersible Polysulfide Sealant:
1. Available Products:
 - a. Pecora Corporation; GC-2+
 - b. PolySpec Corp.; T-2235-M.
 2. Type and Grade: M (multicomponent) and NS (nonsag).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic), NT (nontraffic), and I (immersible), Class 1.
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- G. Multicomponent Pourable Polysulfide Sealant:
1. Available Products:
 - a. Meadows, W. R., Inc.; Deck-O-Seal.
 - b. Pacific Polymers, Inc.; Elastoseal 227 Type I (Pourable).
 2. Type and Grade: M (multicomponent) and P (pourable).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

- H. Single-Component Nonsag Polysulfide Sealant:
1. Available Products:
 - a. Pacific Polymers, Inc.; Elastoseal 230 Type I (Gun Grade).
 - b. Polymeric Systems Inc.; PSI-7000.
 2. Type and Grade: S (single component) and NS (nonsag).
 3. Class: 25.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- I. Multicomponent Nonsag Neutral-Curing Silicone Sealant:
1. Available Products:
 - a. Dow Corning Corporation; 756 H.P.
 2. Type and Grade: M (multicomponent) and P (pourable).
 3. Class: 50.
 4. Use Related to Exposure: NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- J. Single-Component Pourable Neutral-Curing Silicone Sealant:
1. Available Products:
 - a. Dow Corning Corporation; 890-SL.
 - b. Pecora Corporation; 300 Pavement Sealant (Self Leveling).
 - c. Dow Corning Corporation; SL Parking Structure Sealant.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 100/50.
 4. Uses Related to Exposure: NT and T (traffic).
 5. Uses Related to Joint Substrates: M, A and O, as applicable to joint substrates indicated.
- K. Single-Component Neutral- and Basic-Curing Silicone Sealant:
1. Available Products:
 - a. Dow Corning Corporation; 790.
 - b. GE Silicones; SilPruf LM SCS2700.
 - c. Tremco; Spectrem 1 (Basic).
 - d. GE Silicones; SilPruf SCS2000.
 - e. Pecora Corporation; 864.
 - f. Pecora Corporation; 890.
 - g. Polymeric Systems Inc.; PSI-641.
 - h. Sonneborn, Division of ChemRex Inc.; Omniseal.

- i. Tremco; Spectrem 3.
- j. Dow Corning Corporation; 791.
- k. Dow Corning Corporation; 795.
- l. GE Silicones; SilPruf NB SCS9000.
- m. GE Silicones; UltraPruf II SCS2900.
- n. Pecora Corporation; 865.
- o. Pecora Corporation; 895.
- p. Pecora Corporation; 898.

- 2. Type and Grade: S (single component) and NS (nonsag).
- 3. Class: 50.
- 4. Use Related to Exposure: NT (nontraffic).
- 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

L. Single-Component Neutral-Curing Silicone Sealant:

- 1. Available Products:
 - a. Dow Corning Corporation; 799.
 - b. GE Silicones; UltraGlaze SSG4000.
 - c. GE Silicones; UltraGlaze SSG4000AC.
 - d. Polymeric Systems Inc.; PSI-631.
 - e. Schnee-Morehead, Inc.; SM5731 Poly-Glaze Plus.
 - f. Tremco; Proglaze SG.
 - g. Tremco; Spectrem 2.
 - h. Tremco; Tremsil 600.
- 2. Type and Grade: S (single component) and NS (nonsag).
- 3. Class: 25.
- 4. Use Related to Exposure: NT (nontraffic).
- 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

M. Single-Component Acid-Curing Silicone Sealant:

- 1. Available Products:
 - a. Bostik Findley; Chem-Calk 1200.
 - b. Dow Corning Corporation; 999-A.
 - c. Dow Corning Corporation; Trademate Glazing.
 - d. GE Silicones; Construction SCS1200.
 - e. GE Silicones; Contractors SCS1000.
 - f. GE Silicones; Sanitary SCS1700.
 - g. Pecora Corporation; 860.
 - h. Polymeric Systems Inc.; PSI-601.
 - i. Polymeric Systems Inc.; PSI-613.
 - j. Schnee-Morehead, Inc.; SM5732 Polyglaze.
 - k. Sonneborn, Division of ChemRex Inc.; OmniPlus.

- l. Tremco; Proglaze.
 - m. Tremco; Tremsil 200.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
- N. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:
- 1. Available Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- O. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:
- 1. Available Products:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary SCS1700.
 - c. Tremco; Tremsil 200 Clear.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
- P. Multicomponent Nonsag Urethane Sealant:
- 1. Available Products:
 - a. Pecora Corporation; Dynatrol II.
 - b. Tremco; Dymeric 511.
 - c. Tremco; Vulkem 922.
 - 2. Type and Grade: M (multicomponent) and NS (nonsag).
 - 3. Class: 50.
 - 4. Uses Related to Exposure: NT (nontraffic) and T (traffic).
 - 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- Q. Multicomponent Nonsag Urethane Sealant :

1. Available Products:
 - a. Schnee-Morehead, Inc.; Permathane SM 7200.
 - b. Sika Corporation, Inc.; Sikaflex - 2c NS TG.
 - c. Sonneborn, Division of ChemRex Inc.; NP 2.
 - d. Tremco; Vulkem 227.
 - e. Tremco; Vulkem 322 DS.
2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
5. Uses Related to Joint Substrates: M, [G,]A, and, as applicable to joint substrates indicated, O.

R. Multicomponent Nonsag Urethane Sealant:

1. Available Products:
 - a. Bostik Findley; Chem-Calk 500.
 - b. Pacific Polymers, Inc.; Elasto-Thane 227 R Type II (Gun Grade).
 - c. Polymeric Systems Inc.; PSI-270.
 - d. Tremco; Dymeric.
2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Additional Movement Capability: 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

S. Multicomponent Nonsag Urethane Sealant:

1. Available Products:
 - a. Pacific Polymers, Inc.; Elasto-Thane 227 High Shore Type II (Gun Grade).
 - b. Pacific Polymers, Inc.; Elasto-Thane 227 Type II (Gun Grade).
 - c. Pecora Corporation; Dynatred.
 - d. Polymeric Systems Inc.; PSI-270.
2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

T. Multicomponent Nonsag Immersible Urethane Sealant:

1. Available Products:

- a. Pacific Polymers, Inc.; Elasto-Thane 227 R Type II (Gun Grade).
 - b. Pecora Corporation; Dynatred.
 - c. Tremco; Vulkem 227.
 - d. Tremco; Vulkem 322 DS.
- 2. Type and Grade: M (multicomponent) and NS (nonsag).
 - 3. Class: 25.
 - 4. Uses Related to Exposure: T (traffic), NT (nontraffic) and I (immersible), Class 1.
 - 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

U. Multicomponent Pourable Urethane Sealant:

- 1. Available Products:
 - a. Bostik Findley; Chem-Calk 550.
 - b. Meadows, W. R., Inc.; POURTHANE.
 - c. Pacific Polymers, Inc.; Elasto-Thane 227 High Shore Type I (Self Leveling).
 - d. Pacific Polymers, Inc.; Elasto-Thane 227 Type I (Self Leveling).
 - e. Pecora Corporation; Urexpan NR-200.
 - f. Polymeric Systems Inc.; PSI-270SL.
 - g. Schnee-Morehead, Inc.; Permathane SM 7201.
 - h. Tremco; THC-901.
 - i. Tremco; THC-900.
 - j. Tremco; Vulkem 245.
 - k. Pecora Corporation; Urexpan NR 300, Type H.
 - l. Pecora Corporation; Urexpan NR 300, Type M.
- 2. Type and Grade: M (multicomponent) and P (pourable).
- 3. Class: 25.
- 4. Use Related to Exposure: T (traffic).
- 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

V. Multicomponent Pourable Urethane Sealant:

- 1. Available Products:
 - a. Pecora Corporation; Dynatrol II-SG.
 - b. Sika Corporation, Inc.; Sikaflex - 2c SL.
 - c. Sonneborn, Division of ChemRex Inc.; SL 2.
- 2. Type and Grade: M (multicomponent) and P (pourable).
- 3. Class: 25.
- 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
- 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

W. Multicomponent Pourable Immersible Urethane Sealant:

1. Available Products:
 - a. Pacific Polymers, Inc.; Elasto-Thane 227 R Type II (Self Leveling).
 - b. Tremco; Vulkem 245.
2. Type and Grade: M (multicomponent) and P (pourable).
3. Class: 25.
4. Uses Related to Exposure: T (traffic), NT (nontraffic) and I (immersible), Class 1.
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

X. Single-Component Nonsag Urethane Sealant:

1. Available Products:
 - a. Sika Corporation, Inc.; Sikaflex - 1a.
 - b. Sonneborn, Division of ChemRex Inc.; Ultra.
 - c. Sonneborn, Division of ChemRex Inc.; NP 1.
 - d. Tremco; Vulkem 116.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

Y. Single-Component Nonsag Urethane Sealant:

1. Available Products:
 - a. Bostik Findley; Chem-Calk 900.
 - b. Bostik Findley; Chem-Calk 915.
 - c. Bostik Findley; Chem-Calk 916 Textured.
 - d. Bostik Findley; Chem-Calk 2639.
 - e. Pecora Corporation; Dynatrol I-XL.
 - f. Polymeric Systems Inc.; Flexiprene 1000.
 - g. Polymeric Systems Inc.; PSI-901.
 - h. Schnee-Morehead, Inc.; Permathane SM7100.
 - i. Schnee-Morehead, Inc.; Permathane SM7108.
 - j. Schnee-Morehead, Inc.; Permathane SM7110.
 - k. Sika Corporation, Inc.; Sikaflex 15LMg
 - l. Tremco; DyMonic.
 - m. Tremco; Vulkem 921.
 - n. Tremco; Vulkem 931.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).

5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- Z. Multicomponent Nonsag Immersible Urethane Sealant:
1. Available Products:
 - a. Tremco; Vulkem 116.
 - b. Tremco; Vulkem 921.
 2. Type and Grade: M (multicomponent) and P (pourable).
 3. Class: 25.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic) and I (immersible), Class 1.
 5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
- AA. Single-Component Pourable Urethane Sealant:
1. Available Products:
 - a. Sika Corporation, Inc.; Sikaflex - 1CSL.
 - b. Sonneborn, Division of ChemRex Inc.; SL 1.
 - c. Tremco; Vulkem Nova 300 SSL.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 50.
 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
- BB. Single-Component Pourable Urethane Sealant:
1. Available Products:
 - a. Bostik Findley; Chem-Calk 950.
 - b. Pecora Corporation; Urexpan NR-201.
 - c. Polymeric Systems Inc.; Flexiprene 952.
 - d. Schnee-Morehead, Inc.; Permathane SM7101.
 - e. Tremco; Tremflex S/L.
 - f. Tremco; Vulkem 45.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 25.
 4. Use Related to Exposure: T (traffic).
 5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

2.4 SOLVENT-RELEASE JOINT SEALANTS

- A. Acrylic-Based Solvent-Release Joint Sealant: Comply with ASTM C 1311 or FS TT-S-00230.
 - 1. Available Products:
 - a. Schnee-Moorehead, Inc.; Acryl-R Acrylic Sealant.
 - b. Tremco; Mono 555.
- B. Butyl-Rubber-Based Solvent-Release Joint Sealant: Comply with ASTM C 1085.
 - 1. Available Products:
 - a. Bostik Findley; Bostik 300.
 - b. Fuller, H. B. Company; SC-0296.
 - c. Fuller, H. B. Company; SC-0288.
 - d. Pecora Corporation; BC-158.
 - e. Polymeric Systems Inc.; PSI-301.
 - f. Sonneborn, Division of ChemRex Inc.; Sonneborn Multi-Purpose Sealant.
 - g. Tremco; Tremco Butyl Sealant.
- C. Pigmented Narrow-Joint Sealant: Manufacturer's standard, solvent-release-curing, pigmented, synthetic-rubber sealant complying with AAMA 803.3 and formulated for sealing joints 3/16 inch (5 mm) or smaller in width.
 - 1. Available Products:
 - a. Fuller, H. B. Company; SC-0289.
 - b. Schnee-Morehead, Inc.; SM 5504 Acryl-R Narrow Joint Sealant.

2.5 LATEX JOINT SEALANTS

- A. Latex Sealant: Comply with ASTM C 834, Type O P, Grade NF.
- B. Available Products:
 - 1. Bostik Findley; Chem-Calk 600.
 - 2. Pecora Corporation; AC-20+.
 - 3. Schnee-Morehead, Inc.; SM 8200.
 - 4. Sonneborn, Division of ChemRex Inc.; Sonolac.
 - 5. Tremco; Tremflex 834.

2.6 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Available Products:

- a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
 - 1. Available Products:
 - a. Pecora Corporation; BA-98.
 - b. Tremco; Tremco Acoustical Sealant.

2.7 PREFORMED JOINT SEALANTS

- A. Preformed Silicone-Sealant System: Manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
 - 1. Available Products:
 - a. Dow Corning Corporation; 123 Silicone Seal.
 - b. GE Silicones; UltraSpan US1100.
 - c. Pecora Corporation; Sil-Span.
 - d. Tremco; Spectrem Ez Seal.
- B. Preformed Foam Sealant: Manufacturer's standard mildew-resistant, nonmigratory, nonstaining, preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent.
 - 1. Available Products:
 - a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
 - b. Illbruck Sealant Systems, Inc.; Wilseal 600.
 - c. Polytite Manufacturing Corporation; Polytite B.
 - d. Polytite Manufacturing Corporation; Polytite Standard.
 - e. Sandell Manufacturing Co., Inc.; Polyseal.
 - f. Density: Manufacturer's standard.

2.8 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin), or

any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
 - 2. Remove laitance and form-release agents from concrete.

- a. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. **Joint Priming:** Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

- A. **Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. **Acoustical Sealant Application Standard:** Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. **Tooling of Nonsag Sealants:** Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- G. Installation of Preformed Silicone-Sealant System: Comply with manufacturer's written instructions.
- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.
- I. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 07920

CONSTRUCT NEW AIRFIELD ELECTRICAL VAULT

DIVISION 8 – DOORS AND WINDOWS

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DIVISION 8 - DOORS AND WINDOWS
Section 081113 - Hollow Metal Doors and Frames

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required.
- E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.3 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10B, UL 10C.
- B. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Amweld Building Products, LLC.
 2. Benchmark; a division of Therma-Tru Corporation.
 3. Ceco Door Products; an Assa Abloy Group company.
 4. Curries Company; an Assa Abloy Group company.
 5. Deansteel Manufacturing Company, Inc.
 6. Firedoor Corporation.

7. Fleming Door Products Ltd.; an Assa Abloy Group company.
8. Kewanee Corporation (The).
9. Mesker Door Inc.
10. Pioneer Industries, Inc.
11. Security Metal Products Corp.
12. Steelcraft; an Ingersoll-Rand company.
13. Windsor Republic Doors.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Comply with ANSI/SDI A250.8.
 1. Design: Flush panel .
 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
 - a. Fire Door Core: As required to provide fire-protection ratings indicated.
 - b. Thermal-Rated (Insulated) Doors: R-value of not less than 6 deg F x h x sq. ft./Btu (1.057 K x sq. m/W) when tested according to ASTM C 1363.

3. Vertical Edges for Single-Acting Doors: Square edge.
 4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
 5. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush)
- C. Hardware Reinforcement: ANSI/SDI A250.6.

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate frames with mitered or coped corners.
 2. Fabricate frames as full profile welded unless otherwise indicated.
- C. Hardware Reinforcement: ANSI/SDI A250.6.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 ACCESSORIES

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

2.7 FABRICATION

- A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- B. Hollow Metal Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
 - 2. Glazed Lites: Factory cut openings in doors.
 - 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 6. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1. Two anchors per jamb up to 60 inches (1524 mm) high.
 - 2. Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3. Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
 - 4. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
- D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 electrical Sections.

2.8 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 - 1. Shop Primer: ANSI/SDI A250.10.
- B. Field finish paint.
 - 1. Color and Gloss: Match brick color, semi-gloss.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - e. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

- c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- B. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

DIVISION 8 - DOORS AND WINDOWS
Section 087100 - Door Hardware

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Commercial door hardware.

1.2 SUBMITTALS

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

B. Samples: For each exposed finish.

C. Other Action Submittals:

1. Door Hardware Sets: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as procedures and diagrams.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, and material of each door and frame.
 - 2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
 - 3) Complete designations of every item required for each door or opening including name and manufacturer.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced

in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- D. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.5 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.

2.2 HINGES, GENERAL

- A. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Hinge Base Metal: Unless otherwise indicated, provide the following:
 - 1. Exterior Hinges: Stainless steel, with stainless-steel pin.

2. Interior Hinges: Steel, with steel pin.
 3. Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
- C. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors.
- D. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
 2. Wood Screws: For wood doors and frames.
 3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
 4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors. Finish screw heads to match surface of hinges.

2.3 HINGES

- A. Butts and Hinges: BHMA A156.1.
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Available Manufacturers:
1. Baldwin Hardware Corporation (BH).
 2. Bommer Industries, Inc. (BI).
 3. Cal-Royal Products, Inc. (CRP).
 4. Hager Companies (HAG).
 5. Lawrence Brothers, Inc. (LB).
 6. McKinney Products Company; an ASSA ABLOY Group company (MCK).
 7. PBB, Inc. (PBB).
 8. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2.4 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Lock Trim:
1. Levers: Schlage, D-Series, Athens.
- D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.

- E. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- F. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Bored Locks: BHMA A156.2.
- B. Bored Locks: BHMA A156.2, Grade 1 Series 4000.
 - 1. Available Manufacturers:
 - a. Arrow USA; an ASSA ABLOY Group company (ARW).
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - d. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
 - e. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.6 AUXILIARY LOCKS AND LATCHES

- A. Auxiliary Locks: BHMA A156.5, Grade 1 with interchangeable core. Single cylinder dead bolt with thumb turn.
 - 1. Manufacturers:
 - a. Arrow USA; an ASSA ABLOY Group company (ARW).
 - b. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - c. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
 - d. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.7 EXIT DEVICES

- A. Exit Devices: BHMA A156.3, Grade 1, Rim Type.
- B. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).

- C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- F. Outside Trim: Lever with cylinder, material and finish to match locksets, unless otherwise indicated.
 - 1. Match design for locksets and latchsets, unless otherwise indicated.
- G. Through Bolts: For exit devices and trim on metal doors.
- H. Available Manufacturers:
 - 1. Arrow USA; an ASSA ABLOY Group company (ARW).
 - 2. Cal-Royal Products, Inc. (CRP).
 - 3. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - 4. DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
 - 5. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
 - 6. Monarch Exit Devices & Door Hardware; an Ingersoll-Rand Company (MON).
 - 7. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - 8. Von Duprin; an Ingersoll-Rand Company (VD).
 - 9. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.8 LOCK CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 1.
- B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six.
- C. Permanent Cores: Manufacturer's standard; finish face to match lockset; with removable cores.

- D. Construction Keying: Comply with the following:
 - 1. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 5 construction master keys.
- E. Manufacturer: Same manufacturer as for locks and latches.

2.9 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into master key system.
 - 1. Existing System: Master key or grand master key locks to Owner's existing system.
- B. Keys: Nickel silver permanently inscribed with a visual key control number and including the notation "DO NOT DUPLICATE."
 - 1. Quantity: In addition to one extra key blank for each lock, provide three cylinder change keys and five master keys.

2.10 OPERATING TRIM

- A. Standard: BHMA A156.6.
- B. Materials: Fabricate from stainless steel, unless otherwise indicated.
- C. Available Manufacturers:
 - 1. Burns Manufacturing Incorporated (BM).
 - 2. Don-Jo Mfg., Inc. (DJO).
 - 3. Forms + Surfaces (FS).
 - 4. Hager Companies (HAG).
 - 5. Hiawatha, Inc. (HIA).
 - 6. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - 7. Rockwood Manufacturing Company (RM).
 - 8. Trimco (TBM).

2.11 CLOSERS

- A. Accessibility Requirements: Comply with the following maximum opening-force requirements:
 - 1. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - 2. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - 3. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

- B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
- C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- D. Surface Closers: BHMA A156.4, Grade 1. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
 - 1. Available Manufacturers:
 - a. Arrow USA; an ASSA ABLOY Group company (ARW).
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - c. DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
 - d. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
 - e. LCN Closers; an Ingersoll-Rand Company (LCN).
 - f. Norton Door Controls; an ASSA ABLOY Group company (NDC).
 - g. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
 - h. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - i. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.12 PROTECTIVE TRIM UNITS

- A. Size: 1-1/2 inches (38 mm) less than door width on push side and 1/2 inch (13 mm) less than door width on pull side, by 12" height.
- B. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:
 - 1. Material: 0.050-inch- (1.3-mm-) thick stainless steel.
 - 2. Available Manufacturers:
 - a. American Floor Products Co., Inc. (AFP).
 - b. Baldwin Hardware Corporation (BH).
 - c. Burns Manufacturing Incorporated (BM).
 - d. Don-Jo Mfg., Inc. (DJO).
 - e. Hager Companies (HAG).
 - f. Hiawatha, Inc. (HIA).
 - g. IPC Door and Wall Protection Systems, Inc.; Div. of InPro Corporation (IPC).
 - h. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - i. Pawling Corporation (PAW).
 - j. Rockwood Manufacturing Company (RM).

k. Trimco (TBM).

2.13 STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 1.
1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
- B. Silencers for Door Frames: BHMA A156.16, Grade 1; neoprene or rubber; fabricated for drilled-in application to frame.
- C. Available Manufacturers:
1. Architectural Builders Hardware Mfg., Inc. (ABH).
 2. Baldwin Hardware Corporation (BH).
 3. Burns Manufacturing Incorporated (BM).
 4. Cal-Royal Products, Inc. (CRP).
 5. Don-Jo Mfg., Inc. (DJO).
 6. Door Controls International (DCI).
 7. DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
 8. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
 9. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 10. Hager Companies (HAG).
 11. HES, Inc.; an ASSA ABLOY Group company (HES).
 12. Hiawatha, Inc. (HIA).
 13. IVES Hardware; an Ingersoll-Rand Company (IVS).
 14. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
 15. Rockwood Manufacturing Company (RM).
 16. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 17. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
 18. Trimco (TBM).

2.14 DOOR GASKETING

- A. Standard: BHMA A156.22.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
 - D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
 - E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
 - F. Gasketing Materials: ASTM D 2000 and AAMA 701/702.
 - G. Available Manufacturers:
 1. Hager Companies (HAG).
 2. M-D Building Products, Inc. (MD).
 3. National Guard Products (NGP).
 4. Pemko Manufacturing Co. (PEM).
 5. Reese Enterprises (RE).
 6. Sealeze; a unit of Jason Incorporated (SEL).
 7. Zero International (ZRO).

2.15 THRESHOLDS

- A. Standard: BHMA A156.21.
- B. Accessibility Requirements: Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch (13 mm) high.
- D. Available Manufacturers:
 1. Hager Companies (HAG).
 2. M-D Building Products, Inc. (MD).
 3. National Guard Products (NGP).
 4. Pemko Manufacturing Co. (PEM).
 5. Reese Enterprises (RE).
 6. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
 7. Sealeze; a unit of Jason Incorporated (SEL).
 8. Zero International (ZRO).

2.16 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Comply with NFPA 80 for fasteners of door hardware in fire-rated applications.
- C. Finishes: All metallic hardware to have US26D or US32D finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.
- C. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- F. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

3.2 DOOR HARDWARE SETS

A. Door 101A

Active Leaf:

3	Hinges
1	Closer
1	Panic exit device (rim)
1	Flat astragal
1	Weather gasket
1	Door sweep
1	Threshold (under both doors)
1	Kickplate

Inactive Leaf:

3	Hinges
2	Surface bolts
1	Weather gasket
1	Door sweep

B. Door 101B

3 each	Hinges
1 each	Closer
1 each	Panic exit device (rim)
1 each	Weather gasket
1 each	Threshold
1 each	Door sweep

END OF SECTION 087100

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Door Hardware

CONSTRUCT NEW AIRFIELD ELECTRICAL VAULT

DIVISION 9 – FINISHES

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DIVISION 9 - FINISHES
Section 099123 – Painting

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete masonry units (CMU).
2. Galvanized metal.

1.2 SUBMITTALS

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

B. Samples: For each finish and for each color and texture required.

C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
- C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
 - 5. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 INTERIOR PAINTING SCHEDULE

- A. CMU Substrates:
 - 1. Latex System: MPI INT 4.2A.
 - a. Prime Coat: Interior/exterior latex block filler.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: Interior latex (gloss).

B. Galvanized-Metal Substrates:

1. Water-Based Dry-Fall System: MPI INT 5.3H.
 - a. Prime Coat: Waterborne dry fall.
 - b. Topcoat: Waterborne dry fall.
2. Alkyd Dry-Fall System: MPI INT 5.3F.
 - a. Prime Coat: Cementitious galvanized-metal primer.
 - b. Topcoat: Interior alkyd dry fog/fall.
3. Latex System: MPI INT 5.3A.
 - a. Prime Coat: Cementitious galvanized-metal primer.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: Interior latex (semigloss).
4. Latex Over Waterborne Primer System: MPI INT 5.3J.
 - a. Prime Coat: Waterborne galvanized-metal primer.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: Interior latex (semigloss).
5. Alkyd System: MPI INT 5.3C.
 - a. Prime Coat: Cementitious galvanized-metal primer.
 - b. Intermediate Coat: Interior alkyd matching topcoat.
 - c. Topcoat: Interior alkyd (semigloss).

END OF SECTION 099123

CONSTRUCT NEW AIRFIELD ELECTRICAL VAULT

DIVISION 10 – SPECIALTIES

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10520	Fire-Protection Specialties	10520-1 - 10520-2

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Portable fire extinguishers.
 - 2. Mounting brackets for fire extinguishers.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Fire Extinguishers: Include rating and classification.

1.03 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

2.02 PORTABLE FIRE EXTINGUISHERS

- A. Available Manufacturers:
 - 1. JL Industries, Inc.
 - 2. Larsen's Manufacturing Company.
 - 3. Potter Roemer; Div. of Smith Industries, Inc.
- B. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

- C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.03 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 1. Color: Red.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or undercharged units.
- B. Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10520

NEW VAULT BUILDING
STRUCTURAL SPECIFICATIONS

DIVISION 2 – SITE WORK

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02317	Backfilling and Compacting	02317 1-8

DIVISION 2 – SITEWORK
Section 02316 – Excavating

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavation and stockpiling of existing earth materials and dewatering of excavations as required under the project.

1.02 RELATED SECTIONS

- A. Section 02317 – Backfilling and Compacting.

1.03 REFERENCE TO STANDARDS

- A. American Safety for Testing and Materials (ASTM).
- B. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction adopted January 1, 2007 and applicable sections of the Supplemental Specifications and Recurring Special Provisions adopted January 1, 2009, hereinafter referred to as IDOT Standard Specifications.
- C. Occupational Safety and Health Administration (OSHA): Current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.

1.04 REGULATORY REQUIREMENTS

- A. Codes and Standards
 - 1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
 - 2. Prior to the commencement of construction, the Contractor shall be aware of, and become familiar with applicable local, state and federal safety regulations, including the current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
 - 3. Additionally, the Contractor shall be aware that slope height, slope inclination and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state or federal safety regulations.

1.05 COORDINATION

- A. Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by the Engineer and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice prior to enacting an approved temporary interruption.

1.06 SUBMITTALS

- A. Submit under the provisions of Division 1, Section 01330 – Submittal Procedures. All materials shall be submitted for approval. Samples shall be submitted when requested by the Engineer.
- B. The Contractor shall submit a list of equipment intended to be utilized on this project to the Engineer.

PART 2 PRODUCTS – Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Site Information
 - 1. Data indicated on subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner, and Engineer will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.
 - 2. Contractor shall be responsible for determining the actual ground water elevation and soil conditions at the specific site prior to commencing with the excavation. It may be expedient to drill auger holes, excavate test pits or make additional soil borings at or adjacent to the construction area immediately prior to construction to determine the prevailing soil conditions and water table elevation. It is the Contractor's responsibility to make auger holes, excavate test pits or make additional soil borings as he deems appropriate to determine the ground water and soil conditions that will be encountered. Additional test borings and other exploratory operations made by the Contractor shall be at no cost to the Owner.

3.02 PREPARATION

- A. Establish extent of excavated areas.
- B. Set specified lines, levels, contours and grades.
- C. Maintain bench marks, monuments and other reference points.
- D. Before starting excavation, establish location and extent of underground utilities occurring in work area. Contact Joint Utility Locating Information For Excavators (J.U.L.I.E.) (800)892-0123, or 811 and all other utility companies on the project site which are not members of this system. If the Contractor ruptures or causes damage to such objects while digging or during any construction, it is the responsibility of the party performing the construction work to pay the utility company for repairs and such costs shall not be borne by the Owner or the Engineer.

- E. Maintain, reroute or extend existing utility lines to remain which pass through work area.

3.03 EXCAVATION

A. General

1. Excavation consists of removal of material encountered when establishing required grade and subgrade elevations and cross sections.
2. The Contractor is solely responsible for designing and constructing stable excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. All excavations shall comply with applicable local, state and federal safety regulations including the current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
3. All sheeting, shoring and bracing of trenches, pits and excavations shall be the sole responsibility of the Contractor.
4. Construction site safety is the sole responsibility of the Contractor, including but not limited to, the means, methods, and sequencing of construction operations.
5. Earth excavation consists of removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on sub-surface conditions, and other materials encountered that are not classified as unauthorized excavation.

B. Unauthorized Excavation

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at Contractor's expense. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, only when determined necessary by the Engineer. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

C. Additional Excavation

1. When excavation has reached required sub-grade elevations, notify the Engineer who will make an inspection of conditions. If unsuitable bearing materials are encountered at required sub-grade elevations, carry excavations deeper and replace excavated material as directed by the Engineer. Removal of unsuitable material and its replacement as directed

will be paid on basis of contract conditions relative to change in work.

D. Dewatering

1. Prevent surface water and subsurface or ground water from flowing into excavation and from flooding project site and surrounding area.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
4. Dewatering for supported excavations shall be accomplished in accordance with Articles 3.03.D.1 through 3.03.D.3 (above) and Section 02140 – Dewatering.

E. Material Storage

1. Stockpile satisfactory excavated materials in the location designated by the Engineer, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain. Contain excavated silt/soil runoff with hay bales and silt fences as directed by the Engineer and in accordance with Local, State and Federal Requirements.

F. Excavation for Structure

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction and for inspection.
2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work. After completion of excavation and prior to placement of concrete for footings, excavations shall be inspected by the Engineer to insure that suitable bearing has been obtained. Twenty-four (24) hours notice shall be given to the Engineer.
3. Placing of footings and foundations on earth fill will not be permitted. Fill excess cuts under footings and foundations with IDOT CA-6 Class C compacted to 100% Standard Proctor ASTM D698 and fill any excess cuts under slabs with lean concrete.

G. Excavation Near Utilities

1. Protect, support, shore, brace, etc. all utility services uncovered by excavation.
2. Accurately locate and record abandoned and active utility lines rerouted or extended, on Project Record Documents.
3. Repair damaged utilities to the satisfaction of the Utility Owner.

H. Disposal of Excess and Waste Materials

1. Removal from Owner's Property
 - a. Remove waste materials, trash and debris and legally dispose of it off Owner's property at no expense to Owner.
2. Excess Material
 - a. Excess excavated material shall be removed from the site and properly disposed of.

3.04 FIELD QUALITY CONTROL

- A. The Contractor shall allow bearing surfaces at the bottom of excavations to be inspected by the Engineer prior to placement of any backfill materials.
- B. Proofrolling: Subgrades shall be proofrolled to detect areas of insufficient compaction. Proofrolling shall be accomplished by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck with a maximum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while under the supervision and direction of the independent testing laboratory. Areas of failure shall be excavated and recompacted as specified herein. Continual failure areas shall be stabilized in accordance with Section 02340 at no additional cost to Owner. Subgrade exposed longer than 48 hours or on which precipitation has occurred shall be re-proofrolled.

3.05 PROTECTION

A. Stability of Excavation

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
2. Comply with current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
3. Where indicated on the drawings, sloped and vertical sides of excavations

shall be stabilized with an erosion control system as specified in Section 02370 – Erosion Control.

B. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F (1°C).

C. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required by authorities having jurisdiction.
2. Protect structures, landscaping, utilities, sidewalks, pavements or other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
3. Comply with current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.

END OF SECTION 02316

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Backfilling and compacting for structures, pavement and general site.
- B. Site rough and finish grading.
- C. Preparation of subgrade for slabs, pavements and installation of footings.
- D. Standard Proctor density testing and compaction testing.

1.02 RELATED SECTIONS

- A. Section 02316 – Excavating.
- B. Division 3 – Concrete.
- C. Division 15 – Mechanical.
- D. Division 16 – Electrical.

1.03 REFERENCE TO STANDARDS

- A. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
- B. ASTM D 4253 Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
- C. ASTM D 4254 Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- D. Illinois Department of Transportation Standard Specifications for Road and Bridge Construction adopted January 1, 2007 and applicable sections of the Supplemental Specifications and Recurring Special Provisions adopted January 1, 2009, hereinafter referred to as IDOT Standard Specifications.

1.04 REGULATORY REQUIREMENTS

- A. Codes and Standards
 - 1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
 - 2. Prior to the commencement of construction, the Contractor shall be aware of, and become familiar with applicable local, state and federal safety regulations, including the current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.

3. Additionally, the Contractor shall be aware that slope height, slope inclination and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state or federal safety regulations.

1.05 COORDINATION

- A. Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by the Engineer and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice prior to enacting an approved temporary interruption.

1.06 SUBMITTALS

- A. Submit under the provisions of Division 1, Section 01330 – Submittal Procedures.
- B. Manufacturer's Certificate and Product Data: Certify that products meet or exceed specified requirements.

1.07 FIELD TESTS

- A. Provide in accordance with Division 1, Section 01450 – Quality Control and Testing Services.
- B. Compaction Tests
 1. Standard Proctor Density Testing and Compaction Testing of fill materials and inspection of subgrades and fill layers will be performed by the Engineer or Engineer's representative. Contractor shall inform Engineer 24 hours in advance of soil compaction operations.
 2. If in opinion of the Engineer, based on testing and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense to the Owner.
 3. When, during progress of work, tests indicate that compacted materials will not meet specifications, remove defective work, replace and retest at no additional cost to the Owner.
 4. Ensure that all compacted fills are tested before proceeding with placement of surface materials.

PART 2 PRODUCTS

2.01 DEFINITIONS

- A. Suitable Soil: Suitable soil is a soil having less than 6% organic matter by weight as determined by Loss on Ignition Test (determine weight loss caused by heating sample to 500 degrees C for six hours after drying in accordance with ASTM D-2216, "Laboratory Determination of Moisture Content of Soil").
- B. Unsuitable Soil: Unsuitable soil is a soil that contains 6% or more organic matter as determined by the Loss on Ignition. Test previously specified, rubbish, vegetable

matter of any kind, roots and boulders larger than five inches in dimension which might interfere with the proper bonding to adjacent contact surfaces, or as otherwise determined unsuitable by Engineer.

2.02 STRUCTURAL FILL MATERIALS

A. General

1. Structural fill for all structures listed above shall meet the requirements of IDOT CA-6 or shall be composed of suitable lean (silty or sandy) clay with liquid limit no greater than 45% and plasticity index no greater than 25%. The on-site lean clay materials obtained from excavations may be used as structural fill except below foundations.
2. Engineer shall engage a qualified independent testing laboratory to test materials from on-site and off-site sources to test materials for conformance to this specification.

2.03 BACKFILL MATERIALS

A. Base Materials

1. Under floors, structural slabs, pads and concrete landings, base material shall be IDOT CA-6 crushed limestone Class C Quality material with a Plasticity Index (PI) range of 0 to 4, minimum of 6 inches in depth unless otherwise shown. All materials to be compacted to 98% Standard Proctor Density in accordance with ASTM D-698.
2. Under exterior walks, steps and grade slabs, base material shall be naturally or artificially graded mixture of natural or crushed gravel, crushed stone or sand as acceptable to the Engineer - minimum depth 6 inches unless noted otherwise.

B. Backfill Materials

1. Granular Backfill: When called for on the plans, granular backfill under steps, concrete landings, walks, slabs and against substructure walls is defined as granular soils IDOT FA-1 or FA-2, Class C quality, or CA-6 Class C quality with a Plasticity Index (PI) range of 0 to 4.
2. Cohesive Backfill: Provide acceptable soil materials in accordance with geotechnical report for backfill free of clay lumps, rock or gravel larger than 2 inches in dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

2.04 FILTER FABRIC

- A. Nonwoven needle punched geotextile composed of polypropylene filaments formed into a stable network. Filter fabric shall be inert to biological degradation and to naturally encountered chemicals, alkalines and acids.

- B. Filter fabric shall be Mirafi 1100N or an equal material conforming to the properties listed below:

PROPERTY	TEST METHOD	UNIT	MINIMUM AVERAGE VALUE
Weight	ASTM D-5261	oz/yd ²	10.3
Thickness	ASTM D-5199	mils	100
Grab Tensile Strength	ASTM D-4632	lbs.	250
Grab Tensile Elongation	ASTM D-4632	%	50
Mullen Burst Strength	ASTM D-3786	psi	500
Puncture Strength	ASTM D-4833	lbs.	155
Trapezoid Tear Strength	ASTM D-4533	lbs.	100
Apparent Opening Size	ASTM D-4751	U.S. Std. Sieve	100
Permittivity	ASTM D-4491	Sec ⁻¹	1.0
Permeability	ASTM D-4491	inch/sec	0.2
Flow Rate	ASTM D-4355	gpm/ft ²	75

- C. Filter fabric shall be shipped in roll sizes to minimize the number of laps required during installation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Prior to placement of any fill or backfill and prior to placement of all subsequent fill lifts, Engineer shall contact his/her independent testing laboratory for inspection and testing of excavation subgrade and testing of each compacted layer of fill and backfill material. Results of this testing shall be submitted to the Engineer in a timely manner for review.

3.02 PREPARATION

- A. Provide all items and perform all preparation and work for access roads and culverts in accord with IDOT Standard Specifications, referenced sections:
1. Section 205. Embankment.
 2. Section 502. Excavation for Structures.
 3. Section 542. Pipe Culverts.
- B. Backfilling and compaction shall not occur until the following conditions are satisfied:
1. Acceptance by the Engineer of construction below finish grade including, where applicable, dampproofing, geocomposite wall drain, perimeter

insulation and filter fabric.

2. Inspection, testing, approval and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of trash and debris, vegetation, snow or ice, water, unsatisfactory soil materials, obstructions and deleterious materials.
5. Removal of shoring and bracing and backfilling of voids with satisfactory material.
6. Ensure that ground surface within excavated area to be backfilled is not frozen.
7. When existing ground surface has a density less than that specified under Article 3.03-C of this Section for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content and compact to required depth and percentage of maximum density.

3.03 BACKFILLING AND COMPACTING

A. General

1. Definition
 - a. Backfilling shall consist of placing and compacting the necessary fill materials within the space excavated for the structures to the grade limits shown on the drawings or as directed by the Engineer.
2. Place acceptable material in layers to required subgrade elevations, for each area classification listed below.
 - a. In lawn or unpaved areas, use satisfactory excavated or borrow exterior fill material.
 - b. Building, access drive and parking related, use granular fill or base material as indicated.
 - c. Under walks and steps, use granular fill material.

B. Placement and Compaction

1. Place backfill, base and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand operated tampers. Heavy equipment including compaction equipment shall not operate within 2 feet of substructure walls. Compaction in these areas shall be obtained with hand operated compaction equipment or devices.
2. Before compaction, moisten or aerate each layer as necessary to provide a placement with moisture content between 2% below and 3% above the optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do

not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.

3. Place backfill and fill materials evenly adjacent to structure to required elevations. Take necessary precautions to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift

C. Percentage of Maximum Density Requirements

1. Unless otherwise noted on the plan sheets, the Contractor shall compact each layer of soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698, Standard Proctor Compaction Test; and not less than the following percentages of relative density, determined in accordance with ASTM D 4253 and ASTM D 4254, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).

REQUIRED COMPACTIVE EFFORT				
MATERIAL TESTED	PROCTOR TYPE	MIN % DRY DENSITY	MOISTURE CONTENT	MIN FREQUENCY OF TESTING
Structural Fill (cohesive)	Standard	97%	-2 to +3%	1 per 2,500 sf of fill placed
Structural Fill (granular)	Standard	97%	-2 to +3%	1 per 2,500 sf of fill placed
Base Under Slab (cohesive)	Standard	97%	-2 to +3%	1 per 2,500 sf of fill placed
Base Under Slab (granular)	Standard	97%	-2 to +3%	1 per 2,500 sf of fill placed
Landscape Fill (non-load bearing)	Standard	90%	-2 to +3%	1 per 5,000 sf of fill placed
Utility Trench / Wall Backfill	Standard	97%	-2 to +3%	1 per 200 lf of backfill placed

D. Moisture Control

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to top surface of subgrade or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. For subgrade soil materials that are too wet to permit compaction to the specified density and optimum moisture content, scarify and air-dry or remove and replace with suitable materials meeting the satisfaction of the Engineer.

E. Grading

1. General
 - a. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances. Compact with uniform levels or slopes between

points where elevations are indicated, or between such points and existing grades.

- b. Loosen grades of lawn areas not receiving additional topsoil to a minimum depth of 4". Remove stones over 1-1/2" in any dimension and sticks, roots, rubbish and other extraneous matter.
- c. Grading Outside Building Lines:
 - i. Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
 - ii. Finish surfaces free from irregular surface changes, and as follows:
 - a) Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below proposed subgrade elevation.

2. Grading Surface of Backfill Under Walks and Slabs

- a. Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4" when tested with a 10' straightedge.

3. Compaction

- a. After grading, compact subgrade surfaces to the depth and percentage of maximum or relative density for each area classification.

F. Maintenance

1. Protection of Graded Areas

- a. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- b. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

2. Reconditioning Compacted Areas

- a. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.

3. Settling

- a. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance quality and condition of surface or finish to match adjacent work and eliminate evidence of restoration to greatest extent possible.

3.04 RESERVED

3.05 FILTER FABRIC INSTALLATION

- A. Prepare subgrade as recommended by the filter fabric manufacturer prior to installation.
- B. Install filter fabric as shown on the drawings and in accordance with manufacturer's installation procedures, including lap splice and anchorage requirements. Minimum lap splice of filter fabric shall be 2'-0".

3.06 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction
 - 1. Proofrolling: Subgrades shall be proofrolled to detect areas of insufficient compaction. Proofrolling shall be accomplished by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck with a maximum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while under the supervision and direction of the independent testing laboratory. Areas of failure shall be excavated and recompacted as specified herein. Continual failure areas shall be stabilized in accordance with Section 02340 at no additional cost to Owner. Subgrade exposed longer than 48 hours or on which precipitation has occurred shall be re-proofrolled.
 - 2. The Testing Service firm, employed by and paid by the Engineer shall conduct compaction testing at intervals no less than the minimum requirements defined in IDOT Standard Specifications or as specified herein.
 - 3. Provide and forward copies of all compaction testing reports to the Engineer as required by Section 01450.
 - 4. Allow the Engineer to inspect subgrades and fill layers before further construction work is performed.
 - 5. If in opinion of the Engineer, based on field density testing and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense to the Owner.
 - 6. Allow the Construction Coordinator to inspect drainage system before work is covered.

END OF SECTION 02317

DIVISION 3 – CONCRETE

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DIVISION 3 - CONCRETE
Section 03100 - Concrete Formwork

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 WORK INCLUDES

- A. Concrete formwork, shoring and accessories as shown on the drawings and as herein specified for following:
 - 1. Footings and concrete foundations
 - 2. Floor slabs
 - 3. Concrete sidewalks
 - 4. Entrance slabs
 - 5. Miscellaneous items

1.03 RELATED WORK

- A. Specified Elsewhere:
 - 1. Division 1 – General Requirements
 - 2. Section 03200 – Concrete Reinforcement
 - 3. Section 03300 – Cast-In-Place Concrete
 - 4. Division 15 – Mechanical
 - 5. Division 16 – Electrical

1.04 REFERENCES

- A. ACI 301 (R 2005) - Specifications for Structural Concrete.
- B. ACI 347-04 - Guide to Formwork for Concrete.

1.05 SYSTEM DESCRIPTION

- A. Design, engineer and construct formwork, shoring and bracing to meet design requirements so that resultant concrete conforms to required shapes, lines and dimensions.

1.06 QUALITY ASSURANCE

- A. Construct and erect concrete formwork in accordance with ACI 301 (R 2005) and 347.

1.07 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01330 – Submittal Procedures.
- B. Indicate pertinent dimensions, materials and arrangement of joints and sites.
- C. Submit product data under provisions of Section 01330 – Submittal Procedures.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver form materials in manufacturer's packaging with installation instructions.
- B. Store off ground in ventilated and protected area to prevent deterioration from moisture or damage.

PART 2 PRODUCTS

2.01 WOOD FORMS

- A. Wood forms for exposed concrete shall be equivalent to B-B Plyform, Class 1, as designated by American Plywood Association.

2.02 FORM OIL

- A. Coat inside of forms with non-staining oil prior to erecting forms.
- B. Use only specified products of following manufacturers:
 - 1. Symons Manufacturing Co., Deerfield, IL - Magic Kote
 - 2. Lambert Corporation - Formcel
 - 3. Guardian Chemical Coatings, Inc., Houston, Texas - Guardian Form Coating
 - 4. Concrete Service Co., Philadelphia, PA - Form-Coat
 - 5. Euclid Chemical Co. - Ecoslip

2.03 FORM TIES

- A. Form ties shall have 1" minimum break-off depth from face of concrete. Ties shall be removed after forms are removed and holes shall then be filled with mortar that matches adjacent surfaces. Provide stainless steel form ties for exterior surfaces exposed to view.
- B. Use only specified products of following manufacturers:
 - 1. Dayton - Sure Grip snap-in form tie
 - 2. Heckmann - Snapties
 - 3. Richmond - Snap-Tys

2.04 PVC WATERSTOPS

- A. Waterstop shall be white PVC with factory made splices. Waterstops shall be

manufactured by Green Streak, St. Louis, MO, or equal. The waterstops shall be Green Streak No. 748, 3/8" thick by 6" wide. All splices shall be made with manufacturer recommended heat sealing method. Labyrinth type waterstop made of PVC or neoprene or bentonite strips shall not be permitted as a substitute for waterstop materials specified herein or as detailed on the plans.

2.05 METAL FORMS

- A. Centering shall be as manufactured by U.S. Steel Deck; Wheeling Corrugating Co.; Vulcraft or Engineer approved equal. Metal forms shall be minimum 9/16" deep, 26 gauge galvanized. Metal forms shall be installed in strict accordance with manufacturer's directions and specifications.
- B. Metal forms shall be capable of safely supporting dead and live loads as shown on drawings.

2.06 ANCHORS AND DOVETAIL ANCHOR SLOTS (RESERVED)

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify lines, levels and measurements before proceeding with formwork.

3.02 PREPARATION

- A. Earth forms, except for footings, not permitted.
- B. Minimize form joints. Symmetrically align joints.
- C. Arrange and assemble formwork to permit stripping so that concrete is not damaged during its removal.

3.03 ERECTION

- A. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.
- B. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.
- C. Provide chamfer strips on external corners of beams, joists and columns.
- D. Construct formwork to maintain tolerances in accordance with ACI 301(R 2005).
- E. Steel centering shall be placed with corrugation edges up and with corrugations perpendicular to supports. Sheets shall be placed end to end along one side of building. Adjacent rows are to be placed in like manner, side lapping one

corrugation with previously placed row. End laps shall always occur over supporting joists, beams or purlins and should be centered over support. Minimum end lap is 2" for welded attachment. Bottom sheet shall not extend beyond edge at support flange. Sheets shall be attached to supports by plug welding through curved washers to supporting top chords. Centering attached by welding shall have following minimum welding requirements:

1. End Laps - each lap is to be fastened using a weld washer at each side lap plus one intermediate weld (3 welds per sheet).
2. Intermediate Supports - weld sheet at side laps at each intermediate support plus one intermediate weld (3 welds per sheet).
3. Spacing between deck attachments to top chord shall not exceed 36".

3.04 APPLICATION OF FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices and embedded items.
- B. Do not apply form release agent where concrete surfaces are scheduled to receive special finishes, which may be affected by agent. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

3.05 INSERTS, EMBEDDED PARTS AND OPENINGS

- A. Provide formed openings where required for work embedded in or passing through concrete.
- B. Coordinate work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors and other inserts.
- C. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

3.06 FORM REMOVAL

- A. Do not remove forms and shoring until concrete has sufficient strength to support its own weight and construction and design loads which may be imposed upon it. Remove load-supporting forms when concrete has attained 75% of required 28-day compressive strength.
- B. Do not damage concrete surfaces during form removal.

3.07 CLEANING

- A. Clean forms to remove foreign matter as erection proceeds.
- B. Ensure that water and debris drain to exterior through clean-out ports.

- C. During cold weather, remove ice and snow from forms. Do not use deicing salts. Do not use water to clean out completed forms, unless formwork and construction proceed within heated enclosure. Use compressed air to remove foreign matter.

END OF SECTION 03100

DIVISION 3 – CONCRETE
Section 03200 – Concrete Reinforcement

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel bars, welded wire fabric and accessories for cast-in-place concrete.

1.02 RELATED SECTIONS

- A. Section 03100 – Concrete Formwork.
- B. Section 03300 – Cast-in-Place Concrete.
- C. Section 04810 – Unit Masonry Assemblies.

1.03 REFERENCE TO STANDARDS

- A. ACI 301 - Structural Concrete for Buildings, latest edition.
- B. ACI 315 - Details and Detailing of Concrete Reinforcement, latest edition.
- C. ACI 318 - Building Code Requirements for Reinforced Concrete, latest edition.
- D. ACI SP-66 - Detailing Manual.
- E. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
- F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- G. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- H. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.
- I. ASTM A884 – Standard Specification for Epoxy Coated Steel Wire and Welded Wire Reinforcement
- J. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.
- K. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
- L. CRSI MSP-1-86 - Manual of Standard Practice.

1.04 SUBMITTALS

- A. Shop Drawings: Indicate bar sizes, lengths, splices, spacing, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, supporting and spacing devices and type of steel.

- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice, ACI 301, ACI 315, ACI 318 and ANSI/ASTM A185.
- B. Maintain one copy of each document on site.
- C. Submit certified copies of mill test report of reinforcement materials analysis, indicating physical and chemical analysis.

1.06 QUALIFICATIONS

- A. Welder's Certificates: Submit under provisions Division 1 - General Requirements, Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.07 COORDINATION

- A. Coordinate work under provisions of Division 1 – General Requirements.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60-ksi yield grade; deformed billet steel bars, unfinished.
- B. Welded Steel Wire Fabric: ASTM A185 Plain Type; unfinished.
- C. Epoxy Coating on Reinforcing Steel: ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.
- D. Epoxy Coating of Welded Wire Reinforcing: ASTM A884.

2.02 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions, including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Special Chairs, Bolsters, Bar Supports, and Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice, ACI 315, ACI 318 and ANSI/ASTM A185.
- B. Locate reinforcing splices not indicated on drawings, at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Reinforcement shall be tied at a minimum of 50 percent of the bar intersections. Tack welding of reinforcing for maintaining position and welding of splices shall not be permitted. Reinforcement shall not be flame cut or heated to bend.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Conform to ACI 318 for concrete cover over reinforcement, unless noted otherwise on drawings.
- E. Wall reinforcement shall not be placed in the work until one side of the wall forms has been erected, aligned and braced. As the wall reinforcement is placed, it shall be secured to the wall form with the proper clearance between the steel and forms.
- F. Slab reinforcement shall be supported by manufactured steel bolsters only. Concrete brick may be permitted only in slab on grade or footing construction.
- G. Where walls or other items are shown as built integrally with other sections, but are placed as separate pours, keys and dowels shall be provided. Dowels shall be same size and at same spacing as reinforcing.
- H. Provide 6 x 6 - W 2.9 x W 2.9 electrically welded wire fabric, ASTM A185 reinforcing in all concrete slabs on ground unless shown otherwise.
- I. Provide corner bars of same size and spacing as main reinforcement at all intersections and corners, unless noted otherwise.
- J. Where openings occur in walls or slabs, and unless otherwise noted on the plans, provide two (2) #5 bars at all sides and extending at least 2 feet beyond corners and two (2) #5 bars at least 4 feet long diagonally across each re-entrant corner.
- K. The Contractor shall give sufficient notice to the Engineer for inspection of the reinforcing prior to the placement of the concrete.
- L. The reinforcing for the concrete placement shall be completed before ordering concrete.

3.02 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Division 1 – General Requirements.

END OF SECTION 03200

DIVISION 3 - CONCRETE
Section 03300 – Cast-In-Place Concrete

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place concrete floors, foundation walls, supported slabs, beams and columns.
- B. Floors and slabs on grade.
- C. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.
- D. Equipment pads and manhole slabs.
- E. Non-Shrink Grout

1.02 RELATED SECTIONS

- A. Section 02317 – Backfilling and Compacting
- B. Section 03100 – Concrete Formwork
- C. Section 03200 – Concrete Reinforcement
- D. Section 03390 – Concrete Curing
- E. Section 05500 – Metal Fabrications
- F. Section 07920 – Joint Sealants
- G. Division 15 – Mechanical
- H. Division 16 – Electrical

1.03 REFERENCE TO STANDARDS

- A. ACI 212 - Guide for Use of Admixtures in Concrete.
- B. ACI 301 - Structural Concrete for Buildings.
- C. ACI 302 - Guide for Concrete Floor and Slab Construction.
- D. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- E. ACI 305R - Hot Weather Concreting.
- F. ACI 306R - Cold Weather Concreting.
- G. ACI 308 - Standard Practice for Curing Concrete.
- H. ACI 318 - Building Code Requirements for Reinforced Concrete, latest edition.

- I. ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- J. ANSI/ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.
- K. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- L. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- M. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- N. ASTM C33 - Concrete Aggregates.
- O. ASTM C40 - Test for Organic Impurities in Sands for Concrete.
- P. ASTM C42 - Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- Q. ASTM C88 - Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
- R. ASTM C94 - Ready-Mixed Concrete.
- S. ASTM C117 - Test for Materials Finer Than No. 200 Sieve in Mineral Aggregates by Washing.
- T. ASTM C123 - Test for Lightweight Pieces in Aggregate.
- U. ASTM C127 - Test for Specific Gravity and Absorption of Coarse Aggregate.
- V. ASTM C136 - Test for Sieve or Screen Analysis of Fine and Coarse Aggregates.
- W. ASTM C138 - Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
- X. ASTM C142 - Test for Clay Lumps and Friable Particles in Aggregates.
- Y. ASTM C143 - Test for Slump of Portland Cement Concrete.
- Z. ASTM C150 - Portland Cement.
- AA. ASTM C172 - Method of Sampling Fresh Concrete.
- BB. ASTM C231 - Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
- CC. ASTM C260 - Air Entraining Admixtures for Concrete.
- DD. ASTM C494 - Chemicals Admixtures for Concrete.

EE. USDA Bull. 949 Dorry Hardness Test.

1.04 SUBMITTALS

A. Product Data: Provide data on joint devices, attachment accessories, admixtures, form release agents and bonding agent.

B. Material Certifications: For each item listed, provide information indicated.

1. Coarse and Fine Aggregate

- a. Producer Name.
- b. Quarry Location.
- c. Contact Person and Phone Number.
- d. IDOT Certification Sheets with Material Quality Results.
- e. Specific Gravity.
- f. Moisture Content.

2. Cement

- a. Mill Test Report.
- b. Producer Name and Location.

3. Water

- a. Specify Potable Water Source.

C. Concrete Mix Properties: Provide the following information:

1. Mix Design

- a. Cement (Lbs./C.Y.)
- b. Fine Aggregate (Lbs./C.Y.)
- c. Coarse Aggregate (Lbs./C.Y.)
- d. Water (Lbs./C.Y.)
- e. Admixtures.

2. Slump Specified.

3. Air Content Specified.

D. Mix Plant Certification: Provide IDOT certification of plant inspection (within past 12 months) and provide contact person name, address, and phone number at plant.

E. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent work.

F. Submittal Timing: Within 30 days of award, the Contractor shall indicate his intentions regarding mix design. Should Method 1 be used, the submittal should be submitted with back-up documentation as indicated under the provision of Method 1.

Should Method 2 be utilized, the proposed mix trial proportions and w/c ratios made should be submitted. This would then be followed with 7 and 28 day breaks. Concrete placement shall not be permitted prior to approval of mix designs.

1.05 PROJECT RECORD DOCUMENTS

- A. Contractor shall accurately record actual locations of embedded utilities and components which are concealed from view.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301, ACI 318 and ACI 350.
- B. Maintain one copy of each document on site.
- C. Acquire cement and aggregate from same source for all work.
- D. Conform to ACI 305R when concreting during hot weather.
- E. Conform to ACI 306R when concreting during cold weather.

1.07 FIELD TESTS

- A. Provide under provisions of Division 1 - General Requirements.
- B. Cylindrical Compression Tests
 - 1. Contractor shall make arrangements with the Engineer for making compression strength tests.
 - 2. Specimens for making compressive strength tests shall be made using standard 6" x 12" cylindrical molds. The Contractor shall arrange with the Engineer to take samples and fill molds. Specimens shall be made, cured and tested in accordance with ASTM C-31 and ASTM C-39.
 - 3. Test cylinders shall accurately represent concrete placed in forms. For each 50 cubic yards or fraction thereof or for each 4,000 square feet of surface area poured per day in each separate structure of each class of concrete, one set of four standard cylinders shall be cast. Casting, handling and curing of all cylinders shall be in accordance with ASTM C21. Additional cylinders may be required if an error in batching is suspected. For first 24 hours after molding, cylinders shall be kept moist in storage box constructed and located so that its interior air temperature will be between 60 and 80 degrees F. At end of 24 hours, cylinders shall be transported to laboratory. Exception: Where the Contractor intends to remove load supporting forms (when conditions permit), a sufficient number of additional test cylinders shall be made and shall be field cured at the site of the structure. Field curing shall continue up to within four hours prior to laboratory testing. The Contractor shall be responsible for the safe field storage of the concrete cylinders during the field curing process.

4. Contractor shall inform Engineer 24 hours in advance of any concrete pours, indicating location and size of pour by submitting completed pre-pour checklist.
5. Testing of specimens for compressive strength shall be in accordance with ASTM C39. Tests shall be made at 7 and 28 days from time of molding. One test cylinder from each group of four shall be tested at end of 7 days and two will be tested at end of 28 days, all in accordance with ASTM C39. Fourth cylinder shall be held for testing as a check cylinder.
6. Laboratory test reports shall include following information:
 - a. Mix design designation
 - b. Number of specimens
 - c. Date specimen taken
 - d. Date specimen tested
 - e. Portion of structure represented by specimen
 - f. Design strength of concrete
 - g. Slump of concrete
 - h. Temperature of concrete
 - i. Percent entrained air
 - j. Test strength of specimen

C. Slump Test

1. Contractor shall make arrangements with the Engineer for making slump tests. Concrete shall be tested for consistency at place of deposit in accordance with ASTM C-143. Contractor shall arrange for slump tests to be made from first load of concrete of each placement, each time compressive test cylinders are made and as often thereafter as Engineer determines necessary.

D. Air Entrainment

1. Contractor shall make arrangements with the Engineer for making air tests. Air content of air entrained concrete shall be determined in conformance with ASTM C-231. Contractor shall arrange for sufficient tests to be made to insure uniform air content in placement, including each time compressive test cylinders are made.

1.08 COORDINATION

- A. Coordinate work under provisions of Division 1 – General Requirements.
- B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150, Portland Type I - Normal. Only one brand of cement shall be used for exposed concrete throughout any one structure or composite element. Cement used for rubbing and/or patching shall be of same type and brand as that used in element of work.

B. Concrete Aggregate

1. Concrete aggregate shall conform to ASTM C33. Maximum size of coarse aggregate shall be in accordance with guidelines listed below:

Maximum Aggregate

Size, Inches Type of Structure

1/2"	Concrete Toppings
3/4"	Mud Slabs Stairs and Steps Columns Beams Elevated Slabs Flowable Fill
1"	Grade Beams Equipment Pads All Other Structures
1-1/2"	Caissons, Piles and Piers Footings Slabs on Grade, Interior & Exterior Tank Walls

2. Aggregate gradations shall be Class A quality for coarse and fine materials in accordance with the Standard Specifications for Road and Bridge Construction, Illinois Department of Transportation and shall conform to the following:

1-1/2" Coarse Aggregates

<u>Sieve Size</u>	<u>% Passing</u>
1-3/4"	100
1-1/2"	98 ± 2
1"	72 ± 22
1/2"	22 ± 12
No. 4	3 ± 3

1" Coarse Aggregates

<u>Sieve Size</u>	<u>% Passing</u>
1-1/2"	100
1"	95 ± 5
1/2"	42 ± 18
No. 4	5 ± 5

3/4" Coarse Aggregates

<u>Sieve Size</u>	<u>% Passing</u>
1"	100
3/4"	95 ± 5
1/2"	55 ± 15
3/8"	33 ± 15
No. 4	5 ± 5

Fine Aggregate

<u>Sieve Size</u>	<u>% Passing</u>
3/8"	100
No. 4	97 ± 3
No. 16	65 ± 20
No. 50	16 ± 13
No. 100	5 ± 5

Results of durability tests shall be required for coarse and fine aggregates used for concrete. In lieu of durability test results, a certificate from the aggregate supplier(s) indicating that the aggregate furnished is from a supply approved for use in concrete by the Illinois Department of Transportation will be acceptable.

C. Fly Ash

1. Fly ash used in concrete shall meet ASTM C618, Type C or Type F with 5% maximum loss on ignition.
2. Supplier shall furnish certifications/fly ash analysis.

D. Water

1. Water used in mixing concrete and mortar and water used for curing concrete shall be clean, clear and free from deleterious amounts of sugar, acids, alkalies, salts or organic matter. Water approved by public health agencies for drinking may be accepted without being tested. All other sources shall be approved by Engineer.

2.02 ADMIXTURES

- A. When required or permitted, admixtures shall conform to requirements specified below. Use of one or more admixtures in concrete shall be approved by Engineer prior to its use at job site.
- B. Field Service: When requested, the Contractor shall arrange to have a qualified concrete technician employed by manufacturer be available to assist in proportioning concrete materials for optimum use, to advise on proper use of admixture and adjustment of concrete mix proportions to meet job site and climatic conditions.
 - 1. Air Entraining Admixture: Shall conform to ASTM C260 and shall be Darex AEA by W. R. Grace; MB-VR by Master Builders, Sealtight AEA by W. R. Meadows, or equal.
 - 2. Water Reducing Admixture: Shall conform to ASTM C494, Type A and shall be WRDA by W. R. Grace, Pozzolith by Master Builders, Plastiment by Sika Corporation or equal.
 - 3. Water-Reducing and Retarding Admixture: Shall conform to ASTM C 494, Type D and shall be Daratard-17 by W. R. Grace & Co., or equal.
 - 4. Non-Chloride Accelerating Admixture: Shall conform to ASTM C 494, Type C and shall be Daraset or DCI Corrosion Inhibitor by W. R. Grace & Co., or equal.
 - 5. Superplasticizers: Shall conform to ASTM C494 Type F. Material shall contain no calcium chloride and shall be WRDA-19 or Daracem-100 by W. R. Grace & Co., or equal, furnished in liquid form ready for use.
- C. Calcium chloride shall not be permitted under any circumstances. Non-corrosive accelerator may be used in concrete, other than when it is required, when approved by Engineer.
- D. Admixtures containing chloride shall not be used where aluminum conduit, couplings or accessories are embedded in concrete without adequate corrosion protection for embedded items.

2.03 MACRO STRUCTURAL FIBER

- A. Macro synthetic reinforcement fibers for concrete shall be used where indicated on the drawings or specified herein. They shall meet the criteria of ASTM C 1116. The fiber shall meet or exceed 130 psi when tested in accordance to ASTM C 1018. The required dosage shall be provided by the fiber manufacturer. Independent test data shall be available to show compliance. Mix per manufacturers recommendations.
- B. Approved materials: Tuf-Strand SF as manufactured by The Euclid Chemical Company, STRUX 90/40 by W.R. Grace, or equal.

2.04 ACCESSORIES

- A. Bonding Agent: Bonding agent shall be Larsens "Weld-Crete" or equal. Installation shall be according to manufacturer's recommendations.
- B. Vapor Barrier: 6-mil thick clear polyethylene film type recommended for below grade application.

2.05 JOINT DEVICES AND FILLER MATERIALS

- A. Fiber Expansion Joint Filler: ASTM D1751, Federal Spec. HH-F-341F, Type I - asphalt saturated organic fiber, 1/2 inch thick (unless otherwise shown).
- B. Sealant and Primer: As specified in Section 07920 – Joint Sealants.

2.06 CONCRETE MIX

- A. Strength:
 - 1. Concrete for all parts of work shall be homogeneous and, when hardened, shall have required strength, resistance to deterioration, durability, resistance to abrasion watertightness, appearance and other specified properties.

<u>Mix Design</u>	<u>A</u>
Cement	Type I
Fly Ash	Optional
7 Day Strength, psi	2,500
28 Day Strength, psi	4,000
W/C or W/C&P (Max.)	0.45
Air Content %	4-1/2 to 7-1/2%

Note: Cement/fly ash may require a retarding admixture during hot weather (> 80° F) and reduced ash content during cold weather (< 40° F). The Contractor will be required to submit proposed mix designs utilizing Method 2, paragraph 2.05F.1.b.

- 2. Revised mix designs shall be submitted to the Engineer when weather conditions require use of additional admixtures or changes in mix design. Revised mix designs shall be submitted to the Engineer if the source for any component of the concrete changes for any reasons whatsoever. This shall include changes in cement, aggregate or admixture supplier. Trial mixes shall be developed in accordance with Method 2. New mix designs shall be assigned alpha numeric designations beginning with "D".
- 3. Design of the fly ash mix shall be based on the technique where the fly ash replaces a part of the cement with a greater weight of fly ash and then compensates for the large amount of fines by a subsequent reduction in fine aggregate content.

4. Strength level of an individual class of concrete shall be considered satisfactory if both of following requirements are met:
 - a. Average of all sets of three consecutive strength tests equal or exceed $f'_c = 4000$ psi.
 - b. No individual strength test falls below f'_c by more than 500 psi.
5. If either of above requirements is not met, steps shall be taken to increase average of subsequent strength test results. Engineer shall have right to order a change in proportions of mix for remaining work. Engineer shall also have right to require conditions of temperature and moisture necessary to secure required strength. If requirement (b) is not met, following steps shall be taken.
 - a. If any strength test of laboratory-cured cylinders falls below specified values of f'_c by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection or curing, steps shall be taken to assure that load-carrying capacity of structure is not jeopardized.
 - b. If likelihood of low-strength concrete is confirmed and computations indicate that load-carrying capacity may have been significantly reduced, tests of cores drilled from area in question may be required in accordance with "Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete" (ASTM C42). In such cases, three cores shall be taken for each strength test more than 500 psi below specified value of f'_c . If concrete in structure will be dry under service condition, cores shall be air dried (temperature 60° to 80° F., relative humidity less than 60%) for 7 days before test and shall be tested dry. If concrete in structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 40 hours and be tested wet.
 - c. Concrete in an area represented by core tests shall be considered structurally adequate if average of three cores is equal to at least 85% of f'_c and if no single core is less than 75% of f'_c . To check testing accuracy, locations represented by erratic core strengths may be retested.
 - d. If criteria of paragraph (c) are not met, and if structural adequacy remains in doubt, the Engineer may order load tests as outlined in Chapter 20 of ACI 318-05 for questionable portion of structure or require other appropriate action.
 - e. All costs associated with performing analytical investigations, core testing and load testing shall be paid for by Contractor.

B. Slump:

1. Slump of concrete of normal weight as determined by "Method of Test for Slump of Portland Concrete" (ASTM C-143) shall be as follows:

<u>Kinds of Construction</u>	<u>Slump</u>
Footings, foundation slabs, caissons and sub- structure walls	3"
Slabs, Beams, Columns, Reinforced Walls and Concrete Toppings	4"

All concrete containing a water reducer shall have a slump as recommended by the manufacturer of the water reducer and approved by the Engineer.

If concrete pour under consideration could be classified under more than a single kind of construction listed above, the stricter of all classifications shall apply as determined by Engineer.

C. Durability:

1. Concrete, which will be subject to exposure conditions such as freezing and thawing, severe weathering or chemicals, shall contain total entrained air between 4-1/2% and 7-1/2% of concrete by volume.
2. Interior floor slabs and other elements located indoors and not subjected to any of above mentioned exposure conditions need not contain entrained air for purposes of durability but may be included from standpoint of increased workability at Contractor's option.

D. Proportioning of Ingredients:

1. Proportion of ingredients shall be selected to produce proper placability, durability, strength and other serviceability requirements. Proportion of ingredients shall be such as to produce a mixture which will work readily into corners and angles of forms and around reinforcement by methods of placing and consolidation employed on work, but without permitting materials to segregate or excessive free water to collect on surface.

E. Mix Design Use Locations:

1. All cast-in-place concrete on this project shall be placed utilizing Mix A specified in Paragraph 2.06(A)(1) above.

F. Procedures for Mix Design Acceptance:

1. Determination of proportions of cement, aggregate, admixtures and water to attain required strengths shall be made by one of following methods:
 - a. Method 1 - Field Test Data:

- i. This procedure shall be acceptable when production facility has a control record, based on at least 30 consecutive strength tests of the identical mix or mixes obtained within the past year representing materials and conditions to those expected. Compressive strength tests shall equal to or exceed specified strength. Air and slump shall meet the requirements specified herein. Contractor shall submit to Engineer mix design and test results for approval.
 - ii. In all respects, the components of the proposed concrete mix shall be identical to the components represented by the field test data. This includes cement type and cement manufacturer, material gradation and material sources admixture suppliers and concrete plant.
 - iii. Under no circumstances shall applicable requirements for cement, water, admixtures and aggregate durability as stated in this specification be waived in approval of mix design. Contractor shall submit in writing certification of the performance of proposed mix design and guarantee materials proposed in mix design will be used throughout duration of the project.
 - iv. Use Flow Chart Fig. 5.3 of ACI 318-05 for approval procedure.
- b. Method 2 - Trial Mixes - Applicable Standards:
- i. ACI 211-1 (ACI 613) Recommended Practice for Selecting Proportions for Concrete.
 - ii. ASTM C-192 Method for Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory.
 - iii. ASTM C-39 Method of Test for Compressive Strength of Cylindrical Concrete Cylinders.
 - iv. Trial mixtures having proportions and consistencies suitable for work shall be made in accordance with ACI 211-1 (ACI 613), USING AT LEAST THREE DIFFERENT WATER-CEMENT RATIOS which will produce a range of strengths encompassing those required for work. Trial mixes shall be designed to produce slump within 1" of maximum permitted and for air-entrained concrete, maximum allowable air content. Temperature of concrete used in trial batches shall be reported.
 - v. For each water-cement ratio, at least 3 compression test cylinders for each test age shall be made and cured in accordance with ASTM C-192. They shall be tested for strength at 28 days or at earlier or later age specified

according to ASTM C-39. The water cement ratio to be used in concrete shall be selected to produce minimum specified compressive strength. No substitutions shall be made in materials used on work without additional tests in accordance herewith to show that quality of concrete is satisfactory.

2.07 GROUT

- A. Non-shrink Grout: Equipment bases and other locations noted in drawings shall be grouted with Type 1 Grout. Type 1 Grout shall be "N-S Grout" by the Euclid Company, "Masterflow 928" by Masterbuilders, "Sika Grout 212" by Sika. Equipment bases (25 HP or greater) shall be grouted with "Euco Hi-Flow Grout" by Euclid Company, or "Masterflow by Masterbuilders 928 by Degussa".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify site conditions under provisions of Division 1 - General Requirements.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 TESTING

- A. Plant Tests

Sufficient testing shall be done by the supplier to assure the quality and consistency of the mix produced. The field tests are not to be used as a gauge of this quality.

- B. Field Tests

See Article 1.07 of this specification section.

3.04 BATCHING, MIXING AND TRANSPORTING CONCRETE

- A. Concrete shall be transit-mixed and batched at stationary batch plant which has been certified by the Illinois Department of Transportation. Name of concrete supplier shall be submitted to Engineer for approval prior to beginning of concrete

work. Engineer reserves right to reject supplier at any time and to require Contractor to obtain different supplier.

- B. Concrete batch shall be transferred from plant hoppers to revolving-drum type truck mixers and it shall be completely mixed while in transit to job site. Truck mixers shall be modern and dependable and be maintained in good working condition. Engineer reserves right to disallow any truck mixers that have excessively worn mixing blades or fail to conform to any other requirements of this specification, or hinder operations of placing and finishing at job site.
- C. Delivery and discharge of concrete shall be made within 1-1/2 hours or before drum has revolved 300 revolutions after addition of mixing water to cement and aggregates. Delivery of mixed concrete shall be regulated so that there will not be an interruption of more than 20 minutes duration in placement of concrete in forms. Engineer may waive these requirements if slump and temperature requirements are met without adding water.
- D. Each load of transit-mixed concrete shall have delivery ticket showing following information:
 - 1. Mix design designation
 - 2. Quantity of concrete
 - 3. Concrete design strength
 - 4. Quantity of cement
 - 5. Quantity of water
 - 6. Time of charging of mixer (mechanically stamped ticket only)
 - 7. Total amount of admixtures
 - 8. Quantity of water added to concrete at job site shall be noted on ticket. No water is to be added at job site unless acceptable to the Engineer.
- E. One copy of delivery ticket shall be furnished to Engineer at time truck arrives at job site.

3.05 PUMPING CONCRETE

- A. Pumping of concrete shall be in accordance with ACI 304.2 except as modified herein.
- B. Contractor, at his option, may elect to use concrete pump for final placement of concrete. It is responsibility of Contractor to furnish and maintain in good working condition, modern and dependable equipment for pumping concrete. All equipment shall be appropriate for work in accordance with these specifications and subject to approval of Engineer.
- C. Selection of pipe diameter for pumping shall be such that smallest inside diameter is no less than 4 inches or 3 times nominal maximum size coarse aggregate, whichever is greater.
- D. Pumping lines shall be lubricated with minimum of 1 cubic yard of grout prior to pumping regular mix through lines.

- E. Contractor shall show sufficient evidence prior to use of pump that mix is pumpable. This shall be accomplished by submitting a certification from supplier that mix has performed satisfactorily on previous jobs of similar nature or by performing full scale field test for pumpability with line height and other variables being identical (or nearly so) to that of actual placing conditions.
- F. No increase in water content shall be allowed for concrete that is to be pumped. An admixture (water reducer or superplasticizer) shall be used if improvement of pumpability of concrete is necessary. Mix design requirements of this specification shall apply for concrete containing admixtures not previously included in mix.

3.06 CONVEYING AND PLACING CONCRETE

- A. Concrete shall be conveyed and placed in conformance with ACI 318, ACI 309, and ACI 304. Method and manner of placing concrete shall be such as to avoid segregation or separation of aggregates or displacement of reinforcing steel. Contractor shall instruct laborers on proper vibration techniques required for each situation.
- B. Chutes shall extend as nearly as practicable to point of deposit. Concrete shall not be dropped more than 6 feet. For walls or column placements in excess of 6 feet vertical height, tremie shall be used in placing concrete. If reinforcing steel or formwork is such that tremie cannot be used, method of placement shall be approved by Engineer.
- C. Placement of concrete shall be regulated so that pressures caused by wet concrete will not exceed those used in design of forms. Concrete placed in vertical forms shall be placed in lifts of not more than two (2) feet which shall be kept practically level.
- D. On horizontal construction joints at mid-height of a wall, a mixture of grout shall be applied to joint immediately prior to placing concrete. This shall be a manually mixed and poured (via tremie) just ahead of concrete placement.

3.07 CONSOLIDATION

- A. Consolidation of concrete in formwork and in slabs shall be accomplished by use of hand-held internal type vibrators and shall be adequately powered to operate at minimum frequency of 4500 cycles per minute. They shall be applied internally to fresh concrete in manner that will result in homogeneous mass without segregation.
- B. Hand spading, tapping forms and other external vibration techniques shall be used only when permitted by Engineer and will not be allowed as sole means of consolidation of concrete.
- C. At beginning of concrete placement, a spare vibrator shall be on job site in addition to vibrators to be used during placement.
- D. When concrete is placed in vertical forms, vibrator shall slowly penetrate newly placed concrete well into concrete layer below. Vibrator shall penetrate concrete at

frequent regular spacings amply close together to insure complete consolidation of concrete.

- E. Use of vibrator to aid in lateral movement of concrete in slabs or wall forms shall not be permitted under any circumstances.
- F. If electrical power for equipment used in the concrete placement is provided by a portable electric generator, an additional back-up portable electric generator or an alternate reliable electrical source shall be available prior to and during the concrete placement.

3.08 CURING AND PROTECTION

- A. Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures and shall be maintained with minimal moisture loss at relatively constant temperature for period of time necessary for hydration of cement and proper hardening of concrete.
- B. Initial curing shall immediately follow finishing operation and shall continue for a minimum of 24 hours after placement. Concrete shall be kept continuously moist by one of following methods listed below.
 - 1. Polyethylene Sheeting: Unformed surfaces shall be covered with polyethylene sheeting as soon as concrete has hardened sufficiently to prevent marring surface. Surface of concrete shall be wetted immediately before sheeting is placed. Use of a layer of wetted burlap beneath sheeting may be required at option of Engineer. Edges of sheeting shall have sufficient lap and shall be fastened securely by any means satisfactory to Engineer to provide an airtight cover. Tears or holes in sheeting will not be permitted.
 - 2. Membrane Curing:
 - a. After concrete has been finished and immediately after water sheen is no longer visible on surface of concrete, surface shall be cured with membrane curing compound. Curing compounds may be used to cover all exposed surfaces. Membrane curing will not be permitted at construction joints. Application shall be such to completely cover all exposed surfaces and rate of coverage shall be in accordance with manufacturers recommendations.
 - b. Application of curing compound shall be by power sprayer. Garden sprayers will not be allowed. Curing compound shall be applied immediately after form removal. Notify Engineer when curing compound is to be applied so that application rate can be verified.
 - c. Curing compounds specified in Section 03390 – Concrete Curing shall be used unless other special floor treatments are required.

3. Continuous Wetting:

- a. After concrete has been finished and is hardened sufficiently to prevent any type of surface damage, curing shall be accomplished by continuous steam not exceeding 150°F, a continuous vapor mist bath or by use of burlap fabric kept continuously saturated.

Mechanical equipment used in this method shall be modern and maintained in good working condition throughout specified curing period. All equipment and procedures shall meet approval of Engineer prior to its use.

C. Immediately following initial curing and before concrete has dried, additional curing shall be accomplished by one of the following methods:

- 1. Continuing method used in initial curing.
- 2. Waterproof Paper: While concrete surface is still wet, surface shall be covered with waterproof paper meeting approval of Engineer. Paper shall be lapped minimum of 12" end to end and such laps and ends shall be securely held in place to form closed joint. Tears or holes in paper will not be permitted.
- 3. Other moisture-retaining coverages, which are practical and meet approval of Engineer.
- 4. Final curing shall continue until cumulative number of days of initial and final curing totals not less than 7 days. Rapid drying at end of curing period shall be prevented.
- 5. Steel forms heated by sun and all wood forms in contact with concrete during final curing period shall be kept wet. If forms are to be removed during curing period, one of above curing methods shall be employed immediately. Such curing shall be continued for remainder of curing period.

3.09 COLD WEATHER CONCRETING AND CURING

- A. Placing and protection of concrete shall be in conformance with ACI 306R-88 (Reapproved 2002) and shall meet approval of Engineer prior to its use.
- B. Minimum temperature of fresh concrete shall be as follows:

<u>Atmospheric Temperature Range</u>	<u>Minimum Fresh Concrete Temperature</u>
Above 30°F	60°F
0°F - 30°F	65°F
Below 0°F	70°F

- C. Changes in temperature of concrete shall be as uniform as possible and shall not exceed 5°F in any one-hour or 50°F in any 24 hour period.
- D. Contractor shall maintain temperature records of concrete. When concrete is placed, record time, date, weather conditions, outside air temperature and temperature of concrete. Record temperatures at several locations (or as directed by Engineer) within enclosures and on concrete surfaces, edges and corners to obtain the range of temperatures. Record maximum and minimum temperatures in each 24-hour period using measuring devices embedded in concrete surface or by placing thermometer against surface under temporary cover of thick insulation until a constant temperature is registered.

3.10 HOT WEATHER CONCRETING AND CURING

- A. Special precautions contained herein shall be applicable to hot weather concreting and curing when following conditions exist:
 - 1. Any combination of high air temperature, low relative humidity and high wind velocity. Refer to ACI 305R, Figure 2.1.5 for more detailed information on specific conditions, which create need for special precautions to be taken.
 - 2. Any combination of rising air temperature and falling relative humidity.
- B. Hot weather concreting and curing shall be performed in accordance with requirements of this Specification and ACI 305R, latest edition.
- C. Under hot weather conditions, Contractor shall be responsible for making arrangements for installation of windbreaks, shading, fog spraying, sprinkling, ponding or wet covering of light color.

Arrangements shall be made in advance of placement and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.
- D. Maximum allowable temperature of concrete at time of placement shall not be greater than 90°F. Concrete in excess of 90°F shall be rejected at no additional cost to Owner. Contractor shall have provisions at plant for maintaining temperature of concrete less than 90°F but greater than 55°F. Introduction of ice in an amount equal to 50% of mixing water by weight will be permitted. Use of higher quantities shall be approved by Engineer.

Addition of water to increase the workability of the concrete at the site shall not be permitted. Changes in temperature of the concrete shall be as uniform as possible and shall not exceed 5°F in any one-hour or 50°F in any 24-hour period.

3.11 FINISHES FOR CONCRETE

- A. Surface Finish for Formed Concrete Surfaces:
 - 1. Defects in new concrete such as rock pockets and tie holes shall be repaired when forms are removed. All form ties shall be removed to a point 1"

beneath surface of concrete and resulting depression shall be carefully pointed with mortar or sand, water and cement in a proportion of 2:1. Bonding admixture, "Flex-Con" by Euclid Company, Sika Latex, or equal, shall be used in mortar. This shall be done for all surface finishes of formed concrete surfaces.

2. Formed concrete surfaces which will be covered by earth fill need not be finished except for repair of defects and pointing of form tie depressions.
3. Surfaces that will be exposed to view after completion of work shall be given an ordinary finish consisting of removal, by rubbing, of any fins left by form work and rubbing of pointed areas to remove roughness and projection as well as repairing rock pockets and tie holes as explained above. This includes interior wall surfaces above and below water surfaces.
4. Exposed exterior wall surfaces of all proposed structures shall receive a scrubbed finish.
 - a. Exterior wall finish shall extend minimum of one foot below final grade.
 - b. A scrubbed finish shall be performed in the following manner:
 1. Immediately following removal of the forms, remove all surface roughness, projections and other defects by grinding or chipping. Wet down the entire area and fill all air pockets, voids and other depressions with grout to produce a smooth dense surface free from pits and other irregularities. Thoroughly scrub into the wetted surface a mortar mixture consisting of 1 part well graded sand passing the No. 30 sieve, 1 part portland cement and a sufficient quantity of a bonding admixture (described previously) to produce a workable mixture. Scrubbing shall be accomplished by use of a rubber or wood float following by finishing with a cork float or a light brush. The resulting surface shall be true and uniform, with no discernible thickness of mortar on the surface.

B. Surface Finish for Unformed Concrete Surfaces.

1. Scratched Finish. A scratched finish is required on unformed concrete surfaces which will be covered with fill material and topping. The concrete shall be placed, consolidated, struck off and leveled. The surface shall then be roughened with stiff brushes or rakes before final set.
2. Float Finish. A float finish is required on unformed concrete surfaces that will be covered by built-up roofing. After the surface has been leveled and has stiffened sufficiently to allow the operation, the surface shall be floated at least twice to a uniform sandy texture.
3. Trowel Finish. A "hard, steel troweled finish" is required on all unformed concrete surfaces that are exposed in the finished work. After floating, the

surface shall be troweled at least twice to a dense, uniform surface free of blemishes, ripples and trowel marks. Care shall be taken to prevent an excess of fine material and water from being worked to the surface. Exterior slabs and sidewalks shall be given a "light broom finish" in lieu of the final steel troweling.

C. Miscellaneous

All areas. Edges and corners of structures, which are exposed in the completed structures, shall be chamfered 3/4", unless noted otherwise. Edges of walks and slabs on grade shall be finished with an edging tool.

Walks and slabs on grade shall have contraction joints scored in the concrete to control cracking. The spacing of the scored joints shall be equal to the width of the walk or slab unless otherwise specified or noted on the plans.

3.12 REPAIR OF DEFECTIVE AREAS

- A. All repair work on defective areas, regardless of size shall have prior approval of Engineer. Methods and procedures shall be in accordance with ACI 301, Chapter 9 except as modified herein.
- B. As early as possible, after removal of forms, Contractor shall patch any poor joints, voids, air pockets and minor honeycomb. Large areas of honeycomb and other weak areas shall be chipped out with light pneumatic chip-hammer. When chipping is performed, edges shall be perpendicular to surface. Feather edging will not be permitted.
- C. Repair of all defects shall be accomplished by first wetting area followed by application of a bonding grout consisting of one part cement and one part sand (passing the No. 30 sieve) mixed to consistency of thick cream. Patching material shall consist of one part of gray Portland and white Portland cement so proportioned with 2-1/2 parts of sand (passing the No. 30 sieve) and enough water to produce workable mixture which, when in place and cured will match color of unmarred surfaces.
- D. In lieu of cement bonding grout, bonding compound shall be Euco-Weld by Euclid Company, Duraweld by W. R. Grace Company, or equal. In lieu of Portland cement patching material, for non-architectural and non-structural areas only, patching compound may be "Poly-patch" by Euclid Company, Thorocrete by Standard Drywall, or equal.

3.13 WATERTIGHTNESS

- A. Upon completion of treatment tank(s) and/or channels the following test shall be applied to determine watertightness:

1. Fill the tanks(s) and/or channels with water to the maximum level and let it stand for at least 24 hours.
2. Measure the drop in liquid level over the next 72 hours to determine the liquid volume loss for comparison with the allowable leakage. Evaporative losses shall be measured or calculated and deducted from the measured loss to determine the net liquid loss (leakage). The net liquid loss for a period of 24 hours shall not exceed 0.05 of 1 percent of the tank capacity.
3. Extension of test duration. If the leakage exceeds the maximum allowable, the leakage test shall be extended to a total of five days. If at the end of five days the average daily leakage does not exceed the maximum allowable, the test shall be considered satisfactory. If the net liquid loss exceeds the maximum allowable, leakage shall be considered excessive and the tank(s) and/or channels shall be repaired and retested until leakage falls within the appropriate limit.
4. Damp spots. Damp spots on the exterior wall surface or measurable leakage of water at the wall base shall not be permitted. Damp spots are defined as spots where moisture can be picked up on a dry hand. The source of water movement through the wall shall be located and permanently sealed in an acceptable manner. Leakage through the wall-base joint or footing shall likewise be corrected. Damp spots on the footing are generally to be expected and are permissible.

3.14 SCHEDULE - JOINT FILLERS

- A. Sealants: As specified in 07920 – Joint Sealants.

END OF SECTION 03300

DIVISION 3 - CONCRETE
Section 03390 - Concrete Curing

PART 1 GENERAL

1.01 SUMMARY

- A. Initial and final curing, sealing of vertical foundation wall surfaces and exterior concrete flat work and curing, sealing and dust proofing of interior concrete floor slab surfaces.
- B. Related Sections:
 - 1. Section 03300 - Cast-In-Place Concrete

1.02 REFERENCE TO STANDARDS

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 302 - Recommended Practice for Concrete Floor and Slab Construction.
- C. ACI 308 - Standard Practice for Curing Concrete.
- D. ASTM C171 - Sheet Materials for Curing Concrete.
- E. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- F. ASTM D2103 - Polyethylene Film and Sheeting.

1.03 SUBMITTALS

- A. Submit under the provisions of Division 1 - Section 01330 – Submittal Procedures.
- B. Product Data: Provide data on curing compounds, compatibilities, and limitations.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301 and ACI 308.
- B. Maintain one copy of each document on site.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products under provisions of Division 1 - General Requirements.
- B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.01 CONCRETE CURING / SEALER / DUSTPROOFER

- A. Basis of Design Manufacturers: Specific product materials have been identified in the preparation of the drawings and these specifications. Other listed manufacturers will be considered, subject to compliance with the same product specifications and requirements of the drawings and specifications and approval by the Architect / Engineer.

- B. Wherever, substitute products are to be considered, submit adequate supporting technical literature, performance data, test reports and a completed Substitution Request form for a valid comparison of the products by the Architect / Engineer. The Basis of Design products specified herein shall be considered base bid.
- C. Basis of Design Manufacturer: The specific product materials as specified as basis of design herein are manufactured by Degussa Building Systems, 889 Valley Park Drive, Shakopee, MN, for Customer Service - 800- 433-9517.
- D. Interior & Exterior Concrete Foundation Walls and Interior Floor Slab:
 - 1. Transparent solvent-based, 25% solids, solvent-based compound for curing, sealing and dust proofing concrete, semi-gloss finish, VOC compliant.
 - a. Acceptable Product: Sonneborn Kure-N-Seal 25.

2.02 COATING SCHEDULE

- A. Exterior & Interior Concrete Foundation Walls: One coat application
- B. Exterior Concrete Flatwork: One coat application
- C. Interior Concrete Floor Slabs: Two coat application

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate conditions under provisions of Division 1 - General Requirements.
- B. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION

- A. Cure surfaces in accordance with ACI 308.
- B. See Section 03300 - Cast-In-Place Concrete - Article 3.08 for curing methods.

3.04 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions Division 1 - General Requirements.
- B. Do not permit traffic over unprotected floor surface.

3.05 FINAL ACCEPTANCE OF COMPLETE WORK

- A. The work shall be complete in every detail and the finished work approved by the Architect / Engineer and Owner before final acceptance.

END OF SECTION 03390

DIVISION 5 – METALS

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DIVISION 5 – METALS
Section 05210 – Steel Joists

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel joists shown or indicated on drawings and hereinafter specified. Work shall be performed in accordance with Steel "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders" of the Steel Joist Institute (latest edition).

1.02 RELATED SECTIONS

- A. Section 01330 – Submittal Procedures.

1.03 REFERENCE TO STANDARDS

- A. ASTM A307 - Carbon Steel Threaded Standard Fasteners, latest edition.
- B. ASTM A325 - High Strength Bolts for Structural Steel Joints, latest edition.
- C. AWS D1.1 - Structural Welding Code.
- D. Steel Joist Institute (SJI) - Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders.

1.04 SUBMITTALS

- A. The steel joist manufacturer shall prepare and submit to the Engineer complete shop drawings in accordance with Section 01330 for review and shall not proceed with manufacture prior to receiving approval of the Engineer.
- B. Indicate standard designations, configurations, sizes, spacing and locations of joists, joist coding, bridging, connections, attachments and cambers.

1.05 QUALITY ASSURANCE

- A. Conform to SJI Standard Specifications, Load Tables and Weight Tables.
- B. The joist manufacturer shall be certified by the Steel Joist Institute to produce the roof framing components.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Handling and Erection
 - 1. In accordance with standard specifications. Protect joists and accessories from harmful elements when stored at job site. Store above ground on platforms, pallets or other supports. Keep joists free of dirt and other foreign

matter.

- B. Damaged Joists
 - 1. Replace damaged joists.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Open Web Joist Members: SJI, Type K or LH Open Web Series.
- B. Bolts, Nuts and Washers: ASTM A325.

2.02 FABRICATION

- A. Fabricate steel joists in accordance with SJI Standard Specifications.
- B. Provide top and bottom chord bridging in accordance with SJI Standard Specifications. Joist manufacturer is responsible for design of bridging.
- C. Provide sloped bearings as indicated.
- D. Provide sloped top chords as indicated.

2.03 FINISH

- A. Prime paint: SSPC-15, shop coat of lead-free rust-inhibitive paint standard with joist manufacturer complying with the Steel Joist Institute.
- B. Do not prime areas to be field welded.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect steel joists and bridging in accordance with SJI Standard Specifications.
- B. Bear joists on supports in accordance with SJI.
- C. During erection, provide temporary bracing for induced loads and stresses.
- D. Coordinate placement of anchorages in concrete and masonry construction for securing bearing plates.
- E. Field weld joist seat to placed bearing plates after alignment, positioning after installation of bridging.
- F. Do not permit erection of decking until joists are braced and bridged.

- G. Do not field cut or alter joists without written acceptance by the Structural Engineer of record.
- H. After installation, paint bolts and nuts, welds and abraded or rusted surfaces on joists and joist accessories.
 - 1. Wire brush surfaces and clean with solvent before painting.
 - 2. Use same type and thickness of paint as used for shop painting.

END OF SECTION 05210

DIVISION 5 - METALS
Section 05311 - Steel Deck

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal decks.
- B. Accessories.

1.02 RELATED SECTIONS

- A. Section 05500 - Metal Fabrications.

1.03 REFERENCE TO STANDARDS

- A. AISI - Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A572 – High Strength Low Alloy Steels of Structural Quality.
- C. ASTM A446 - Steel sheet, zinc-coated (galvanized) by the hot-dip process, structural (physical) quality, latest edition.
- D. ASTM A525 - Steel sheet, zinc-coated, galvanized by the hot-dip process, latest edition.
- E. AWS D1.1 - Structural welding code, latest edition.
- F. SDI - Design Manual for Composite Decks, Form Decks and Roof Decks.

1.04 SUBMITTALS

- A. Shop Drawings
 - 1. Submit under the provisions of Division 1 - Section 01330 – Submittal Procedures.
 - 2. Deck layout, framing and supports with unit dimensions and sections. Note requirements to provide full decking on all areas and also on secondary light framing as shown on drawings.
 - 3. Type and location of fasteners.
- B. Manufacturer's Literature - recommend installation instructions.
 - 1. Manufacturer's certificate that decking passes 100 hour salt spray test, Method 6061, FED-STD 141.

1.05 SYSTEM DESCRIPTION

A. Performance Requirements

1. SDI "Specifications and Commentaries for Non-Composite Steel Form Deck".
2. Maximum unit design stress - 0.6 x minimum yield strength of steel.
3. Maximum working stress - 20,000 psi (roof deck).
4. Maximum deflection under live load: 1/240 span length, center to center of supports.
5. Anchorage to resist gross uplift loading:
 - a. Eave overhangs: 45 psf less dead load.
 - b. Other roof areas: 30 psf less dead load.

B. Tolerances

1. Maximum variation in unit alignment 1/4" in 40'-0" (1/1920).

1.06 QUALIFICATIONS

A. Qualifications of:

1. Manufacturer: Regularly engaged in the production of metal floor and roof decking.
2. Erector: Minimum of 5 years documented experience on comparable floor and roof deck projects.

1.07 QUALITY ASSURANCE

A. Regulatory Requirements

1. Install metal deck to meet requirements of Steel Deck Institute.

1.08 DELIVERY, STORAGE AND HANDLING

A. Metal Decking

1. Do not bend or mar decking.
2. Store off ground with one end elevated for drainage.
3. Cover deck with waterproof material.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A.	Consolidated Systems, Inc.	Columbia, SC
B.	Epic Metals Corp.	Rankin, PA
C.	Nucor Corporation, Vulcraft Div.	Charlotte, NC
D.	H. H. Robertson Co.	Pittsburgh, PA
E.	Roof Deck, Inc.	Highstown, NJ
F.	United Steel Deck, Inc.	Summit, NJ
G.	Wheeling-Pittsburgh Steel Corp., Wheeling Corrugating Co. Div.	Wheeling, WV
H.	Reliance Steel Products Co.	McKeesport, PA
I.	Roof Deck, Inc.	Highstown, NJ
J.	U. S. Steel Corp.	Birmingham, AL
K.	Ventaire Corp.	Tulsa, OK
L.	Verco Mfg., Inc.	Phoenix, AZ
M.	Walcon Corp.	Southfield, MI

2.02 MATERIALS

- A. Sheet Steel: ASTM A653, Grade A structural quality, G90 coating.
- B. Bearing Plates: ASTM A36 steel.
- C. Welding Materials: AWS D1.1.
- D. Touch-up Primer: Zinc chromate type compatible with top paint coats.

2.03 FABRICATION

- A. Metal Roof Decking
 - 1. As indicated on the drawings, by Vulcraft or equal, ribbed profile 3'-0" wide sheets; multiple span; lapped joints.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect supporting members for correct layout and alignment.
- B. Verify that surfaces to receive deck are free of debris.
- C. Do not proceed with installation until defects are corrected.

3.02 INSTALLATION

- A. Erect metal decking in accordance with SDI Design manual for Composite Decks, Form Decks and Roof Decks. Provide welding in accordance with AWS D1.1.

- B. On steel support members, provide 1-1/2" minimum bearing. Align and level on supports.
- C. Fasten deck to supporting members using 36/3 pattern with #12 TEK screws. Sidelap fasteners shall be 2 - #10 TEK screws per span.
- D. Mechanically fasten male/female side laps per deck manufacturer's requirements.
- E. Side laps of the metal deck shall be fastened by welding or mechanical means at three feet on center between the supports.
- F. Reinforce deck openings from 6 inches to 18 inches in size with 2" x 2" x 1/4" steel angles. Place angles perpendicular to flutes, extend minimum two flutes each side of opening and weld to deck.
- G. Reinforce deck and connections to resist uplift forces at supports and flexural and torsional stresses due to discontinuity of metal deck at silo penetration.
- H. Install sheet metal closures and angle flashings to close openings between deck and walls and openings.

3.03 PROTECTION

- A. Do not use deck units for storage or working platforms until permanently secured in position.
- B. Assure that construction loads do not exceed carrying capacity of deck.

END OF SECTION 05311

DIVISION 5 - METALS
Section 05500 – Metal Fabrications

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 03300 – Cast-In-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04810 – Unit Masonry: Placement of metal fabrications in masonry.

1.03 RELATED SECTIONS

- A. Section 05520 – Handrails and Railings.
- B. Section 05532 – FRP Gratings and Floor Plates: Bearing angles for grating bearing, including anchorage.

1.04 UNIT PRICE - MEASUREMENT AND PAYMENT (RESERVED)

1.05 REFERENCE TO STANDARDS

- A. ASTM A36 - Structural Steel.
- B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
- D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A276 - Stainless Steel Fasteners, Nuts and Washers, Type 304.
- F. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- G. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- H. ASTM A992 – Standard Specifications for Steel for Structural Shapes for Use in Building Frames.
- I. AWS A2.0 - Standard Welding Symbols.
- J. AWS D1.1 - Structural Welding Code.
- K. SSPC - Steel Structures Painting Council.

1.06 SUBMITTALS

- A. Submit shop drawings for fabrication and erection of miscellaneous metal assemblies. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
- B. Indicate welded connections using standard AWS A2.1 welding symbols. Indicate net weld lengths.

1.07 QUALITY ASSURANCE

- A. Field Measurements
 - 1. Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.
- B. Inserts and Anchorages
 - 1. Furnish inserts and anchoring devices, which must be set in concrete or built into masonry for installation of metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- C. See concrete, masonry, mechanical, electrical and other Sections of these Specifications for installation of inserts and anchorage devices.
- D. Shop Assembly
 - 1. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- E. Codes and Standards
 - 1. Comply with the provisions of the following codes, standards and specifications, except as otherwise shown and specified.
 - a. AISC - "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", and including "Commentary of the AISC Specification".
 - b. AISI - "Specification for the Design of Cold-Formed Steel Structural Members".
 - c. AWS - "Code for Welding in Building Construction".

- d. ASTM A6 - "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
- F. AISC Qualification for Welding Work
 - 1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Plates and Bars: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Pipe: ASTM A53, Grade B, Type S, Schedule 40.
- D. Fasteners: A307, galvanized, unless noted otherwise.
- E. Bolts, Nuts, and Washers: ASTM A307, unless noted otherwise.
- F. High-Strength Threaded Fasteners: ASTM A325, 3/4 inch diameter (minimum), unless noted otherwise.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Aluminum Plates and Angles: Aluminum Alloy 6061-T6.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC 20, Organic, zinc rich.
- J. Drilled-In Anchors

All drilled-in concrete anchors shall be adhesive chemical anchor type, as manufactured by Hilti, ITW, or approved equal. Use of expansion anchor devices shall be permitted only where shown on the drawings and where required for attachment of miscellaneous equipment. There will be no exceptions to this requirement. Drilled-in anchors shall be a minimum of 1/2" diameter, ASTM 276 Type 304, unless noted otherwise, with minimum embedment as required by manufacturer, or shown on the drawings.

2.02 FABRICATION - GENERAL

- A. Workmanship
 - 1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces. All welds shall be made with E70XX electrodes and shall conform to AWS Specifications.
4. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use.
5. Cut, reinforce, drill and tap miscellaneous metal work as required to provide adequate support for intended use.
6. Cut, reinforce, drill and tap miscellaneous metal work as required to receive finish hardware and similar items.
7. Verify dimensions on site prior to shop fabrication.
8. Fabricate items with joints tightly fitted and secured.
9. Fit and shop assemble in largest practical sections, for delivery to site.
10. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
11. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
12. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.03 MISCELLANEOUS METAL ITEMS

A. Miscellaneous Framing and Supports

1. Provide miscellaneous steel framing and supports that are not a part of structural steel framework, as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

3. Equip units with integrally welded anchor straps for casting into poured concrete or building into masonry wherever required. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 24" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

2.04 LADDERS

- A. Fabricate ladders and cages for locations shown with dimensions, spacings, details and anchorages as indicated. Comply with requirements of OSHA and ANSI A14.3, except as otherwise indicated.
 1. Construct from stainless steel or aluminum materials as indicated on the drawings.
- B. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- C. Support each ladder at top and bottom and at intermediate points spaced not more than 6'-0" o.c. Use welded or bolted steel or aluminum brackets as indicated, designed for adequate support and anchorage, and to hold the ladder clear of wall surface with a minimum of 8 1/2" clearance from wall to centerline of rungs.

2.05 LOOSE LINTELS

- A. Loose lintels shall be provided for all openings as shown on the drawings and for all masonry openings for ducts and similar items.
- B. Unless otherwise shown, lintels shall be standard structural shapes, selected for trueness of line, bearing 8 inches on each end for built-up members, or as shown on the drawings.
- C. All lintels provided for exterior wall construction shall be hot dipped galvanized per ASTM A123.

2.06 ALUMINUM HATCHES

- A. All access hatches shall be 1/4" aluminum channel with anchor flange around the perimeter. Door leaf shall be 1/4" aluminum diamond plate reinforced with aluminum stiffeners as required. The door shall open to 90 degrees and lock automatically in that position. Doors shall be built to withstand a live load of 300 pounds per square foot and equipped with a snap lock and recessed hasp covered by a hinged lid flush with surface. Mill finish with bituminous coating to be applied to exterior of frame by manufacturer. Hardware shall be stainless steel. Installation shall be in accordance with manufacturer's instructions. The access hatches shall be by Halliday Products, Bilco or an approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

- A. Furnish setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.
- C. Clean and strip site primed steel items to bare metal where site welding is scheduled.
- D. Make provision for erection loads with temporary bracing. Keep work in alignment.
- E. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate Sections.

3.03 INSTALLATION

- A. Fastening to In-Place Construction
 - 1. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- B. Cutting, Fitting and Placement
 - 1. Perform cutting, drilling and fitting required for installation of miscellaneous metal items. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items, which are to be built into concrete, masonry or similar construction.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections, which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth and touch-up shop paint coat or galvanized finish.
- D. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- E. Field weld components indicated on Drawings.

- F. Perform field welding in accordance with AWS D1.1.
- G. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.
- H. Immediately after erection, clean field welds, bolted connections and abraded areas and touch up with paint as specified.

3.04 ERECTION TOLERANCES

- A. Deviation from plumb, level and alignment shall not exceed 1 in 500.

3.05 SCHEDULE

- A. Provide and install items listed in Schedule and shown on Drawings with anchorage and attachments necessary for installation.
- B. The schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
- C. Grating support angles.
- D. Steel members for mechanical equipment support; prime paint finish.

END OF SECTION 05500

DIVISION 5 - METALS

Section 05532 – FRP Grating and Floor Plates

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Provide all labor, materials, and equipment required to complete the installation of all fiberglass grating, stair landings and treads. FRP odor control covers are specified in Section 11305.
- B. The work shall include, but not be limited to, the following principal items:
 - 1. FRP Floor Plate – 2".
 - 2. Pultruded FRP I-Bar grating – 1½".
 - 3. Pultruded FRP heavy duty rectangular bar grating – 2¼".
 - 4. Fiberglass embedment angle frames.

1.02 RELATED WORK

- A. Section 03100 – Concrete Formwork
- B. Section 05500 – Metal Fabrications

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Provide the FRP molded grating to conform to the following codes and standards:
 - 1. ASTM E-84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E-448: Test Method for Strength of Anchors in Concrete and Masonry Elements
 - 3. ASCE 7-05: Minimum Design Loads for Buildings and Other Structures
- B. Take field measurements prior to the preparation of Shop Drawings and fabrication.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's product and complete installation data for all grating and floor plate materials in this specification.
- B. Shop Drawings: Submit shop drawings to show plan, elevations, profiles, joining method, fastening details, adjacent construction interfaces, and dimensions prior to fabrication and installation. Contractor shall submit structural load tables for the applicable use.
- C. Samples: Provide on request; sized to adequately represent the materials.
- D. Contract Closeout: Submit the Manufacturer's Warranty prior to contract closeout.

1.05 PRODUCT HANDLING

- A. All materials shall be delivered in the manufacturer's original steel strapping/packaging.
- B. Store materials in a dry, protected, well-vented area. Report damaged material immediately to delivering carrier and manufacturer.

1.06 JOB CONDITIONS

- A. Verify that other trades are complete before installing the FRP grating or floor plates.
- B. Mounting surfaces shall be straight and secure; substrates of proper width.
- C. Refer to construction documents, shop drawings and the manufacturer's installation instructions.

1.07 WARRANTY/GUARANTEES

- A. Manufacturer's Standard Warranty: The grating and floor plate sections shall be free of defects in material and workmanship for one year from date of shipment. If, after inspection, the manufacturer agrees that materials are defective, the manufacturer shall repair or replace them at no additional cost. Manufacturer shall be liable for removal or reinstallation costs of defective material or resulting damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

McNichols
5505 West Gray Street
Tampa, FL 33609-1007
Tel: (813) 282-3828, Ext. 2100
Fax: (813) 287-1066
E-mail: corp@mcnichols.com

Strong Well
400 Commonwealth Avenue
P.O. Box 580
Bristol, VA 2403-0580
Tel: (276) 645-8000
Fax: (276) 645-8132

IKG Industries
One Mack Centre Drive
Paramus, NJ 07652
Tel: (713) 378-3982
Fax: (713) 378-3900
E-mail: sales@ikgindustries.com

2.02 FRP FLOOR PLATE

- A. The molded fiberglass reinforced plastic (FRP) floor plate shall be solid I-bar floor panels by McNichols, or equal, with 2" deep bearing bars. The floor plate shall be one-piece construction integral with the bearing bars. The resin system shall be

premium grade polyester: PN (for non-fire-retardant polyester). The top surface shall be lightly gritted. Color shall be standard gray.

2.03 PULTRUDED FRP GRATING

- A. Pultruded fiberglass reinforced plastic (FRP) grating shall be MS I-6015 – 1½” grating or MSHD R-6022 – 2¼”, as indicated on the drawings. The grating shall have perpendicular cross bars. The resin system shall be premium grade polyester: PN (for non-fire-retardant polyester). The top surface shall be lightly gritted. Color shall be standard gray. Exterior grating shall have a UV coating. Openings shall be 40% or less of the total area of the grating.

2.04 LOADING AND DEFLECTION REQUIREMENTS

- A. Design Live Load: Uniform load of 150 pounds per square feet; concentrated load of 300 pounds.
- B. Maximum Allowable Deflection Under Live Load: 0.25 inches.

2.05 ACCESSORIES

- A. Support Angles: Unless shown otherwise on drawings, provide manufacturer’s required support angle frames and bolts.
- B. Grating Clips: Provide manufacturer’s stainless steel fastener clips.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that the floor plate installation will not disrupt other trades and verify that the substrate is dry, clean and free of foreign matter. Correct all defects prior to installation.
- B. The Contractor shall verify that the substrate can support the floor plate before installation begins.

3.02 INSTALLATION

- A. Install the grating, floor plate and embedment angles in accordance with the project drawings, specifications, approved shop drawings, and manufacturer’s installation standards.
- B. Grating and floor plate panels shall be fabricated to be square within manufacturer’s tolerances and free from warping and any defect that may affect serviceability and reliability.
- C. Install the grating and floor plate with a min. 1-1/2” bearing surface at the support ends. Hardware and clips are the responsibility of the installer. Grating shall be fastened to the support substrate using grating clips supplied by the grating manufacturer with a minimum of four stainless steel saddle clips per section piece.

Hardware to attach clips is the responsibility of the installer. Fastening shall be consistent with the manufacturer's instructions.

- D. Tolerances between sections shall provide for not more than 1/4" clearance between adjacent sections or between sections and frames. Adjacent sections shall line up to form an uninterrupted straight line, where possible. Clearance between floor plate and equipment shall be 1/2".
- E. Grating and floor plate sections shall be installed to be removable unless indicated otherwise.
- F. Openings shall be field cut by the installer where necessary to permit field installation of wiring, equipment, piping, etc. Where openings are provided, the grating and floor plate shall be discontinuous to allow each section of floor plate to be easily removed. All rectangular cutouts shall be made to the next bearing bar past the obstruction. Circular cutouts shall be 2" larger in diameter than the obstruction.
- G. Coat all cut or sanded surfaces with resin furnished by the grating and floor plate manufacturer in accordance with the manufacturer's instructions.

3.03 IN-USE MAINTENANCE

- A. Provide the Owner with the manufacturer's maintenance instructions.

END OF SECTION 05532

**NEW VAULT BUILDING
HVAC SPECIFICATIONS**

DIVISION 15 - MECHANICAL
Basic Mechanical Materials And Methods

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. All applicable requirements of other portions of the Contract Documents apply to the Work of this Section including, but not limited to, all Drawings, all Specifications, General Conditions, and General Requirements including submittals.

1.02 SUMMARY

- A. This Section includes general administrative and procedural requirements for mechanical installations to expand the requirements specified in Related Documents.

1.03 RELATED WORK

- A. Specified Elsewhere:
 - 1. Section 15764 – Electric Resistance Space Heating Units
 - 2. Section 15832 – Power Ventilators
 - 3. Section 15850 – Air Inlets and Outlets
 - 4. Section 15954 – Air Systems Testing, Adjusting and Balancing

1.03 REFERENCE TO 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. 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 Project Representative for a decision before proceeding.
- C. 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.

1.04 SUBMITTALS

- A. General: Submit: The following lists minimum requirements for Submittals covering Building Mechanical items.
- B. Prior to the performance of any work or installation of any materials, obtain approval from the Project Representative by submitting shop drawings and data sheets.
- C. Submittal of shop drawings, product data, and samples will be accepted only when submitted by the Contractor. Data submitted from Subcontractors and material suppliers directly to the Project Representative will not be accepted or processed.
- D. Any items with a tag number must be submitted for approval. Submittals shall provide all pertinent data and information necessary to evaluate each item. Drawings and data sheets shall show:
 - 1. Principal dimensions and details of construction.
 - 2. Weights of principal parts and total weights with information required for the design of supports and foundations.
 - 3. Sizes and locations of piping and connections.
 - 4. Performance data, including pump and fan curves; fan discharge and inlet noise data; certified by the manufacturer for the equipment furnished.
 - 5. Data on electric motors, including break HP of driven equipment, nameplate ratings and classes, and starting and running full load currents.
 - 6. Approval stamp of Underwriters and other authorities having jurisdiction of drawings requiring such approval.
 - 7. Automatic temperature control system including diagrammatic layout of piping, wiring, control device, and equipment, and detailed descriptions of each item of equipment and its function in the system and system operation.
 - 8. Refrigeration for field-assembled systems including description of specialties and pressure drops, layout of piping with lengths, fittings, and refrigerant specialties, and capacity curves for evaporator and compressor showing balance points.
- E. Approval of shop drawings does not release Contractor from responsibility of coordinating his work at job site and taking field measurements. In cases where interferences become apparent, the Contractor shall notify the Project Representative so that such interferences may be resolved prior to proceeding with shop work. No claim will be allowed for work that might have to be moved or replaced based on a claim that work was placed in accordance with dimensions shown on an approved shop drawing.

1.05 RECORD DOCUMENTS

- A. The following lists minimum requirements for Record Documents covering Building Mechanical item.

- B. Record Documents: Maintain a clean, undamaged set of Contract Documents and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Documents. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark new information that is important to the Project Representative, but was not shown on Contract Drawings or Shop Drawings.
 2. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
 3. Ductwork mains and branches, size and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
 4. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Indicate actual inverts and horizontal locations of underground piping.
 5. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 6. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
 7. Contract Modifications, actual equipment and materials installed.
- C. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located to record the locations and invert elevations of underground installations.

1.06 MAINTENANCE MANUALS AND OPERATING INSTRUCTIONS

- A. The following lists minimum requirements for Operating and Maintenance Manuals covering Building Mechanical items.
- B. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Spare parts list.
 2. Copies of warranties.
 3. Wiring diagrams.
 4. Inspection procedures.
 5. Shop Drawings and Product Data.

6. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 7. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 8. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 9. Servicing instructions and lubrication charts and schedules.
- C. All controls and safety devices shall be clearly and permanently marked with embossed or printed plates as to purpose and as to operation and shall be tested in the presence of the Owner's designated representative to insure that he understands their function and purpose.
- D. Upon completion of the work, the Contractor shall put the systems into service. The Contractor shall be entirely responsible for the equipment during all testing operations including the turning on and off the apparatus. Each Contractor shall provide the Owner, three 4-hour instruction sessions in the operation of the equipment and systems.

1.07 WARRANTIES

- A. Refer to Related Documents for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
- B. Compile and assemble the warranties specified in Division 15, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.
- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

1.08 PRODUCT LISTING

- A. Prepare listing of major mechanical equipment and materials for the project.
- B. When two or more items of same material or equipment are required, they shall be by the same manufacturer. Product manufacturer uniformity does not apply as applicable for project to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in work, except as otherwise indicated.

- C. Provide products which are compatible within systems and other connected items.

1.09 NAMEPLATE DATA

- A. Provide permanent operational data nameplate on each item of power operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliance, and similar essential data. Locate nameplates in an accessible location.

1.10 DEFINITIONS

- A. The following terms are used throughout the contract documents. The work will be governed in accord with the definitions.
 1. The term "Piping" refers to pipe, fittings, valves, flanges, unions, specialties and accessories and appurtenances necessary for, or incidental to, a complete system.
 2. The term "Ductwork" refers to all air delivery, recirculation and exhaust ducts whether of sheet metal or other material, and includes all connections accessories and appurtenances necessary for and incidental to a complete system.
 3. The term "concealed work" refers to piping and ductwork above ceilings and within walls, partitions, shafts or service spaces, not normally exposed to view and enclosed on all sides by finish materials. Access to piping and ductwork would be by removal of finish materials.
 4. The term "concealed but accessible work" refers to piping and ductwork accessible above or through suspended ceilings, in walls at access panels or in chases with access doors or manddoors.
 5. The term "exposed work" refers to piping or equipment normally exposed to view within rooms or open areas.

PART 2 PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

- A. Materials, products, and equipment shall be delivered to job site with factory packaging bearing manufacturer's name or label, and union label whenever practical.
- B. Provide for each piece of equipment any special tools required for the operation or adjustment of the equipment and turn over to the Project Representative prior to final approval of the equipment.
- C. Exposed machined surfaces of equipment such as shafts, bearing surfaces, gasket surfaces, gears, etc., shall be provided with adequate protection at the factory to prevent physical damage and corrosion prior to installation.

- D. Equipment openings and connections shall be provided with adequate covers at the factory to protect the internals, threads, and flanges and prevent entrance of any foreign matter prior to installation.

2.02 MOTORS AND DRIVES

- A. Acceptable Manufacturers:

1. General Electric
2. Lincoln
3. Reliance
4. Gould
5. Siemens
6. Louis-Allis
7. Baldor
8. Peerless
9. Century

- B. Motors shall be standard NEMA design, of size and characteristics as indicated on the Drawings. Motors shall comply with the specifications set forth in Division 16.

- C. Motors shall have the following features:

1. Arranged to operate continuously under full load in an ambient temperature of 40 degrees Centigrade.
2. Motor service factor not less than 1.15, determined by the specific application.
3. Drip-proof unless specific application requires a hermetic, totally enclosed or explosion proof motor as noted.
4. Provided with either internal or external thermal overload protection. Motors to be used with variable frequency controllers shall have internal thermal overload protection.
5. Permanently lubricated or grease reservoir type bearings. Reservoir type bearings shall have top and bottom screw plugs for flushing and repacking.
6. For convenient access (particularly to clear belt guards) the lubrication fittings shall be extended with pipe and fittings properly secured in place.
7. Windings shall be copper.

- D. Drives shall have the following features:

1. Belted motors shall have sliding bases for adjustment of belt tension.
2. Sheaves shall be of the vari-pitch type, except for equipment used with variable speed controllers. Drives and driven sheaves shall be machined cast steel.
3. Belt drives shall be of V-belt type with drive capacity of at least 150 percent of motor horsepower. Belts shall be matched sets when multiple belt drives

- are used. No fan of integral HP or greater shall have less than two belts.
4. Belt drives, shafts and couplings shall be fully guarded with heavily reinforced expanded metal or woven wire in accordance with OSHA and National Safety Council Standards.
 5. Provide openings in the guards all shafts to permit the use of a tachometer.
- E. The following Table indicates minimum efficiencies and power factors for three phase motors operating fully loaded at 1800 rpm with electrical characteristics of 200, 230, 460 volts, 60 hertz.

<u>Horsepower</u>	<u>Efficiency</u>	<u>Power Factor</u>
1	82.5	84
1-1/2	84.0	85.7
2	84.0	85.7
3	85.5	85.0
5	86.5	88.0
7-1/2	88.5	81.0
10	89.5	85.5
15	90.0	84.5
20	91.0	86.0

PART 3 EXECUTION

3.01 MECHANICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
1. Coordinate mechanical systems, equipment, and materials installation with other building components.
 2. Verify all dimensions by field measurements.
 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 8. 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 Project Representative.

9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
10. Install mechanical 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. Extend grease fittings to an accessible location.
11. Install access panels or doors where units are concealed behind finished surfaces.
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. 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 Contract Documents.
14. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

3.02 ELECTRICAL WIRING

- A. Contractor furnishing mechanical equipment shall provide all low voltage and line voltage control circuit wiring, conduit and connections and all wiring associated with starter holding coils, unless specifically designated as another Contractor's work.
- B. Electrical Contractor shall be responsible for all line voltage power wiring and final connections to complete the mechanical systems.
- C. All wiring shall be in compliance with all State and Local codes and in accordance with specifications set forth in Section 16123 - Building Wire and Cable.
- D. The sharing of space within a common conduit by line voltage conductors and by control circuit conductors shall not be permitted.

3.03 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 2 through 16 for rough-in requirements.

3.04 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Related Documents. In addition, the following requirements apply:

1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- B. Perform cutting, fitting, and patching of mechanical 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. Remove samples of installed Work as specified for testing.
 5. Install equipment and materials in existing structures.
 6. Upon written instructions from the Project Representative, uncover and restore Work to provide for Project Representative observation of concealed Work.
- C. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical 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.
- F. 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.

3.05 PERFORMANCE

- A. All equipment and systems shall be protected against freezing, flooding, corrosion, and other forms of damage prior to acceptance by the Project Representative.
- B. Design and fabrication features or proven methods not specifically covered by this specification shall be specifically stated and documented in the proposal.
- C. Labor shall be furnished for assembling all pieces of equipment which, due to shipping limitations, have components which arrive on the jobsite disassembled.

3.06 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Arrange for each installer of equipment that requires regular maintenance to meet

with the Project Representative'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. Spare parts and materials.
2. Tools.
3. Lubricants.
4. Identification systems.
5. Control sequences.
6. Hazards.
7. Cleaning.
8. Warranties and bonds.
9. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

C. Provide, to the Project Representative, maintenance information identical to that to be submitted for Maintenance Manuals. These manuals are beyond those required for Maintenance Manuals. Certification of Substantial Completion cannot be made without documentation of startup, including the issue of above noted maintenance information.

3.07 FINAL INSPECTION

A. Prior to final acceptance, all systems shall be operated to test performance to the satisfaction of the Project Representative.

1. Water shall circulate throughout systems without noise, water hammer, leaks, trapping, or air-binding.
2. Air in ducts shall circulate without excessive noise or vibration.
3. Motors, fans, and other equipment shall operate without excessive noise or vibration.
4. Automatic controls shall maintain specified conditions at control points.
5. Systems shall be balanced to operate within the stated tolerances. If any device does not operate within the stated tolerances, then the entire system shall be considered out of balance and shall be readjusted until all units are within the stated tolerances.
6. Equipment and machines shall have initial lubrication, and be aligned and tuned-up for efficient performance.

7. Heating, ventilating, and air-conditioning systems shall maintain uniform temperatures without drafts.
 8. Drains shall flow freely, without excessive noise, leaks or stoppages.
- B. Defects demonstrated by inspections and tests shall be corrected to the satisfaction of the Project Representative at the Contractor's expense.

3.08 PROTECTION

- A. Guards, barricades, lights, services, etc., necessary for the protection of persons and property shall be furnished and maintained.
- B. Existing work such as pavements, lawns, sidewalks, floors, curbs, and other structures and utilities which are damaged or disturbed due to making connections or any phase of operations shall be restored to the satisfaction of the Project Representative and the governing authorities.

END OF SECTION 15050

DIVISION 15 – MECHANICAL
Section 15764 – Electric Resistance
Space Heating Units

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Extent of work as required by the drawings and these specifications. This section includes requirements to furnish and install electric resistance unit heaters and duct heaters.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 16010 – General Electrical Requirements.
 - 2. Section 16170 – Grounding and Bonding.

1.03 REFERENCE TO STANDARDS

- A. UL
- B. NEC
- C. OSHA

1.04 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. To the greatest extent possible obtain materials from only one manufacturer, even though several may be specified as acceptable manufacturers.
- B. Supplier:
 - 1. Subcontract furnishing of the materials only to a recognized material supplier who has been furnishing materials in the same area as project for a period of not less than 2 years.
- C. Installer:
 - 1. Subcontract installation of materials to a company specializing in the installation in performing work of this section with a minimum 5 years experience. Assign work to experienced tradesmen in compliance with trade union jurisdictions.
- D. Installation:
 - 1. Perform work in accordance with State of Illinois and local building codes.

2. Perform work in accordance with industry standards.

1.05 SUBMITTALS

- A. Submit in accordance with Section 15050 – Basic Mechanical Materials and Methods.
- B. Shop Drawings: Indicate layout (plan and/or elevation) of equipment, dimensions, materials, mounting bolt layout and dimensions, power requirements, wiring, diagrams, etc.
- C. Product Data: Provide data on operating equipment characteristics.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Unit heaters shall be fully assembled when delivered to site.
- B. Coordinate placement of anchors and equipment.

PART 2 PRODUCTS

2.01 HORIZONTAL UNIT HEATERS – UH-1,2

- A. Acceptable manufacturers:
 1. Chromalox LUH
 2. Indeeco
 3. Berko
- B. General: Electric unit heater for suspended mounting, with fan forced air distribution over electric resistance heating coils and horizontal discharge.
- C. Cabinet shall be fabricated of heavy welded steel protected by phosphate primer with powder coated baked enamel.
- D. Discharge louver shall have individually adjustable blades.
- E. Unit shall be equipped with a propeller type, direct drive fan.
- F. Motor shall be totally enclosed, epoxy painted, and shall have built-in thermal overload protection.
- G. Fan blades shall be epoxy coated aluminum and shall be provided with wire fan guard.
- H. Heating element shall have a steel sheath with cold rolled steel fins.
- I. Unit shall be furnished with pre-wired, self-contained control center including

magnetic contactor control circuit transformer, control fuses, and branch circuit motor fuses, with terminal strip and conduit access for external 120V thermostat circuit.

- J. Provide one-stage, remote mounted, line voltage, pilot duty device thermostat. Thermostat shall incorporate a shielded nickel plated sensing bulb attached directly to the bottom of the enclosure. The case shall be sealed with gasket O-rings rings. The adjustable knob shall provide control within $\pm 2\text{-}1/2$ deg. F. Control shall have a positive off position. Enclosure shall be NEMA 4.
- K. Accessories:
 - 1. Provide line voltage disconnect switch for each input circuit.
 - 2. Provide terminal blocks for power and control wiring connections.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify size, type, mounting location and clearances for all equipment.

3.02 INSTALLATION

- A. Unit heaters and controls shall be installed as detailed on the plans and as required by manufacturer. Contractor shall maintain minimum distance from combustibles as required by manufacturer. Where required, stiffener plates shall be installed to walls to assist in supporting heaters.
- B. All unit heaters and controls shall be tested after installation for correct operation, current draw and airflow.

3.03 FIELD QUALITY CONTROL

- A. Operate installed unit heaters to demonstrate compliance with requirements. Repair or replace faulty accessories, as required to obtain proper operation and performance.

3.04 ADJUSTING AND CLEANING

- A. Adjusting: Adjust position and thermostat for proper setting.
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 15764

DIVISION 15 – MECHANICAL
Section 15832 – Power Ventilators

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. The extent of work as required by the drawings and these specifications. This work includes roof exhausters and associated mounting hardware, as required to provide complete and operational ventilation and exhaust systems.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 15954 – Air Systems Testing, Adjusting and Balancing.

1.03 REFERENCE TO STANDARDS

- A. UL
- B. NEC
- C. AMCA
- D. ASHRAE
- E. SMACNA
- F. American Conference of Governmental Industrial Hygienists, "Industrial Ventilation, 21st Edition"

1.04 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. To the greatest extent possible obtain materials from only one manufacturer, even though several may be specified as acceptable manufacturers.
- B. Supplier:
 - 1. Subcontract furnishing of the materials only to a recognized material supplier who has been furnishing materials in the same area as project for a period of not less than 5 years.

- C. Installer:
 - 1. Subcontract installation of materials to a company specializing in the installation in performing work of this section with a minimum 5 years experience. Assign work to experienced tradesmen in compliance with trade union jurisdictions.
- D. Installation:
 - 1. Perform work in accordance with State of Illinois and local building codes.
 - 2. Perform work in accordance with industry standards.

1.05 SUBMITTALS

- A. Submit under the provisions of Section 015050 – Basic Mechanical Materials and Methods.
- B. Shop Drawings: Indicate layout (plan and/or elevation) of equipment, dimensions, materials, mounting bolt layout and dimensions, power requirements, wiring diagrams, etc.
- C. Product Data:
 - 1. Provide data on operating equipment characteristics for each fan.
 - 2. Rooftop supports and roof curbs.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept material on site in shipping containers with labeling in place. Inspect for damage.

PART 2 PRODUCTS

2.01 CENTRIFUGAL ROOF EXHAUSTERS – EF-1

- A. Acceptable Manufacturers:

1.	Carnes	VE_K
2.	Cook	ACE_
3.	Greenheck	G_
4.	ILG	CR_A
5.	Penn	Domex
6.	Breidert	DB/RED
7.	Acme	PV/PRN
- B. General Description: Belt-driven or direct-drive as indicated, centrifugal consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.
- C. Housing: Heavy-gage, removable, spun-aluminum, dome top and outlet baffle;

square, one-piece, hinged, aluminum base with venturi inlet cone.

- D. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.
- E. Belt-Driven Drive Assembly: Resiliently mounted to the housing, with the following features:
 - 1. Pulleys: Cast-iron, adjustable-pitch.
 - 2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 - 3. Fan Shaft: Turned, ground, and polished steel drive shaft keyed to wheel hub.
 - 4. Fan and motor isolated from exhaust air stream.
- F. Accessories: The following items are required as indicated:
 - 1. Disconnect Switch: Nonfusible type, with thermal overload protection mounted inside fan housing, factory-wired through an internal aluminum conduit.
 - 2. Bird Screens: Removable 1/2-inch mesh, 16-gage, aluminum or brass wire.
 - 3. Cooling thermostat with OFF-ON-AUTO, switch on the subbase.
 - 3. Dampers: Line voltage motor-operated, parallel-blade, volume control dampers mounted in curb base.
 - a. Blades: Die-formed sheet aluminum.
 - b. Frame: Extruded aluminum, with waterproof, felt blade seals.
 - c. Linkage: Nonferrous metals, connecting blades to operator.
 - d. Operators: Manufacturer's standard electric motor.

2.03 ROOF CURBS

- A. Provide roof curbs and equipment supports where shown and detailed on the drawings, and as required for various roof penetrations and/or equipment support.
- B. Roof Curbs:
 - 1. Acceptable Manufacturers:
 - a. Custom Curb, Inc. - Model CRC-1
 - b. Pate Co. - Model PC-5
 - c. ThyCurb - Model TC-1
 - d. Roof curb may be furnished by equipment manufacturer.
 - 2. Roof curbs shall be constructed using minimum 18 gauge galvanized steel (14 gauge for curbs supporting HVAC units, or as deemed necessary by curb manufacturer), with fully mitered and welded corners, 3" integral cant, integral base plates, internally reinforced with 1" x 1" x 1/8" steel angle (curbs with any side longer than 3'-0") factory insulated with 1-1/2" thick three pound density fiberglass insulation, and factory installed pressure treated wood nailers.
 - 3. Minimum height of curb shall be 12" above finished roof.

4. Curbs shall be constructed to match slope of roof and provide a level top surface for mounting of mechanical equipment or insulated top cover cap.
5. Cant shall be raised to accommodate thickness of roof deck insulation. This height shall be additive to the above specified curb height.
6. Curb shall be provided at all roof penetrations including, but not limited to, HVAC units, duct openings, pipe penetrations, column penetrations, and exhaust fans.

PART 3 EXECUTION

3.01 PREPARATION

- A. Visually inspect for signs of damage, impact damage would appear as whitening of the surface or star shaped cracks or crazes.

3.02 FAN INSTALLATION

- A. Install fans where shown on plans. Exact equipment locations shall be coordinated with all other contractors and trades. Any equipment installed without the proper coordination shall be removed and reinstalled at the expense of that Contractor.
- B. Coordinate exact opening sizes with equipment manufacturer.
- C. Check all bolts to assure that none have loosened.
- D. Before wiring the motor, rotate fan wheel by hand to check for free rotation and to assure that the impeller has not shifted such that it would be rubbing against the fan housing.
- E. Install all accessory equipment that is not already preassembled with fans.
- F. Run conduit from inside building, along inside corner of the curb to the junction box.
- G. Safety disconnect and motor overload protection shall be tested upon successful completion of installation.
- H. All fans, dampers and controls shall be tested after installation for correct operation, current draw and air flow.
- I. Fans shall be installed as detailed on the plans and as required by the manufacturer. Contractor shall maintain minimum service clearances as required by manufacturer.
- J. All equipment shall be set or hung level and securely fastened in place and shall be set or hung true to building wall lines.

3.03 ROOF-CURB INSTALLATION

- A. Curbs: Shall be installed in strict accordance with manufacturer's published instructions and as detailed on the drawings.
 1. Size of curbs and required options shall be coordinated by curb manufacturer

- and Contractor prior to fabrication.
2. Shop drawings shall be submitted for review and acceptance.
 - a. Submittal shall include manufacturer's guarantee that curbs will be free of defects in materials and/or workmanship for a period of five years.
 - B. Roof curbs shall be coordinated with work of General Contractor.
 - C. Flashing and miscellaneous steel framing provided by General Contractor.
 - D. Mechanically fasten equipment to curb.

END OF SECTION 15832

DIVISION 15 – MECHANICAL
Section 15850 – Air Inlets and Outlets

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. Extent of work as required by the drawings and these specifications. Work includes all supply, return and exhaust air inlet and outlet devices including grilles, registers, and louvers.

1.02 RELATED WORK

- A. Specified elsewhere:
1. Section 15954 – Air Systems Testing, Adjusting and Balancing.

1.03 REFERENCE TO STANDARDS

- A. Referenced standards:
1. ARI Compliance: Test and rate air outlets and inlets in accordance with ARI 650 "Standard for Air Outlets and Inlets".
 2. ASHRAE Compliance. Test and rate air outlets and inlets in accordance with ASHRAE 70 "Method of Testing for Rating the Air Flow Performance of Outlets and Inlets".
 3. AMCA Compliance: Test and rate louvers in accordance with AMCA 500 "Test Method for Louvers, Dampers and Shutters."
 4. AMCA Seal: Provide louvers bearing AMCA Certified Rating Seal.
 5. NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems."

1.05 SUBMITTALS

- A. Submit in accordance with Section 015050 – Basic Mechanical Materials and Methods.
1. Schedules: Submit schedule(s) for all items. Schedules shall be formatted to match those provided with the specification and drawings for ease of comparison and shall contain all rated performance information.
 2. Product Data: Provide manufacturers data sheets for each type of air outlet and inlet, and accessory furnished; indicating construction, finish, performance, and mounting details for each of the following items:
 - a. Louvers.
 - b. Dampers.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect, and handle in strict accordance with manufacturer's instructions.
- B. Deliver materials to site in original factory packaging, labeled with manufacturer's identification.
- C. Store new materials in original wrapping and protect from weather and construction traffic.
- D. Protect new materials against dirt, water, chemical, and mechanical damage.
- E. Coordinate installation with related work under other sections.

PART 2 PRODUCTS

2.01 LOUVERS – SL-1,2

- A. Acceptable Manufacturers:

1.	Ruskin	ELF375D
2.	American Warming & Ventilating	LE-21
3.	Greenheck	ESD-403
4.	Arrow United	465-35
5.	Dowco	DBE
6.	Louvers & Dampers, Inc	
7.	Vent Products	
- B. General: Drainable louvers where shown; of size, shape, and capacity indicated; designed for a wind load of 20 psf.
- C. Performance: Provide louvers that have maximum free area, and minimum pressure drop for each type as listed in manufacturer's current data, complying with louver schedule. Louvers to have maximum of 0.01 oz/sf of water penetration.
- D. Substrate Compatibility: Provide louvers with frame and sill styles that are compatible with adjacent substrate, and that are specifically manufactured to fit into construction openings with accurate fit and adequate support, for weatherproof installation.
- E. Materials: Construct of aluminum extrusions, ASTM B 221, Alloy 6063-T52. Weld units or use stainless steel fasteners.
- F. Louver Screens: On inside face of exterior louvers, provide 1/2" square mesh anodized aluminum wire bird screens mounted in removable extruded aluminum frames.

2.02 MOTORIZED DAMPERS

- A. Acceptable Manufacturers:
 - 1. Ruskin - Model IL35
 - 2. Dowco
 - 3. Arrow United
 - 4. Air Balance
 - 5. Vent Products
- B. Provide insulated motorized dampers where shown, and of sizes as scheduled, on the drawings.
- C. Construction to have the following features:
 - 1. Blades shall 6" wide, 16 gage galvanized steel on 6" centers. Insulation shall be completely enclosed with galvanized steel outer skin. Blade edge seals shall be PVC coated polyester fabric.
 - 2. Damper shall be of opposed-blade type and equipped with permanently lubricated stainless steel sleeve bearings.
 - 3. Have interlocking edges with extruded vinyl blade seals and flexible metal, compressible jamb seals.
 - 4. Damper linkage shall be concealed in damper frame.
 - 5. Air leakage shall not exceed 4-cfm/square foot.
 - 6. Have solid stops on all four sides.
 - 7. Damper shall be complete with provisions for installation of actuator and linkages.
 - 8. Dampers shall be complete with control shaft extension. End of shaft shall be notched to indicate damper blade position. Outboard support bearings shall be provided with all single section dampers for field mounted actuators. Factory installed jackshaft shall be provided with all multiple section dampers.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which air outlets and inlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 LOUVER INSTALLATION

- A. General: Install louvers and dampers as shown on the drawings and in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended functions.

3.03 MOTORIZED DAMPERS

- A. Install damper plumb and square with proper alignment.
- B. Install damper with proper orientation to airstream.

- C. After installation of motorized damper, seal-off and caulk between frame of damper and duct or opening to prevent air leakage around perimeter of damper. Leakage rate shall not exceed SMACNA's Leakage Class 3 level.
- D. Each motorized damper installation shall allow observation of damper operation.

END OF SECTION 15850

DIVISION 15 – MECHANICAL
Section 15954 – Air Systems Testing,
Adjusting and Balancing

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. The extent of work as required by the drawings and these specifications. This work includes testing, adjusting and balancing of all air handling equipment and systems including exhaust fans and accessories.

1.02 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 15832 – Power Ventilators.
 - 2. Section 15850 – Air Inlets and Outlets.

1.03 REFERENCE TO STANDARDS

- A. SMACNA
- B. NEBB
- C. AABC
- D. TABIC

1.04 QUALITY ASSURANCE

- A. Only qualified personnel shall perform testing and balancing work.
- B. Submit evidence that the personnel who will perform the testing and balancing of the project systems are qualified personnel for review and approval by the Construction Coordinator prior to performing the work.
- C. Submit a list of completed projects successfully tested and balanced by the submitted qualified personnel for review and approval, by the Construction Coordinator, prior to performing the work.
- D. When the Contractor does not have qualified personnel on his staff he shall employ them from other firms or subcontract the work to a test and balance firm normally engaged in this type of work.
- E. Perform all corrective measures caused by faulty installation at Contractor's own expense. Retest, readjust and rebalance systems until satisfactory results are achieved.

1.05 SUBMITTALS

- A. Submit in accordance with Division Section 015050 – Basic Mechanical Material and Methods.
- B. Submit Data Sheet on each item of testing equipment for Construction Coordinator approval. Include name of device, manufacturer's name, model number, latest date of calibration, and correction factors.
- C. Submit a report containing all test data and other related information recorded during testing and balancing, placed on appropriate forms for Construction Coordinator review and approval. Reports shall certify that the methods used and results achieved are as specified.

1.06 QUALIFICATIONS

- A. Qualified personnel are:
 - 1. Personnel who have been certified by one of the following organizations.
 - a. AABC - Associated Air Balance Council.
 - b. Certified TBAB - Certified Testing, Balancing and Adjusting Bureau.
 - c. NEBB - National Environmental Balancing Bureau, Illinois Chapter.
 - d. SMARTA - Sheet Metal, Air Conditioning & Roofing Contractors Trade Association of Illinois.
 - e. TABIC - Test and Balancing Institute for Certification.
 - 2. Personnel with a general engineering or mechanical engineering degree from an accredited four-year college.

PART 2 PRODUCTS

2.01 AIR BALANCE INSTRUMENTS

- A. Velometer with probes and Pitot tube.
- B. Rotating vane anemometer.
- C. ASHRAE Standard pitot tubes, stainless steel 3/16 outside diameter, lengths 18" and 36".
- D. Magnehelic differential air pressure gages, 0 to 0.5", 0 to 1.0" and 0 to 5.0" water pressure ranges, each arranged as a portable unit for use with a standard Pitot tube.
- E. Combination inclined-vertical portable manometer, range 0 to 5.0" water.
- F. Portable type hook gage, range 0 to 12" water.

- G. Portable flexible U-tube manometer, magnetic mounting clips, range 0 to 18" water.
- H. Static pressure probe for induction unit.
- I. Conical or pyramidal shaped hood.

2.02 SYSTEM PERFORMANCE MEASURING INSTRUMENTS

- A. Insertion thermometers, with graduations of 0.5 deg. F.
- B. Sling psychrometer.
- C. Tachometer, centrifugal type.
- D. Revolution counter.
- E. Clamp-On Volt-ammeter.
- F. Portable recorders for temperature and humidity.

PART 3 EXECUTION

3.01 AIR SYSTEMS

- A. Test, adjust and balance systems in accord with the following:
 - 1. Preliminary:
 - a. Identify and list size, type and manufacturer of all equipment to be tested, including air terminals. Inspect all system components for proper installation and operation.
 - b. Use manufacturer's ratings for all equipment to make calculations except where field test shows ratings to be impractical.
 - c. Verify that all instruments are accurately calibrated and maintained.
 - d. Install clean filters.
 - 2. Central System:
 - a. Test adjust and record exhaust fan RPM to design requirements within the limits of mechanical equipment provided.
 - b. Test and record motor voltage and running amperes including motor nameplate data and starter heater ratings.
 - c. Test and record system static pressure, suction and discharge.
 - d. Test and adjust system for design outside air, cfm.
 - e. Test and record heating apparatus entering air temperatures, dry bulb.

3. Verification:

- a. Prepare summation of readings of observed cfm for each system, compare with specified cfm and verify that duct losses are within specified allowable range.
- b. Verify design cfm at fans.

3.02 CONTROL SYSTEM

- A. The HVAC Contractor shall set and adjust automatically operated devices to achieve sequence of operations.
- B. Testing organization shall verify all controls for proper calibration and list those controls requiring adjustment.

3.03 SYSTEM PERFORMANCE REPORT

- A. After the conclusion of balancing operations, make temporary installation of portable recorders and simultaneously record temperatures summer and winter conditions at representative locations in each system inside of building.
- B. Construction Coordinator will direct test locations.
- C. Make recordings during summer and winter for a seven-day period, continuous over a weekend and including at least one period of operation at outside conditions within 5 degrees F wet bulb temperature of 75 deg. F for maximum summer design condition and within 10 degrees F dry bulb temperature of minus 3 deg. F for minimum winter design conditions.
- D. Report of test results shall include original recording and two reproductions.

3.04 REPORT SUBMITTAL

- A. Fill in test results on appropriate forms.
- B. Submit three certified copies of test reports to the Construction Coordinator for approval.
- C. Include in report a list of instruments used and last date of calibration.

END OF SECTION 15954

**NEW VAULT BUILDING
ELECTRICAL SPECIFICATIONS**

DIVISION 16 - ELECTRICAL

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DIVISION 16 - ELECTRICAL
Section 16010 - General Electrical Requirements

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is general in nature and applicable to electrical system work. Contractor is also directed to other sections of Division 16 - Electrical for additional related specifications for items described in this section.
- B. Work included in this section shall apply to installation and testing of all materials and equipment necessary to completely install electrical system as shown on drawings and as described herein in these specifications, or as may be necessary for a complete and operational electrical system.
- C. Unless otherwise noted, all electrical equipment shown on project drawings shall be furnished under Division 16.
- D. Drawings pertaining to this installation indicate general location of conduits, wiring, distribution and motor control centers, lighting and outlets, and other details necessary for installation of system.
- E. Electrical installation as shown on drawings and as specified herein is based upon best available information, with regard to characteristics of mechanical equipment specified. In the event changes are necessary in order to accommodate mechanical equipment furnished, necessary revisions will be made with approval of Owner's representative.
- F. Any minor changes in location of equipment, to include conduits, outlets, etc., from those shown on drawings, shall be made without extra charge if so directed by Owner's representative. These changes shall be any changes in location that, had new location been the bid-upon location, would not have resulted in an increase in contract construction cost over that actually bid.
- G. All electrical equipment shall be installed in conformance with applicable sections of NPFA 70 - National Electrical Code, respective equipment manufacturer's directions, as detailed on drawings and as specified herein. Any installations which void U.L. listing (or other third party listing) and/or manufacturer's warranty of a device or equipment shall NOT be permitted
- H. RELATED CONTRACT WORK DESCRIBED ELSEWHERE IN THESE SPECIFICATIONS:

Electrical Contractor shall note that it is **not** the intent of these Division 16 specifications herein to be all-inclusive of electrically related work to be performed as part of this contract.

Contractor shall also comply with electrical requirements in these sections of the specifications, including, but not limited to, wiring of motors, control panels furnished by others, HVAC equipment and all other electrically powered

equipment furnished by others under this project.

1.02 LAWS AND ORDINANCES

- A. In installation of this work, Contractor shall comply in every respect with requirements of National Electrical Code (NEC), National Board of Fire Underwriters, and any state and local requirements, laws and ordinances as may be applicable.
- B. If, in opinion of the Contractor, there is anything in drawings or specifications that will not strictly comply with above laws, ordinances and rules, the matter shall be referred to the attention of the Owner's representative for a decision before proceeding with that part of the work. No changes on drawings or in specifications shall be made without the full consent of Owner's representative.
- C. Contractor shall obtain and pay for all licenses, permits and inspections required by above laws, ordinances and rules for entire electric wiring job called for in these specifications and accompanying drawings.

1.03 DRAWINGS

- A. Drawings for electrical work will be a part of electrical drawings to which will be added, during the period of construction, any other detail drawings as may be necessary in opinion of Owner's representative, to show proper installation of various appliances or equipment with relation to project.
- B. Drawings and specifications are intended to be descriptive only, and any error or omissions of detail in either **shall not** relieve Contractor from obligations thereunder to install in correct detail any and all materials necessary for complete and operating electrical systems to extent shown on drawings and described in this specification.
- C. Contractor shall, during progress of job, record any and all changes or deviations from original drawings, and, at completion of project, shall deliver to Owner's representative a **single** marked-up set of "as-built" drawings.

1.04 SHOP AND ERECTION DRAWINGS

- A. This Contractor shall prepare shop drawings for all parts of his work. Before commencing any work or providing any material, Contractor shall submit for approval of Owner's representative all drawings relating to construction, arrangement or disposition of equipment entering into contract, and show complete equipment with manufacturer's specifications of same.
- B. Shop drawings of all distribution and motor control centers, panels, power and lighting systems, fixtures, wire, cables, devices, etc. shall be submitted for approval, as well as complete details of all systems not shown in detail on drawings.

- C. SHOP DRAWINGS SHALL BE FULLY DESCRIPTIVE OF ALL MATERIALS AND EQUIPMENT TO BE INCORPORATED INTO THIS PROJECT. CONTRACTOR SHALL CAREFULLY CHECK ALL SUBMITTED SHOP DRAWINGS, MAKING SURE THEY ARE COMPLETE IN ALL DETAILS AND COVER SPECIFIC ITEMS AS HEREINAFTER SPECIFIED.
- D. Shop drawings shall be submitted in sufficient quantity as required by the General Conditions. Three (3) copies will be retained by the Engineer for his use and records.
- E. No material or equipment shall be allowed at the site until shop drawings approved by the Engineer are received by the Resident Engineer at the site.
- F. The following information shall be clearly marked on each shop drawing, catalog cut, pamphlet, specifications sheet, etc. submitted:

PROJECT TITLE:

BRANCH OF WORK: ELECTRICAL

NAME OF BUILDING OR LOCATION:

PAGE OF DRAWINGS OR SPECS WITH WHICH EQUIPMENT COMPLIES:

DATE:

SUBMITTED BY:

PART 2 PRODUCTS

2.01 PRODUCTS SHALL BE AS SPECIFIED IN OTHER SECTIONS AND AS DETAILED ON THE DRAWINGS.

PART 3 EXECUTION

3.01 EQUIPMENT STORAGE

- A. All electrical equipment considered to be a part of this contract, to include, but not be limited to, motor control centers (MCC), starters, transformers, lighting fixtures, etc., shall be stored before installation in a warm, dry, indoor area so as to protect the equipment from physical damage, freezing, dirt and any other harmful effects. Equipment stored under tarpaulins or plastic covers **will not** be considered as meeting this requirement.
- B. The installation of electrical equipment shall not begin until the structure, if required, within which the equipment is to be permanently housed, is complete enough to provide protection from weather and vandalism (i.e. roof and doors installed).
- C. The Contractor will be responsible for ensuring conformance with these procedures.

3.02 EQUIPMENT MOUNTING

- A. Electrical Contractor shall be responsible for furnishing and setting all anchor bolts required to install Contractor's equipment.
- B. Where concrete mounting pads are required for equipment mounting, Electrical Contractor shall furnish all concrete and form work necessary to complete the installation.
- C. Where electrical equipment is located on damp or wet walls or locations as directed, it shall be "stand-off" mounted $\frac{1}{2}$ " from wall in a manner so that rear of equipment is freely exposed to surrounding air. Method of mounting shall be approved by Owner's representative before equipment is mounted.
- D. Unless otherwise noted, top of safety-switches, control panels, and similar equipment shall be 5'-0" above finish floor or finish grade.
- E. Enclosures for panelboards, switches or overcurrent devices shall not be used as junction boxes, auxiliary gutters or raceways for conductors feeding through or tapping-off to other switches or overcurrent devices, unless adequate space for this purpose is provided and the equipment is listed for this use.
- F. In order to maintain NEC ratings and classifications of cables, do not combine conduit contents or modify conduit materials of construction unless specifically directed or shown otherwise on project documents.

END OF SECTION 16010

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is conduits, raceways and fittings required for operation and maintenance of facility.

1.02 RELATED SECTIONS

- A. Division 15 - Mechanical
- B. Section 16010 - General Electrical Requirements
- C. Section 16123 - Building Wire and Cable
- D. Section 16190 - Supporting Devices

1.03 REFERENCE TO STANDARDS

- A. Federal Specifications WW-C-581d
- B. Federal Specifications WW-C-540c
- C. Federal Specifications WC-1094-A
- D. ANSI C80.1
- E. ANSI C80.3
- F. ANSI C80.5
- G. UL Standard UL-1
- H. UL Standard UL-6
- I. UL Standard UL-651
- J. UL Standard UL-797
- K. UL Standard UL-1479
- L. NEMA RN1
- M. NEMA RN2
- N. NFPA 70 (NEC)
- O. NEMA TC-2
- P. NEMA TC-3
- Q. NEMA TC-7
- R. A.A.S.H.T.O.
- S. ASTM A615

1.04 DELIVERY, STORAGE AND HANDLING

- A. Conduits shall not be shipped loose, but shall be bundled by sizes. Threads of metal conduits shall be protected by plastic caps. Fittings shall be stored in boxes. All equipment shall be stored on pallets to prevent contact with earth and shall be covered with plastic sheeting to protect them from dirt and weather.

1.05 SUBMITTALS (submit only on types applicable for project)

- A. Schedule 40 Galvanized Rigid Steel Conduit
- B. Liquid Tight Flexible Metal Conduit
- C. Fittings and Conduit Bodies

D. Lay-In Wireway

1.06 QUALIFICATIONS

A. All material shall be purchased new from suppliers/manufacturers regularly engaged in the business of electrical conduit, ducts and fittings.

1.07 MAINTENANCE SERVICE (WARRANTY)

A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

Note that all types specified below may not be used on every project. Refer to project drawings for individual project requirements.

A. Schedule 40 Galvanized Rigid Steel Conduit:

Conduit shall be of heavy wall type fabricated from mild steel tubing and shall have a hot-dipped galvanized inner and outer coating, with a final coating of zinc chromate. Conduit and installation shall comply with all requirements in NEC Article 344.

B. Liquid Tight Flexible Metal Conduit (Non-Hazardous Areas):

Liquid tight flexible metal conduit shall consist of polyvinyl jacket over flexible hot dip galvanized steel tubing. Flexible conduit shall be completely sealed from liquids, dust, dirt and fumes, be resistant to oil, gasoline, grease and abrasion. Jacket shall also be sunlight resistant. Flexible conduit shall be U.L. listed and comply with Article 351 of NEC. Flexible conduit shall be Flexi-Guard Type UAG, as manufactured by O-Z/Gedney, or equal. Conduit and installation shall comply with all requirements in NEC Article 350.

C. Fittings and Conduit Bodies:

Unless otherwise specified, all fittings and conduit bodies shall be manufactured from the same type of material as the conduit system (aluminum, galvanized steel, PVC, etc.). Mounting hardware shall be corrosion resistant, stainless steel, or equivalent.

D. Lay-In Wireway:

Unless otherwise indicated on the drawings, lay-in wireway installed in dry (non-hosedown) interior areas shall be NEMA 1 hinge cover steel enclosed wiring trough. Lay-in wireway installed outdoors or in interior areas subject to hosedown or wet conditions shall be NEMA 3R, 4 or 4X as noted on the drawings. Wireway shall be sized as shown on drawings, as a minimum, or as required by NEC, and

shall be as manufactured by Square D, Hoffman, or equivalent. Install all hinged wireways with hinges on bottom such that doors will not interfere with maintenance and installation when open.

E. Pull Cords

Each empty conduit shown or described on the drawings shall be furnished with a pull cord to facilitate future conductor installation. Cord shall consist of non-deteriorating, non-metallic, non-cotton construction such as polyester or nylon material. Minimum tensile strength of all pull strings shall be 200#. Leave minimum of 12 inches slack at each termination or end. Any references on project drawings to "pull wire" shall be interpreted as a pull cord as described herein.

2.02 SEALING

A. Moisture Seal:

1. Seal conduit penetrations of perimeter walls or floors below grade to prevent entry of water. Use materials compatible with wall or floor construction and approved by Engineer. Use pre-manufactured fittings.
2. Seal penetrations of roof with flashings compatible with roof design and approved by Roofing System Manufacturer and Engineer.
3. Seal annular space between conductors and conduit wall of all conduit terminations where conduit exits from below grade in order to block moisture migration into electrical equipment. Install product only after conductors have been installed, terminated and commissioned for service. Conduit moisture barrier material shall not harden and be compatible with both wire insulation and conduit materials. Installed product shall be easily removed for maintenance or modifications, regardless of the length of time material has been installed. Install moisture seal products per all manufacturers instructions and requirements. Conduit moisture seal material shall be:
 - a. "Hydroblock" by WaterGuard Technology Products
16023 East Freeway
Channelview, Texas 77530-4365
Phone: (281) 862-0300
Fax: (281) 862-0314
 - b. American Polywater Corporation
Polywater Duct Sealant FST-180 Series
P.O. Box 53
Stillwater, MN 55082
Phone: (651) 430-2270
Fax: (651) 430-3634
 - c. O-Z/Gedney
Type DUX Water Sealing Compound

PART 3 EXECUTION

3.01 INSPECTION

- A. All conduits shall be inspected for proper fit and finish, for out-of-round and for proper thickness. All burrs and flashing shall be removed. Conduit and fittings shall be clean and free of obstructions.

3.02 INSTALLATION

- A. Unless otherwise shown on the project drawings, minimum conduit trade-size shall be 3/4". Larger sizes shall be installed where noted or where required by NEC.
- B. Conduit size and fill requirements shall comply with appropriate conduit fill tables in Annex C of NEC. It should be noted these are minimum requirements and larger conduit sizes or smaller fill requirements shall be used whenever specified or detailed on drawings.
- C. Flexible conduit shall be provided as a connection between each motor junction box (or any other piece of equipment subject to movement or vibration) and rigid conduit system. Liquid-tight and explosion-proof flexible conduit shall not exceed 3' in length.
- D. Ream conduits only after threads are cut. Cut joints square to butt solidly into couplings. Where necessary to join two pieces of conduit and it is impossible to use standard coupling, use three piece conduit coupling. Use of running thread is prohibited. This applies to all rigid conduit installations, underground or otherwise. In order to comply with NEC Article 300.6(A), all rigid steel conduit shall have field-cut threads re-coated using an electrically conductive, corrosion-resistant compound, Thomas & Betts/Shamrock "Kopr-Shield" (a product of Jet Lube, Inc.), or equivalent.
- E. Make all joints in underground conduit watertight with approved joint compound. Temporarily plug conduit openings to exclude water, concrete or any foreign materials during construction. Clean conduit runs before pulling in conductors.
- F. Hickey hand-bends will not be acceptable for conduits one inch (1") and larger. Use pre-manufactured factory elbows or bends fabricated with hydraulic bending machine. Field bending of all PVC conduit shall be accomplished with use of equipment approved by conduit manufacturer. Open flame bending equipment will not be acceptable.
- G. A run of conduit between outlet and outlet, between fitting and fitting or between outlet and fitting shall not contain more than the equivalent of four quarter turn bends (360°), including bends immediately at an outlet or fitting.
- H. At all conduit terminations furnish locknuts on both sides of enclosure plus an insulated bushing unless conduit termination is into a factory-threaded conduit opening or watertight (Myers-type) hub.

- I. Run exposed conduits parallel with walls and at right angles to building lines, not diagonally. Make bends and turns with pull boxes or conduit bodies.
- J. Support exposed PVC conduit runs on walls or ceiling every three feet (3') and support exposed rigid metal conduit runs on walls or ceiling every five feet (5') with stainless steel or PVC coated galvanized cast one hole straps, clamp backs and anchors. Provide lead shield insert anchors, with stainless steel round head machine screws, for concrete and brick construction. In wood construction, use stainless steel round head wood screws. Where steel members occur, drill and tap and use stainless steel round head machine screws.
- K. In brick construction, drill hole for insert near center of brick, not near edge or in mortar joint.
- L. Support two or more PVC exposed hanging parallel conduit runs every three feet (3') and support exposed rigid metal hanging parallel conduit runs every five feet (5') with trapeze hangers. Hanger assembly to consist of concrete inserts, threaded solid rod, washers, nuts and cross members nominally one and five-eighths inch (1-5/8") by one and five-eighths inch (1-5/8") non-metallic framing, as specified in Section 16190 - Supporting Devices. Anchor each conduit individually to cross members of every other hanger with cast one hole straps, clamps backs and proper sized stainless steel or non-metallic machine bolts and nuts.
- M. Perforated metal strapping of any kind is prohibited.
- N. All box support hardware shall be constructed of rust-resistant materials such as stainless-steel.
- O. Provide expansion and deflection fittings in all conduits which pass through or over building expansion joints. All expansion and deflection fittings shall be designed for, and compatible with, the conduit types on which they are installed.
- P. Grounding Electrode Conductors shall be installed in non-metallic PVC conduit or bonded to both ends of metallic conduit to comply with NEC 250.64.

END OF SECTION 16111

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DIVISION16 – ELECTRICAL
Section 16123 - Building Wire and Cable

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply of wire and cable to provide a complete and operational electrical system.
- B. Any bid submitted to the Owner which contains cost adjustments for the current price of metals (copper and/or aluminum) will be rejected. Qualified bids in any form will not be considered.

1.02 RELATED SECTIONS

- A.
- B. Division 15 - Mechanical
- C. Section 16010 - General Electrical Requirements
- D. Section 16111 - Conduit and Raceway
- E. Section 16170 - Grounding and Bonding

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code
- B. U.L Standard No. 44 - Thermoset-Insulated Wires and Cables.
- C. IPCEA Publication No. S-66-524.
- D. Federal Specification J-C-30B
- E. ASTM Specification B-8.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Wire and cable shall be delivered on reels or coiled in boxes. Wire and cables shall be stored and handled to prevent damage to conductor and insulation.

1.05 SUBMITTAL REQUIREMENTS

- A. Contractor shall submit for all cable types and sizes used on this project.

1.06 QUALIFICATIONS

- A. Wire and cable shall be manufactured and supplied by a company regularly engaged in business of furnishing wire and cable. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of wire and cable.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Cable shall be 600 Volt rated, sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 83. Cables shall be rated 90°C in dry locations 75°C in wet locations.
- B. CATEGORY 5E (CAT5 - ENHANCED) CABLE

2.02 COLOR CODING

- A. Color code conductor insulation for #10 AWG or smaller conductors. Color code conductors #8 AWG or larger with colored tape or colored insulation. Standard colors:

	120/240V 1 Phase <u>3W</u>	240 V or 208/120V 3 Phase <u>3 or 4W</u>	480V 3 Phase <u>3 or 4W</u>	240/120V 3 Phase <u>4W, Δ</u>
Phase A	Black	Black	Brown	Black
Phase B	Red	Red	Orange	Orange (high leg)
Phase C	N/A	Blue	Yellow	Blue
Neutral	White	White	Gray	White
Ground	Green	Green	Green	Green

- B. Control wiring insulation color shall be red.
- C. 120 VAC control wiring from a separate source (for example, 120 V control wiring from a control panel that supplies a remote located starter) shall be with yellow color insulation.

2.03 SPLICES AND JOINTS

- A. Splices and joints shall be as described below, or approved equivalent.
- B. Interior applications:
 - 1. #8 and smaller conductors:
 - a. Ideal "wing nut" type insulated connectors.
 - b. Scotchlok R, B, and Y type insulated connectors.
 - 2. #6 and larger conductors:
 - a. New construction: For straight line connections, use compression connector with rubber insulating cover or boot.

- b. New construction: For “Tee” cable taps, use compression connector with rubber insulating cover or boot.
- c. Existing construction: For taps in cabinets, gutters and other close locations, use O-Z/Gedney type XW & XWC, XTP & XTPC or, PMX & PMXC, or equivalent.

PART 3 EXECUTION

3.01 INSTALLATION (Wire Conductors)

- A. Wire and cable shall be installed using accepted industry methods to prevent damage to conductors and insulation. Installation shall comply with all applicable sections of NEC regarding conduit fill.
- B. No splices shall be permitted in conduit bodies. All splices shall be made in junction boxes, control panels and cabinets provided for that purpose as detailed or required by need.
- C. Neatly train and lace wiring inside boxes, equipment and panelboards.
- D. Drawings are diagrammatic in showing circuitry routing between devices and equipment. Provide all phase conductors, neutrals, switched and unswitched legs, grounds, etc., as required for a complete and operational electrical system.
- E. All 120V circuits shall have individual neutral conductors. 120V circuits with “shared” neutral conductor shall not be permitted.
- F. Minimum wire size shall be #12 unless otherwise noted. Where protected by 15A fuses, control wiring may be #14 AWG.
- G. All conductors shall be continuous without splices except at locations approved for the purposes of splicing.
- H. All wire sizes shall be stranded except where specifically approved otherwise.
- I. All circuits shall be labeled in compliance with Section 16195 - Electrical Identification.

3.02 CONNECTIONS AND TERMINATIONS (Wire Conductors)

- A. Identify each conductor in panelboards, junction or pull boxes, or troughs with a permanent pressure sensitive label with suitable numbers or letters for easy recognition. Identify control wiring at each end and in junction boxes with numeric wire number corresponding to control wiring diagram.
- B. Thoroughly clean wire before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- D. Terminate spare conductors with electrical tape, identify as “spares” and roll up

in box.

3.03 TESTING (Wire Conductors)

- A. Inspect wiring for physical damage and proper connection.
- B. All wire and cable shall be tested for continuity and short circuits prior to energizing circuits. Verify proper phasing, adjust as required.
- C. Comply with all applicable items in Section 16010 and 16950.

END OF SECTION 16123

DIVISION 16 - ELECTRICAL
Section 16130 - Boxes

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply and installation of all junction and pull boxes to provide a complete and operational electrical system.
- B. The pull box for transition of New Vault Service Aluminum cables to Copper cables and to house the New Vault Service Metering is specified elsewhere, in Section 16470 – Panelboards.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceways
- C. Section 16123 - Building Wire and Cable
- D. Section 16170 - Grounding and Bonding
- E. Section 16190 - Supporting Devices
- F. Section 16470 – Panelboards

1.03 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. U.L. 50 - Enclosures for Electrical Equipment
- C. ANSI/NEMA OS-1 - Sheet Steel Outlet boxes, Device Boxes, Covers and Box Supports
- D. NEMA 250 - Enclosures for Electrical Equipment

1.04 DELIVERY, STORAGE AND HANDLING

- A. Junction and pull boxes shall not be shipped loose, but shall be in boxes with labels indicating size and type. These boxes shall be stored away from contact with earth and protected from weather and abuse.

1.05 SUBMITTAL REQUIREMENTS

- A. Junction and pull boxes.

1.06 QUALIFICATIONS

- A. Junction and pull boxes shall be manufactured and supplied by a company regularly engaged in business of furnishing junction and pull boxes. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of junction and pull boxes. Junction and pull boxes shall be U.L. listed.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Dimensions of all boxes shall meet or exceed NEC Article 370 requirements. Boxes larger than 12 inches in any dimension shall be hinged type.
- B. Flush mounted exterior boxes in floors, walkways and walls shall be NEMA 4, cast aluminum, Crouse Hinds, Killark, or equal. For supplemental corrosion protection, boxes encased in poured concrete shall have an asphalt paint coating applied to surfaces in contact with concrete prior to installation. Note that an asphalt paint coating is not required on boxes installed in masonry brick or block walls.
- C. Surface mounted interior junction and pull boxes used with Schedule 40 PVC conduit shall be nonmetallic and shall be as manufactured by Carlon, or equal.
- D. Surface mounted interior junction and pull boxes used with GRS or EMT conduit shall be NEMA OS-1, stamped galvanized steel.
- E. Flush mounted interior boxes in concrete floors and concrete walls shall be NEMA 4, cast aluminum, Crouse Hinds, Killark, or equal, and shall be supplied with asphalt paint applied to all surfaces in contact with concrete.
- F. Boxes used to support light fixtures shall be of metallic construction and capable of supporting installed fixtures.
- G. Exterior junction and pull boxes located in non-hazardous, non-classified areas shall be NEMA 4X stainless steel or aluminum. Provide waterproof conduit hubs, Meyers or equivalent, for all conduit terminations at enclosures. Gasketed lock-nuts will not meet this requirement.
- J. Acceptable manufacturers:
 - 1. Appleton Electric Co.
 - 2. Crouse-Hinds Co.
 - 3. Hennessy Outdoor Enclosures.
 - 4. Hoffman Co.
 - 5. Hubbell-Killark Electric Mfg. Co.
 - 6. O.Z./Gedney Co.
 - 7. Square D.
 - 8. Hammond.
 - 9. Carlon

PART 3 EXECUTION

3.01 INSTALLATION

- A. Junction or pull boxes required by code or need which are not detailed on drawings shall be considered incidental to proposal price and will not be paid for separately.
- B. Any damage to equipment enclosures, pull or junction boxes shall be immediately repaired or replaced to satisfaction of Owner's representative.
- C. All pull or junction boxes surface mounted in any interior damp location shall be "standoff" mounted 1/2" from the wall in a manner to promote air circulation completely around the box.
- D. The contractor shall coordinate the installation of flush mounted junction boxes with the general and mechanical work as required at each structure.
- E. Provide knockout closures to cap unused knockout holes where blanks have been removed (for non-hazardous location boxes).
- F. All mounting hardware shall be corrosion resistant.
- G. All metal junction boxes shall be bonded to ground with a ground wire connection.

END OF SECTION 16130

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DIVISION 16 - ELECTRICAL
Section 16141 - Wiring Devices

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work in this section is supply and installation of receptacles and toggle switches.
- B. Work shall also include supply and installation of device boxes for receptacles and toggle switches.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceway
- C. Section 16123 - Building Wire and Cable
- D. Section 16195 - Electrical Identification

1.03 REFERENCE TO STANDARDS

- A. UL Standard 943 Class A
- B. Federal Specification W-C-596F
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. NEC Article 410-57
- E. NEMA WD-1
- F. NEMA WD-6
- G. ANSI/NEMA OS-1 - Sheet Steel Outlet boxes, Device Boxes, Covers and Box Supports
- H. U.L. 514A - Metallic Outlet Boxes

1.04 DELIVERY, STORAGE AND HANDLING

- A. Supplied items shall not be shipped loose but shall be in boxes, labeled with material and equipment enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.

1.05 SUBMITTAL REQUIREMENTS

- A. Submit:
 - 1. Receptacles.
 - 2. Toggle switches.
 - 3. Weatherproof covers and device boxes.

1.06 QUALIFICATIONS

- A. Wiring devices shall be manufactured and supplied by companies regularly engaged in business of furnishing wiring devices. If required by Owner's representative, manufacturers shall submit certification to a minimum experience of five years in manufacture of respective wiring devices.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

A. Receptacles:

Receptacles shall be installed under this item where shown on drawings.

1. General Purpose Receptacles

General purpose receptacles for all wall type convenience outlets in non-hazardous areas shall be of 20 amp, 125 volt, 3 wire grounding type, NEMA 5-20R, back and side wire compatible, heavy duty industrial specification grade.

- a. Leviton 5362A
- b. Pass & Seymour 5362-A
- c. Hubbell HBL5362
- d. Equivalent

2. Ground Fault Circuit Interrupting (GFCI) Duplex Receptacles

Duplex receptacles with ground fault circuit interrupters (GFCI) shall be provided and installed where noted on drawings. All units shall be rendered permanently inoperative at its "end of useful life" (EOL) as defined in UL 943. All receptacles shall be rated 20 amp with NEMA 5-20R receptacle configuration. To simplify locating the proper "reset" button after tripping, unless specifically noted on project drawings, DO NOT utilize "feed-thru" feature to protect downstream GFCI outlets. Provide self-protected GFCI receptacles at each required location. Receptacles shall be back and side wire compatible, feed-thru type (whether or not feed-thru feature is utilized on project):

- a. Leviton "SmartLock" 8899
- b. Pass & Seymour 2094
- c. Hubbell GF-5362A
- d. Equivalent, meeting requirements noted.

B. Toggles Switches:

Toggle switches shall be installed under this item.

1. General Purpose Toggle Switches

Units for use in non-hazardous, toggle-type applications shall be 20A, 120/277 VAC rated, back and side wired type, industrial specification grade. Switches shall be duty rated for 1 HP at 120 VAC.

a. Single Pole

Leviton 1221-2
Pass & Seymour CSB20AC1
Hubbell HBL1221
Equivalent

b. Three-Way

Leviton 1223-2
Pass & Seymour 20AC3
Hubbell HBL1223
Equivalent

C. Unless noted otherwise on the drawings, wallplates shall be of nylon construction for resistance to impact, abrasion and mechanical stress fracture. Wallplate color shall match receptacle or switch at each location.

D. Weatherproof Receptacle Covers:

All receptacle covers noted as "weatherproof" or installed outdoors shall comply with NEC Article 406.8B1. Units shall remain raintight whether or not a plug and cord is inserted. Covers shall be extra-deep, sunlight resistant, padlockable, polycarbonate construction as manufactured by Taymac MM740C-B, or equivalent.

E. Device Boxes:

1. Where PVC conduit is used, associated device boxes shall be of FS design, non-metallic PVC, as manufactured by Carlon, or equivalent.
2. Where galvanized rigid metal conduit is used, associated device boxes shall be FS or FD design, metallic, as manufactured by Crouse-Hinds, or equivalent.

PART 3 EXECUTION

3.01 INSTALLATION

A. Unless otherwise specified on the drawings, use the following as a guide for mounting of device boxes and control operator (pushbutton) stations:

<u>Device</u>	<u>Height above finished floor to bottom of box</u>
1. Receptacles in offices and finished areas.	16 inches
2. Toggle wall switches	48 inches
3. Receptacles in all other or non-finished areas.	48 inches
4. Receptacles on walkways	Attach to handrail crossbar
5. Clock Outlets	88 inches
6. Telephone Outlets	16 inches
7. Data Outlets	16 inches
8. CATV Outlets	16 inches
9. Fire Alarm Break Glass Stations	44 inches
10. Fire Alarm Horns/Lights	96 inches
11. Control Operator (P.B.) Stations	48 inches

- B. Legend plates shall be securely attached using weatherproof adhesives in accordance with Section 16195.
- C. All receptacles and toggles switches shall be grounded with a ground conductor connected to their respective grounding terminal or screw.
- D. Grounded conductors (neutrals) shall be continuous between outlets, boxes, devices, and so forth per NEC Article 300.13. Wiring device neutral connections shall not be utilized as splice points. Neutral path shall not be broken with wiring devices removed from boxes.
- E. Test all receptacles, toggle switches and control stations for proper operation, including GFCI operation where applicable.
- F. Ground device enclosure or box with a ground conductor connected to the respective grounding lug or screw.
- G. Unless specifically shown otherwise on the drawings, all device boxes are to be flush mounted. This includes masonry construction.
- H. Do not install boxes back-to-back in the same wall. Provide minimum 4 inches separation.
- I. Provide insulation behind boxes mounted in exterior walls.
- J. Unless otherwise specified, install wall switches with "OFF" position down.
- K. Unless otherwise specified, install duplex outlets with ground blade on the bottom if mounted vertically or to the right if mounted horizontally. Install GFCI receptacles in such that "Test" and "Reset" wording are oriented correctly.
- L. Each duplex outlet cover shall be furnished with a 3/8"-1/2" adhesive label strip identifying its respective source of supply (e.g. LP1-15 for Lighting Panelboard

LP-1 circuit #15). All labels shall be affixed to the exterior (outside) of each respective cover plate. All duplex outlet labels shall be installed in the same general location on each cover plate throughout the project.

- M. Each toggle wall switch shall be furnished with a 3/8"-1/2" adhesive label strip identifying its respective source of supply (e.g. LP1-16 for Lighting Panelboard LP-1 circuit #16). All toggle switch labels shall be affixed to the rear (inside) of the respective cover plate.

END OF SECTION 16141

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DIVISION 16 - ELECTRICAL
Section 16160 - Cabinets and Enclosures

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Enclosures used to house electrical equipment.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16170 - Grounding and Bonding
- C. Section 16190 - Supporting Devices
- D. Section 16195 - Electrical Identification

1.03 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NFPA 70 - National Electrical Code.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Cabinets and enclosures shall be delivered to jobsite in original shipping containers and shall be stored in a clean, dry location until ready for installation.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard data for enclosures and cabinets.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Cabinet and Enclosure manufacturer shall be regularly engaged in construction of Product and shall have at least five years experience.

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS)

- A. Provide individual containers of touch up paint for each painted cabinet and enclosure.
- B. For each cabinet and enclosure with a locking mechanism, provide two spare keys.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cabinets and Enclosures shall be as manufactured by Hoffman Engineering, Wiegman, Rittal, or equivalent.

2.02 EQUIPMENT SPECIFICATION (WHERE APPLICABLE)

- A. NEMA 1

Enclosures shall be NEMA 1 rated, hinged, single or double door with slotted flush latch and white interior mounting panel, similar to Hoffman A-xxN Series (where xx is size subseries), or equivalent. Materials of construction shall be 14 or 16 gauge steel, depending on enclosure size, with polyester powder coating. Large enclosures shall have continuous hinge on door. Where noted, large enclosures shall include door operated light kits. Enclosure shall include grounding device kit or other means of positively grounding door to enclosure body.

- B. NEMA 3R

Enclosures shall be NEMA 3R rated, hinged with stainless steel hinge pin, with drip shield, single door, white interior mounting panel and easily released door clamps. Materials of construction shall be 16 or 14 gauge steel, depending on enclosure size, with polyester powder coating. Furnish all exterior-mounted NEMA 3R enclosures with a NEMA 4X Drain-Vent (specified below) to remove interior moisture and condensation

- C. NEMA 4X

Enclosures shall be NEMA 4/ NEMA 4X/ NEMA 12 rated, hinged, gasketed, single or double door, with easily released fast-operating clamp assemblies or quarter turn slotted latch kits replacing conventional screw clamps, white interior mounting panel and stainless steel hinge pin. Materials of construction shall be

16 or 14 gauge (depending on size) Type 304 stainless steel, Type 5052 H-32 aluminum, molded fiberglass polyester or corrosion resistant nonmetallic composite material. Interior mounting panel shall be steel, finish shall be white enamel. Where noted, enclosures shall include door operated light kits. Metallic enclosures shall include grounding device kit or other means of positively grounding door to enclosure body. Furnish all exterior-mounted NEMA 4X enclosures with a NEMA 4X Drain-Vent (specified below) to remove interior moisture and condensation.

D. NEMA 7

Enclosures shall be NEMA 7 rated suitable for Class 1, Division 1, Group D hazardous locations. Materials of construction shall be copper-free aluminum and shall be either U.L. or F.M. listed and labeled for the application. Covers for small enclosures shall be threaded construction with minimum of 5 threads fully engaged after installation. Larger enclosures shall utilize bolted covers with all bolts torqued per manufacturer's requirements after installation.

D. NEMA 12

Enclosures shall be NEMA 12 rated, continuous hinge, gasketed, single or double door, with white interior mounting panel. Materials of construction shall be 16 or 14 gauge steel, depending on enclosure size, with polyester powder coating. Small enclosures shall be similar to Hoffman "CHQR" Series, or equivalent. Medium size enclosures shall include 1-point latch kits or quarter turn slotted latch kits replacing conventional external screw clamps. Large size enclosures shall include 3-point latch kits. Where noted, large enclosures shall include door operated light kits. Enclosure shall include grounding device kit or other means of positively grounding door to enclosure body.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect cabinets, enclosures and mounting panels for damage or rust. Inspect gasketing for proper sealing. Inspect hinges and clamps for proper operation.

3.02 PREPARATION

- A. Thoroughly clean interior and exterior of cabinets and enclosures. Sand and apply touch up paint where needed. Install mounting panels after equipment is mounted to it.

3.03 INSTALLATION

- A. Install cabinets and enclosures at locations shown on drawings and as directed by Owner's representative. Cabinets and enclosures shall be "stand off" mounted 1/2" from wall to provide free air flow behind cabinets and enclosures.

- B. To maintain NEMA 4X enclosure ratings, watertight hubs which are UL listed NEMA 4X shall be installed as necessary at conduit entrances to enclosure.
- C. At both interior and exterior locations, where enclosure or cabinet knockouts consist of tangential knockouts, the Contractor shall install weatherproof hubs sized for largest knockout, with a reducing bushing sized for the incoming conduit.

END OF SECTION 16160

DIVISION 16 - ELECTRICAL
Section 16170 - Grounding and Bonding

PART 1 GENERAL

- 1.01 Work under this item includes the electrical grounding and bonding of Electrical Distribution Equipment, metallic raceways, metallic enclosures, utilization equipment and other appurtenances for the work or equipment to be furnished under this project. In general, all work shall meet or exceed that defined in Article 250 of the National Electrical Code NEC/NFPA 70.
- 1.02 This Specifications section neither replaces any NEC requirements, nor are any NEC requirements not specifically identified considered deleted from the scope of work. Items listed in this Section are furnished to either augment, or exceed those established by NEC.
- 1.03 WORK INCLUDES
- A. Equipment grounding conductors
 - B. Grounding Electrodes
 - C. Grounding Electrode Conductors
 - D. Bonding.
- 1.04 RELATED SECTIONS
- A. Section 16010 - General Electrical Requirements
 - B. Section 16671 - Surge Protective Devices (SPD)
- 1.05 REFERENCE TO STANDARDS
- A. Article 250; ANSI/NFPA 70 - National Electrical Code (NEC)
 - B. NFPA 780 – Standard for the Installation of Lightning Protection Systems
- 1.06 DELIVERY, STORAGE, AND HANDLING
- A. Ground rods shall be tie-wrapped together and stored away from contact with the earth.
 - B. Exothermic welds and hardware items shall not be shipped loose but shall be in boxes, labeled with material and equipment enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.
- 1.07 SUBMITTALS
- A. Submit:
 - 1. Ground rods.
 - 2. Exothermic welding components
- 1.08 QUALIFICATIONS (RESERVED)

1.09 QUALITY ASSURANCE (RESERVED)

1.10 REGULATORY REQUIREMENTS (RESERVED)

1.11 COORDINATION

- A. Installation of all Grounding and Bonding shall be coordinated with other trades and Sub-Contractors. Special attention is required for installation of Concrete-Encased Electrodes within structural footings.

1.12 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.13 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

- A. Ground rods shall be UL listed, single-piece, 3/4" diameter by 10' long copper-clad steel with minimum 10 mil copper cladding.

All buried connections of grounding and bonding components shall be via exothermic weld only. Clamp or compression grounding connections below grade will be rejected and replaced at Contractor's expense.

- B. Exothermal Welding Equipment Manufacturers:

- 1. Erico - Cadweld
- 2. Continental Industries – Therm-O-Weld
- 3. Hagar – Ultraweld

- C. Grounding conductors shall be 600 volt, same insulation type as used for phase conductors, green in color unless otherwise noted.

- D. Grounding electrode conductors in contact to earth shall be bare, stranded, annealed copper. Grounding Electrode Conductors shall be the larger of that detailed on the project drawings, specified herein or as required by NEC.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. A continuous grounding system shall be provided throughout the facility. The Contractor shall furnish and install all grounding and bonding as required per NEC and all Local Codes, whether or not specifically shown on the project drawings.
- B. Except for separately derived systems, a single-point ground system is intended throughout the facility. So-called "Multi-point", "independent", "clean" or "separate" grounding systems that are not inter-bonded to the single-point facility system do not comply with NEC, are unsafe, and will be rejected.
 - 1. On occasion, supplemental driven ground rods may be required on the project drawings. All such supplemental ground rods are to be bonded to the equipment grounding conductor and are NOT intended to indicate any separation of, or isolation from, the facility grounding system.
- C. Equipment ground conductors (green insulated) shall be used solely for grounding and bonding purposes and be kept entirely separate from grounded neutral conductors (white insulation), except where bonded at the Service Entrance equipment.
 - 1. The system Neutral and Ground conductors shall be bonded together through the Main Bonding Jumper in the Service Entrance Equipment only.
 - 2. Unless otherwise directed on the project drawings, Grounding Electrode Conductors shall terminate on the Neutral Bus within the Service Entrance equipment.
 - 3. The Main Bonding Jumper within the Service Entrance equipment shall be accessible for visual inspection.
- D. Bond the system Neutral and Ground within Utility-owned KWH metering or Current-Transformer (C.T.) Cabinets ONLY if specifically required by the serving Utility. Otherwise, bond the system neutral and the ground in Service Entrance Equipment as described below.
- E. Service Entrance Equipment Grounding and Bonding
 - 1. Furnish grounding bushings on all metallic service conduits entering Service Entrance Equipment. Bond each bushing to Neutral bus in the Service Entrance Equipment as required by NEC Article 250.92 and 250.102C.
 - 2. The System (Main) Bonding Jumper shall be installed within the Service Entrance Equipment and shall connect the Neutral Bus to the Ground

Bus.

- a. The Main Bonding Jumper shall consist of either a U.L. Listed bonding link furnished by the Service Equipment manufacturer or a copper bonding conductor sized to requirements in NEC Article 250.28D.
- b. Do not re-bond Neutral and Ground downstream unless required by special conditions, such as those described in NEC Article 250.32.

F. Grounding Electrode System

1. As a minimum, the Grounding Electrodes shall comply with NEC Articles 250.52 and 250.53. Where present at each new building or structure, all available Grounding Electrodes defined in NEC Article 250.52A1 thru A4 shall be interconnected to form the Grounding Electrode System.
2. Per NEC Article 250.68A, the Grounding Electrode System shall be installed in such a manner that each connection point may be visually inspected, unless encased by concrete or earth.
3. Per NEC Article 250.64, Grounding Electrode Conductors shall be installed without splice between Service Entrance Equipment Neutral bar and Grounding Electrodes. Where required due to distance or construction, splicing shall be permitted by means of exothermic welding only. Irreversible "H" and "C" type compression connectors shall NOT be utilized for Grounding Electrode Conductors.
 - a. Where exposed or visible, all Grounding Electrode Conductors (regardless of size) shall be protected from physical damage using non-metallic conduit, such as Schedule 40 PVC. Extend protective conduit as close as practical to the Grounding Electrode. Any metallic conduits installed by the Contractor for grounding electrodes must be bonded at both ends per NEC Article 250.64E and 250.92A3.
 - b. Where a copper Grounding Electrode System Bus-Bar is indicated on the project drawings, it shall sized as noted but no less than ¼" T x 2" W x 24" L.. Size of the single copper Grounding Electrode Conductor between the Service Entrance Neutral Bus and the Grounding Electrode System Bus-Bar shall be the larger of that shown in NEC Table T250.66 or as noted on the project drawings. Connection of Grounding Electrode Conductors to a Grounding Electrode System Bus-Bar shall be through the use of listed compression-type lugs bolted to the Bus-Bar.
4. Grounding Electrode Conductors shall be individually installed from the Service Entrance Neutral Bus (or Grounding Electrode System Bus-Bar) to the respective Grounding Electrode. "Looping" of Grounding Electrode

conductors (extending a suitably-sized single grounding electrode conductor from electrode-to-electrode) shall NOT be utilized without written approval from the Engineer.

5. Connection of Grounding Electrode Conductors to individual Grounding Electrodes shall comply with NEC Article 250.70.
 - a. Connection at all Grounding Electrodes shall be by use of exothermic welding, Listed clamp or compression connection connections shall NOT be utilized without written approval from the Engineer.
 - b. Below-grade ground rod and associated ground wire shall be clean and dry before performing the exothermic weld. Verify that the proper size and type of exothermic weld kit is used before beginning work
 - c. Exothermic welds shall be left exposed for inspection and approval before backfilling or otherwise concealing. Any unacceptable exothermic welds shall be redone, including any necessary replacement material (ground rods, ground wires, etc.) as needed to provide an accepted exothermic weld.
6. Non-Metallic conduits containing grounding electrode conductors shall not be supported with metal clamps that completely encircle the conduit. Use nylon nuts, bolts, straps and/or reinforced fiberglass or premium grade plastic resin strut support with non-metallic hardware as manufactured by Aickinstrut, or equivalent.
7. All of the following shall be interconnected, where available:
 - a. Bond metallic underground water piping in direct contact with earth for no less than 10 feet per NEC Article 250.52A1. Size of the copper bonding jumper shall be the larger of that shown in NEC Table T250.66, or as noted on the project drawings. Installation shall comply with NEC Article 250.53. Connection shall be made at a point less than 5 feet from where the metallic water piping enters the facility. Furnish bonding around removable equipment (water meters, etc.) per NEC Article 250.68B.
 - (1). Note that NEC Article 250.53D2 requires a Supplemental Grounding Electrode when a metallic underground water pipe is the sole Grounding Electrode. The Supplemental Grounding Electrode shall be one of those described in NEC Articles 250.52A2 through 250.52A7. See also paragraph 16170-3.03F8 below.
 - b. Metal frames of building or structure shall be bonded per NEC Article 250.52A2. Size of the copper bonding jumper shall be the

larger of that shown in NEC Table T250.66, or as noted on the project drawings. Installation shall comply with NEC Article 250.53.

c. Furnish concrete-encased electrodes (commonly called “Ufer” ground) per NEC Article 250.52A3 and install per NEC Article 250.53.

(1). The size of the copper conductor which is the sole connection to the concrete-encased electrode shall be the larger of that shown on the project drawings or #4 AWG.

(2). The Concrete-Encased Electrode (CEE) shall be no less than #4 rebar ($\frac{1}{2}$ ” diameter) with a minimum length of 20 feet long placed in bottom of concrete footing encased by no less than 2” of concrete in direct contact with earth.

(3). Within the concrete encasement, connect the grounding electrode conductor to the re-bar by means of exothermic weld, Cadweld, or equivalent. Compression connections will not be accepted as an alternate termination method of connection within the concrete envelope.

(4). **The Contractor shall provide all necessary coordination between the Sub-Contractors and trades for the implementation of this item before concrete is placed.**

(5). Do not use Insulated (plastic or epoxy coated) re-bar for concrete-encased electrodes. If the structural construction requires insulated or plastic-coated re-bar, add a minimum of 20 feet bare, non-coated re-bar to create the Grounding Electrode.

(6). For installations that may structurally utilize re-bar smaller than #4, tie-wrap a minimum of 20’ length of no smaller than #4 AWG bare copper Grounding Electrode to the re-bar in the bottom of the footing prior to installation of concrete.

d. Furnish a Grounding Electrode Ground-Ring only where specifically noted on the project drawings. Ground-Ring shall comply with NEC Article 250.52A4 requirements and be installed per NEC Article 250.53. Where utilized, all Ground-Rings must encircle the entire facility (form a closed-loop). Size of the copper Grounding Electrode Conductor which is the sole connection to the ground-loop shall be the larger of that shown on the project drawings or #2 AWG.

8. On projects where the only Grounding Electrode listed in NEC Article

250.52A through 250.52D is a metallic underground water pipe, it must be supplemented by another grounding electrode per NEC Article 250.53D2. Unless directed otherwise, the supplemental grounding electrode shall be a driven ground field.

- a. Ground field shall consist of a triangle 10 feet on each side, with a driven ground rod at each vertex of the triangle. Size of the copper Grounding Electrode Conductor, and the bonding jumpers between all ground rods, shall be the larger of that shown on the project drawings or #6 AWG.
 - b. If required due to space constraints, furnish two (2) ground rods a minimum of 10 feet apart. Deviations from the triangular-shaped ground field shall require written approval by the Engineer prior to installation.
- G. All metallic raceways, boxes, enclosures, etc. shall include an insulated equipment ground conductor. Due to corrosion, metallic raceway and conduit connectors alone WILL NOT be considered as meeting this requirement. The Equipment Grounding Conductor shall positively bond all electrical components and utilization equipment to the facility ground system.
- H. All metallic boxes used for electrical equipment shall include listed grounding screws or lugs. No more than one grounding conductor shall be installed per lug location unless lug is listed for multiple conductors.
- I. The largest factory-scored concentric conduit knockouts shall be used to provide conduit bonding to NEMA 1 & 3R enclosures.
1. If required, provide a conduit reducing hub for the for the specific conduit size terminated.
- J. Equipment Grounding Conductors shall be sizes as shown in NEC T250.122, but no less than #12 AWG.
- K. Where “isolated” ground receptacles are shown on the project drawings, furnish a separate, insulated, equipment grounding conductor directly between the supply panelboard ground bus and the “isolated” ground outlet. Equipment grounding conductors for “isolated” ground outlets shall not be extended or looped from other outlets or equipment.
- L. Isolated, exposed metal conduit segments (e.g. within manhole or handhole) shall be bonded with a bare copper conductor sized from NEC T250.122. Bonding jumper size shall be based upon the largest ampacity circuit contained within.
- M. Bonding of metallic components of manhole and handhole frames and lids as well as all exposed metal conduit sections of underground duct bank is covered under Specifications 16118 “Exterior Underground Duct Bank”.

- N. All other exposed metal piping (e.g. air, fire-protection, natural gas, metallic process piping etc.) and exposed structural steel not used as a Grounding Electrode shall be bonded to the Grounding Electrode System per NEC Article 250.104. Size of the copper bonding jumper shall be no smaller than that shown in NEC Table T250.66.
- O. All communications systems described in NEC Chapter 8 shall be bonded to system ground. Installation shall comply with NEC Article 250.94 and Articles 800, 810, 820 and 830. Size of the copper bonding jumper shall be #6 AWG unless otherwise noted on the project drawings.
- P. General Requirements for Separately Derived Systems (e.g. Two-Winding Transformers).

Solidly-Grounded Separately-Derived Systems shall be installed per NEC Article 250.30 requirements. In general, the following shall apply for solidly-grounded two-winding transformers unless specifically directed otherwise on the project drawings.

1. Primary Equipment Ground conductor shall terminate on transformer ground lug "G".
2. Install the transformer "X0-G" link, or system bonding jumper, within the transformer housing only. Where the System Bonding Jumper consists of a field-installed copper conductor, it shall be sized to NEC Table 250.66 but not less than 12½% of the total cross-sectional area of the secondary phase conductors.
3. Secondary Neutral conductors shall be terminated on transformer "X0" Lug.
4. Secondary Equipment Ground conductors shall be terminated on transformer ground lug "G".
5. Bond the transformer Neutral "X0" to the nearest grounding electrode in accordance with Article 250.30A7 of the NEC. The grounding electrode conductor shall be sized per Table 250.66, "Grounding Electrode Conductor for Alternating-Current Systems of the latest edition of NEC. Grounding Electrode conductor shall be installed in either non-metallic conduit (Schedule 40 PVC) or bonded at both ends of metallic conduit per NEC Article 250.64E.
6. Neutral and Ground Bus in all downstream equipment shall be kept isolated. Do not re-bond downstream unless required by special conditions, such as those described in NEC Article 250.32.

- Q. On-Site Generation (e.g. Standby or Emergency Engine-Generators)

Unless otherwise noted on the project drawings, on-site generators are NOT to be installed as a separately derived system. Unless specifically shown

otherwise on the project drawings, DO NOT bond Neutral and Ground at the generator.

1. Separate Neutral conductors plus separate Equipment Ground conductors shall be extended between distribution equipment (typically a 3-Pole Transfer Switch) and engine-generator system.
2. Generator Equipment Ground conductor shall be terminated on generator ground lug "G".
3. Generator Neutral Conductors shall be terminated on generator Neutral lug "X0".
4. DO NOT install "X0-G" bonding strap at generator. Contractor shall field-inspect generator and remove the "X0-G" jumper if found installed by factory prior to shipping.
5. Unless otherwise shown on the project drawings, the Transfer Switch will be a 3-Pole device switching the phase-conductors only. Unless the Transfer Switch the Service Entrance Equipment, the isolated Generator Neutral is to pass un-switched through the 3-Pole ATS and terminate on the Service Entrance "X0" Neutral Bus.
6. The Generator Ground conductor shall be terminated on the Service Entrance system Ground bus or Ground lug "G".
7. The system Neutral-Ground bond is to be installed at one location at the Service Equipment ONLY. All downstream equipment shall keep Neutral and Ground conductors isolated and insulated from each other.

3.04 INTERFACE WITH OTHER SYSTEMS (Where used on the project)

- A. Interface with Surge Protective Devices installed under Section 16671.
- B. Lightning Protection Systems shall be bonded per NEC Article 250.106. All Lightning Protection Systems shall be bonded to facility Grounding Electrode system on facility exterior. Isolated grounding for Lightning Protection Systems will not be allowed.

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 TESTING

- A. As described in Specifications Section 16950.
- B. All grounded metal cases and parts associated with electrical equipment shall be tested for continuity with ground system.
- C. If requested, testing shall be performed in the presence of the Owner's

representative.

- D. Provide a copy of all testing reports to Engineer for record purposes.

END OF SECTION 16170

DIVISION 16 - ELECTRICAL

Section 16185 - Mechanical Equipment
Wiring

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Line-voltage power wiring and final electrical connections necessary to complete mechanical systems furnished by others, in particular but not limited to, Division 15 tasks. Note that equipment being furnished under other Specification Sections may, or may not be completely shown on project drawings, or may differ from that indicated due to differences between equipment from various manufacturers. Provide coordination as required in order furnish a complete and operational system. No additional payment will be issued for this item.

1.02 RELATED SECTIONS

- A. Division 15 - Mechanical.
- B. Section 16010 - General Electrical Requirements
- C. Section 16111 - Conduit and Raceway.
- D. Section 16123 - Building Wire and Cable.
- E. Section 16130 - Boxes
- F. Section 16141 - Wiring Devices
- G. Section 16160 - Cabinets and Enclosures
- H. Section 16170 - Grounding and Bonding
- I. Section 16190 - Supporting Devices
- J. Section 16195 - Electrical Identification
- K. Section 16950 - Testing Electrical Systems

1.03 REFERENCE TO STANDARDS

- A. NFPA 70 - NATIONAL ELECTRICAL CODE
- B. NEMA - National Electrical Manufacturer's Association.
- C. UL - Underwriter's Laboratories, Inc.
- D. ANSI - American National Standards Institute.
- E. NECA - National Electrical Contractors Association.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be delivered to jobsite in original shipping containers and shall be stored in a clean, dry location until ready for installation

1.05 SUBMITTALS (RESERVED)

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PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide all necessary material to complete final power wiring connections to all mechanical equipment items.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Furnish and install all motor starters and disconnect switches.
- B. All integral packaged control panels shall be provided by the Contractor furnishing the equipment. Install power control panels and complete all power wiring. For equipment and motors requiring a direct fixed connection, install liquid tight flexible conduit.
- C. Provide all necessary assistance during start-up and installation to the contractors furnishing the various equipment.
- D. Verify with mechanical contractors as to what electrical equipment is furnished with mechanical equipment. Provide starters unless otherwise noted as such on the Drawings.
- E. Test all motors for proper rotation and phase connection. Verify with ampere meter that motor is running under normal conditions and is not drawing excessive amperage. All motors shall have proper fuse and thermal overload protection.

END OF SECTION 16185

DIVISION 16 - ELECTRICAL
Section 16190 - Supporting Devices

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Strut-type framing for conduit and equipment supports.
- B. Anchors and Fasteners.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NECA - National Electrical Contractors Association.
- C. ASTM No. A570 G33
- D. ASTM No. A-123
- E. ASTM No. A-525

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Stored conduit and equipment supports shall not be in contact with earth, but shall be on pallets or other above-grade supports. Conduit and equipment supports shall be covered to minimize exposure to weather.
- B. Anchors and fasteners shall be stored in their original containers in a clean, dry place. They shall not be exposed to weather.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog data for fastening systems and supports.
- B. Manufacturer's instructions: Include application conditions and limitations for use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination and installation of Product.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.

- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY) (RESERVED)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MOUNTING STRUT

- A. Where utilized, strut-type metal framing shall be provided to mount and support electrical equipment and enclosures as indicated on the drawings.
- B. Strut-type supports shall be either aluminum or stainless steel construction. Unless specifically identified for use on the drawings, painted or factory coated steel, galvanized steel or non-metallic strut are not acceptable alternates to this requirement. Use stainless steel on all project locations where strut is in direct physical contact with earth.
- C. Wall mounted strut supports for electrical enclosures shall extend to floor and terminate in strut-type floor flange in order to transfer enclosure weight to the floor rather than wall. Vertical mounted strut sections shall be attached to masonry, where available, with expanding anchors. Vertical strut sections for wall construction using studs shall be solidly anchored at stud locations only.
- D. All mounting hardware shall be stainless steel.
- E. Manufacturers:
 - a. Unistrut
 - b. B-Line
 - c. GS-Metals
 - d. Equivalent meeting specifications

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine all supports and fasteners for straightness, rust and corrosion. Do not use any equipment that is not straight or is rusted or corroded.

3.02 PREPARATION

- A. All equipment shall be clean at time of installation. Remove all burs.

3.03 INSTALLATION

- A. Install products in conformance with manufacturer's instructions and as detailed on drawings.
- B. Provide anchors, fasteners and supports in accordance with NECA Standard of Installation. Do not use spring steel clips or clamps except as noted in Section 16190-3.03H.
- C. Do not fasten supports to pipes (except where detailed on drawings), ducts, mechanical equipment (except where detailed on drawings), or conduit.
- C. Install surface mounted cabinets, enclosures and panelboards with a minimum of four anchors.
- D. Provide materials, sizes and types of anchors, fasteners, and supports necessary to carry loads of equipment and conduits. Consider weights of equipment and conduit when selecting products.
- E. Provide all necessary hardware, such as floor flanges, in order to install equipment as specified or as shown on the drawings.
- F. Include knee-braces and stiffeners as necessary to provide rigid support such that equipment does not bounce or sway.
- G. Use spring-lock washers under all nuts.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

END OF SECTION 16190

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DIVISION 16 - ELECTRICAL
Section 16195 - Electrical Identification

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This section includes field-installed nameplates, labeling and identification methods for electrical equipment, components and wiring.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code

1.04 DELIVERY, STORAGE, AND HANDLING (RESERVED)

1.05 SUBMITTALS

- A. Product Data: Provide catalog data for nameplates, labels and markers.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)(RESERVED)

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

- A. Nameplates and legend plates shall be engraved three-layer laminated plastic, black letters on white background. Legends (wording) shall be as detailed on

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drawings or as directed by Owner's representative .

- B. All wire markers installed on electrical equipment above grade shall be weatherproof and water resistant. Wire identification labeling, whether factory applied or written in the field, shall utilize an adhesive that does not soften or weaken over time. Sleeve or tubing type labels may be utilized as an alternate. Paper adhesive-backed wire markers will be rejected and replaced at the Contractor's expense. Wire marker labels shall be as manufactured by Brady, or equivalent.
- C. All wire markers installed below grade in manholes, handholes or vaults shall be waterproof. Markers shall be non-corroding plastic clip-on sleeve type construction. Markers shall be permanently factory-printed such that label identification will not deteriorate due to time or contact with water. Wire markers used below grade shall be Brady Clip-Sleeve, or equivalent.
- D. Provide and install Safety Stripe Tapes on finished floors around electrical gear noting clearances required per NEC Article 110.26. Tape shall be minimum 2" in width with alternating black/yellow striping. Tape shall be Scotch/3M #5702 or equivalent.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION

- A. Degrease and clean surfaces to receive nameplates, legend plates and markers.

3.03 INSTALLATION

- A. Secure nameplates and legend plates to equipment using screws or adhesive.
- B. Nameplates or legend plates shall be provided for all disconnects, enclosed starters, control panels, transformers, etc.
- C. Wiring Device identification labels shall be furnished and installed on all wiring device cover plates per Specifications Sections 16141-3.01O and 16141-3.01P.
- D. Contractor shall develop the Wiring Identification Tables to be used for **ALL** wiring terminations on this project, and shall submit Tables for review and comment by Owner's Representative prior to installation of any conductors or cables.

Provide wire markers for **ALL** wires and terminations. By "all", this is intended to include, but not be limited to, all terminations at distribution panelboards, motors, valves, heaters, fan coils, heat pumps, fans, dampers, all MCC terminations, instrumentation & controls, terminal blocks and strips, etc. Wire identification shall be unique to wire that is marked or to terminal that wire lands upon. Identification of a run of wire from termination to termination shall be same throughout run.

E. Provide wire markers in all manholes, handholes and vaults.

F. Include markers labeled "SP" on all spare conductors.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 AS-BUILT WIRING IDENTIFICATION TABLE

A. Upon completion of project, Contractor shall provide five copies of as-built Wiring Identification Table. This table shall list **ALL** circuits installed as part of this work and shall give identification of ALL wires and terminations as installed and marked.

Table shall include routing of **ALL** conductors installed in the project from end-to-end including each conduit, manhole, handhole and vault through which each conductor passes. Include and identify all spare conductors.

END OF SECTION 16195

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DIVISION 16 - ELECTRICAL
Section 16422 - Temporary Power

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply of temporary electrical power as required to complete work as indicated on drawings and specified herein.
- B. All energy costs, demand costs and applicable one-time charges billed by serving utility for Temporary Power shall be paid for by the Contractor and included in base-bid price. They will not be paid for separately.
- C. It shall remain solely the Contractor's responsibility to ensure proper system voltage and adequate electrical construction power capacity are available for his work. If construction site is at an operational facility, the Contractor's temporary construction power shall not impact Owner's operations in any manner.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16111 - Conduit and Raceway.
- C. Section 16123 - Building Wire and Cable.
- D. Section 16170 - Grounding and Bonding.
- E. Section 16190 - Supporting Devices.
- F. Section 16441 - Enclosed Switches.

1.03 REFERENCE TO STANDARDS

- A. NFPA 70 - National Electric Code (most current issue).
- B. Requirements and standards as noted by serving utility.

PART 2 PRODUCTS

2.01 MATERIALS

- A. May be new or used, but shall be adequate for purposes used, shall not create unsafe conditions, nor violate specified codes. Comply with Federal, State and local regulations.
- B. Any and all additional work as required by serving electrical utility shall be considered incidental to this specification.
- B. Utility Name: AmerenCILCO
Contact Individual: Alan Getz
City, State Peoria, IL
Phone No.: 309-693-4686
Cell Phone No. 309-256-6580

PART 3 EXECUTION

3.01 TEMPORARY ELECTRICITY DURING CONSTRUCTION

- A. Contractor shall be solely responsible to make necessary arrangements and provide temporary electric service for construction equipment and lighting required during the entire construction period including all utility fees, service charges, and permits.
- B. Electric services shall be of sufficient capacity and characteristics to supply proper current for various types of construction tools, motors, welding machines, lights, heating plant, air conditioning system, pumps and other work required. All necessary temporary wiring, panelboards, outlets, switches, lamps, fuses, controls and accessories shall be provided by Contractor. A sufficient number of electric outlets shall be provided along with adequate lighting. Materials used for temporary service shall not be used in permanent system unless specific approval is given by Owner's representative. Temporary service shall be so constructed and arranged as not to interfere with progress of other trades. This system shall be erected and maintained strictly in accordance with all ordinances and requirements for temporary service pertaining thereto inclusive of OSHA and NEC.
- C. All 15A and 20A receptacles used for temporary power shall be ground fault circuit interrupter type, per NEC Article 590.

3.02 TEMPORARY POWER REMOVAL

- A. Any Contractor who has installed a temporary utility connection as herein specified, shall, prior to final acceptance, remove temporary connections and installations and leave premises restored to condition in which it was found.

END OF SECTION 16422

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply and installation of enclosed dry type transformers to provide a complete and operational electrical system.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceways
- C. Section 16123 - Building Wire and Cable
- D. Section 16170 - Grounding and Bonding

1.03 REFERENCE TO STANDARDS

- A. NEMA ST20 - Dry Type Transformers for General Applications

1.04 DELIVERY, STORAGE AND HANDLING

- A. Dry type transformers shall be stored indoors from time of delivery to jobsite, protected from weather and construction.

1.05 SUBMITTAL REQUIREMENTS

- A. Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, KVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

1.06 QUALIFICATIONS

- A. Dry type transformers shall be manufactured and supplied by a company regularly engaged in business of furnishing dry type transformers. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of ten years in manufacture of dry type transformers.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Square D
- B. Cutler-Hammer
- C. General Electric
- D. Siemens

2.02 CONSTRUCTION

A. Insulation System

1. 2 KVA and below: 150°C insulation based upon 80°C rise.
2. 3.0 to 15 KVA: 185°C insulation based upon 115°C rise
3. 15 KVA and above: 220°C insulation based upon 150°C rise

B. Performance shall be obtained without exceeding the specified temperature rise in a 40°C maximum ambient. Units shall be designed for continuous operation, with normal life expectancy as defined in ANSI C57.96.

C. Insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

D. Core and Coil Assemblies

Transformer core shall be constructed with high-grade, nonaging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The transformer core volume shall allow efficient transformer operation at 10% above the nominal tap voltage. Transformer windings may be either copper or aluminum using continuous wound construction.

E. Where noted on project drawings, provide "K-Factor" rated transformers specifically designed as suitable for use with Nonlinear loads having increased harmonic currents. Minimum transformer "K" factor shall be as noted on project drawings.

F. Efficiency

Per Federal Requirements described in 10CFR Part 431 "Energy Efficiency Program for Certain Commercial and Industrial Equipment", all Dry-Type transformers 15 kVA and larger shall comply with NEMA Standard TP-1

G. Sound Levels

Transformer maximum audible sound levels shall not exceed the following per IEEE C57.12.01 and NEMA ST-20 for 600-Volt Class, self-cooled units:

0 to 9 kVA	40db
10 to 50 kVA	45db

51 to 150 kVA	50db
151 to 300 kVA	55db
301 to 500 kVA	60db
501 to 700 kVA	62db
701 to 1000 kVA	64db
1001 to 1500 kVA	65 db

H. Wiring Terminations

Terminals shall be provided for external cables rated 90°C applied at 75°C ampacity.

I. Enclosure

The enclosure shall be made of heavy-gauge steel with minimum NEMA 2 rating unless otherwise specified.. Unit shall be equipped with a wiring compartment suitable for conduit entry and large enough to allow convenient wiring. The maximum temperature of the enclosure shall not exceed 90°C. The core of the transformer shall be grounded to the enclosure.

J. Mounting

Transformers, 75 KVA and below, shall be suitable for wall or floor mounting. Transformers over 75 KVA shall be floor mounted.

K. Unless otherwise noted or specified for environmental reasons, enclosures shall be ventilated. Provide lifting brackets or lifting eyes.

L. Taps

2 ea 2-½% FCAN (Full Capacity Above Normal)
2 ea 2-½% FCBN (Full Capacity Below Normal)

PART 3 EXECUTION

3.01 INSPECTION

A. Dry type transformers shall be inspected for physical damage. Touch up paint matching transformer shall be used as needed.

3.02 INSTALLATION

A. Install transformers in accordance with manufacturer's instructions.

B. Set transformer plumb and level.

C. Use flexible conduit, under provisions of Section 16011, 2 ft. (0.6 M) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

D. Mount transformers on vibration isolating pads suitable for isolating transformer

noise from building structure.

3.03 TESTING

- A. Check for damage and tight connections prior to energizing transformer.
- B. Adjust primary taps so that secondary voltage is within 2 % of rated voltage.

END OF SECTION 16461

DIVISION 16 - ELECTRICAL
Section 16470 - Panelboards

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply and installation of power and lighting panelboards to provide a complete and operational electrical system.
- B. This section shall also include the supply and installation of:
 - NEMA 1 Pull Box next to Section #1 of Power Distribution Panel #1.
 - Power Distribution Block for transition of New Vault Service Aluminum cables to Copper cables.
 - New Vault Service Metering.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements
- B. Section 16111 - Conduit and Raceway
- C. Section 16120 - Building Wire and Cable
- D. Section 16130 - Boxes
- E. Section 16170 - Grounding and Bonding
- F. Section 16190 - Supporting Devices
- G. Section 16195 - Electrical Identification
- H. Section 16671 - Surge Protective Devices

1.03 QUALITY ASSURANCE

- A. Panelboards shall be manufactured and supplied by a company regularly engaged in business of furnishing panelboards. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of panelboards.

1.04 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. U.L. Standard 489 - Molded Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures
- C. U.L. Standard 67 - Panelboards
- D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- E. NFPA 70 - National Electrical Code.
- F. NECA (National Electrical Contractors Association) "Standard of Installation".
- G. NEMA AB 1 - Molded Case Circuit Breakers.
- H. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- I. NEMA KS 1 - Enclosed Switches.
- J. NEMA PB 1 - Panelboards.

1.05 SUBMITTALS

- A. Submittals shall include outline and support point dimensions, voltage, main bus

ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes. Submittals shall also include manufacturer's installation instructions; indicating application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting the product.

B. Power Distribution Blocks.

C. New Vault Service Metering

1.06 DELIVERY STORAGE AND HANDLING

A. Panelboards shall be stored indoors from time of delivery to jobsite, protected from weather and damage.

1.07 MAINTENANCE SERVICE (WARRANTY)

A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 PANELBOARD MANUFACTURERS

- A. Cutler-Hammer/Westinghouse.
- B. Square D.
- C. General Electric.
- D. Siemens
- E. Equivalent

2.02 PANELBOARD EQUIPMENT

A. Panelboard shall be provided with bolt-on circuit breakers of size and rating as detailed in panel schedule on plans. Breakers shall be 1, 2 or 3-pole with an integral crossbar to assure simultaneous opening of all poles in multipole circuit breakers. Breakers shall have an overcenter, trip-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIPPED" positions. Circuit breakers shall be UL listed in accordance with UL Standard 489.

B. Panelboards bus structure and main lugs or main circuit breakers shall have current ratings as shown on panelboard schedule. Bus material shall be copper with either silver or tin plating. Bus ratings shall be in accordance with UL Standard 67. Bus bar connections to branch circuit breakers shall be the "distributed phase" or phase sequence type.

D. Panelboard bus assembly shall be enclosed in a steel cabinet rated NEMA 1 (unless otherwise noted on the drawings). Box front shall include a door and have a flush, cylinder tumbler-type lock and catch and spring-loaded stainless steel door pull. Door shall have completely concealed hinges when closed and shall not be removable when locked. A circuit directory frame and card with a clear plastic cover shall be provided on door interior.

- E. Panelboards shall be nominal 20" in width unless otherwise noted.
- F. Panelboards rated 240 VAC or less shall have short-circuit ratings as shown on the drawings, or as herein scheduled, but not less than an integrated equipment rating of 10,000 amps RMS symmetrical. All units shall bear UL label.
- G. Panelboards rated 480 VAC shall have short-circuit ratings as shown on the drawings, or as herein scheduled, but not less than an integrated equipment rating of 65,000 amps RMS symmetrical. All units shall bear UL label.
- H. Except where noted otherwise on the drawings, all panelboards shall have isolated neutral bar and ground bar. Where neutral bar and ground bar are noted to be isolated, the contractor shall verify during wiring installation that neutral and ground conductors are terminated on the correct bar.
- I. Where schedule on drawings indicates "SPARE", a complete circuit breaker of the ampacity and number of poles indicated is to be provided. Where schedule on drawings does not indicate a specific size circuit breaker provide a 20 AMP single pole circuit breaker for each of the remaining unused poles. Therefore, panelboard shall be filled with feeder circuit breakers.
- J. All circuit breakers feeding HVAC equipment shall be HACR rated.
- K. Multi-pole circuit breakers with removable tie-links are not acceptable.
- L. Tandem circuit breakers (two circuit breakers on single pole frame) are not acceptable.
- M. To comply with "Lock Out- Tag Out" requirements, all feeder circuit breakers on 480V panelboards shall have factory installed padlock kits.

2.03 NEMA 1 PULL BOX

- A. A NEMA 1 pull box shall be installed next to Section #1 of Distribution Panel #1, sized as required to house incoming New Vault Service Aluminum conductors, Power Distribution Blocks, New Vault Service Metering and New Vault Service Copper conductors.

2.04 POWER DISTRIBUTION BLOCKS

- A. New power distribution blocks shall be, ILSCO PDB-26-750-1, or equivalent, suitable for use with both aluminum and copper conductors, with main and branch lug wire range as required.

2.05 NEW VAULT SERVICE METERING

- A. New Vault Service Volts/Amps/Power Meter shall be Eaton IQ-140-M-A-6-5, or equivalent, with CT's, PT's, power supply and fusing as required. Panel mount meter in pull box.

PART 3 EXECUTION

3.01 INSPECTION

- A. Panelboards shall be thoroughly inspected for physical damage, proper alignment, anchorage, and grounding. Exterior finish shall be inspected for blemishes, nicks, and bare spots and touched up as required using touch-up paint provided. Inspection shall be made for proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

3.02 INSTALLATION

- A. Install panelboards where shown on the plans, in accordance with manufacturer's directions and in accordance with NEMA PB1.1. Install panelboards plumb. Provide filler plates for unused spaces in panelboards. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes as required.
- B. Provide legend plates for all panelboards to identify panelboard as well as voltage, phase and number of wires (example "LP-1, 208Y/120 VAC, 3 PHASE, 4 WIRE"). Legend plates shall comply with Section 16195 - Electrical Identification.
- C. Panelboard Surge Protective Device shall be installed in compliance with Section 16671.

3.03 TESTING

- A. Panelboards and load centers shall be thoroughly tested after installation and connection to respective loads. Lighting panelboard phases shall be measured with all major items operating. Phase loads shall be within 20 percent of each other. Rearrange circuits if required maintaining proper phasing for multi-wire branch circuits.
- B. Test for shorts and high resistance grounds. Check for faulty operation of circuit breakers and correct as needed.

END OF SECTION 16470

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Fractional Horsepower Manual Starter: Enclosed manually operated full voltage non-reversing switch equipped with thermal overloads and rated for operation of AC motors of 1.0 HP or less and 600 volts maximum.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16160 - Cabinets and Enclosures.
- C. Section 16170 - Grounding and Bonding.
- D. Section 16190 - Supporting Devices.
- E. Section 16195 - Electrical Identification

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NECA - National Electrical Contractors Association.
- C. NEMA AB 1 - Molded Case Circuit Breakers.
- D. NEMA ICS 2 - Industrial Control Devices, Controllers and Assemblies.
- E. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Motor starters shall be stored in containers as delivered to jobsite, in a clean and dry location, protected from construction.

1.05 SUBMITTALS

- A. Product Data: Provide catalog data showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions and enclosure details.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Motor starters shall be furnished by a manufacturer regularly engaged in construction of motor starters, with at least five years experience in furnishing motor starters.

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with NECA Standard of Installation.

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Enclosed fractional horsepower motor starters, Type F, shall be as manufactured by:
 - 1. Square D series 2510/2512
 - 2. Cutler Hammer series 9101
 - 3. Allen Bradley bulletin 600
 - 4. GE series CR101H/Y

2.02 EQUIPMENT SPECIFICATION

- A. Fractional HP Motor Starters
 - 1. Quick make and break toggle action with double break silver alloy contacts.
 - 2. Shall be inoperative unless one-piece, interchangeable, melting alloy thermal unit is in position, shall have trip-free mechanism.
 - 3. Shall include red pilot light.
 - 4. Enclosures shall be NEMA 1 or standard gang box and suitable switchplate covers for general purpose indoor applications, flush mounted in finished indoor areas, NEMA 4 for exterior applications or where

otherwise noted on the plans, and NEMA 7-9 for Class I Group B, C, & D, and Class I Groups E, F, & G areas.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect motor starters for damage, rust or corrosion, broken or loose wiring. Motor starter operators shall operate smoothly without binding or sticking.

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Install motor starters in accordance with manufacturer's instructions.
- B. Select and install overload heater elements to match installed motor characteristics. Overloads shall be sized based on actual motor nameplate amperage draw, not NEC tables.
- C. Provide nameplates under provisions of Section 16195.

3.04 TESTING

- A. Inspect and test motor starters to NEMA ICS 2, as recommended by manufacturer and as specified herein.

END OF SECTION 16481
(5/6/10)

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DIVISION 16 - ELECTRICAL
Section 16485 - Contactors

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work in this section is supply and installation of non-reversing contactors in enclosures as specified and detailed on the drawings.

1.03 RELATED WORK

- A. Specified Elsewhere:
 - 1. Section 16010 - General Electrical Requirements.
 - 2. Section 16111 - Conduits and Raceways.
 - 3. Section 16123 - Wire and Cable.
 - 4. Section 16160 - Cabinets and Enclosures.
 - 5. Section 16195 - Electrical Identification.
 - 6. Section 16510 - Luminaires.

1.04 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. UL Listed.
- C. ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- E. ANSI/NFPA 70 - National Electrical Code.

1.05 QUALITY ASSURANCE

- A. The contactors shall be manufactured and supplied by companies regularly engaged in the business of furnishing contactors. If requested by the Engineer, the manufacturers shall submit certification to a minimum experience of five years in the manufacture of respective contactors.

1.06 SUBMITTAL REQUIREMENTS

- A. Product data, including dimensions, size, voltage and current ratings.
- B. Manufacturer's instructions, indicating application conditions and limitations of use.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Contactors shall not be shipped loose but shall be in boxes, labeled with item(s) enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.

1.08 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 CONTACTORS

- A. Unless specified otherwise, enclosures for contactors shall be NEMA 12.
- B. Mechanically-held and Electrically-held contactors shall be ampacity and number of poles as shown on the drawings, Square D Class 8903, Type "S", or equivalent. Contacts shall be 480V rated, coils shall operate at 120V.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install contactors in accordance with the manufacturer's instructions. Contactors shall be wired as shown on the drawings. Contactors shall be installed in enclosures located and mounted as shown on the drawings.

3.02 TESTING

- A. Test contactors and respective control circuits for proper operation. Verify all connections are tight and secure and correct as required. Test for proper continuity.

END OF SECTION 16485
(5/6/10)

DIVISION 16 - ELECTRICAL
Section 16510 - Luminaires

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is interior lighting fixtures, lamps, accessories and installation and connection to wiring and ducts required for a complete and operational interior lighting system at facility.
- B. This work shall also include lighting fixtures mounted to building exterior walls and structures, including lamps, accessories and installation and connection to wiring and ducts required for a complete and operational lighting system at facility.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16111 - Conduit and Raceway
- C. Section 16118 - Duct Bank
- D. Section 16123 - Building Wire and Cable
- E. Section 16130 - Boxes
- F. Section 16170 - Grounding and Bonding

1.03 REFERENCE TO STANDARDS

- A. NEC Article 410 - Light Fixtures, Lampholders, Lamps and Receptacles.
- B. U.L. listing as "Suitable for Wet Locations".
- C. Illuminating Engineering Society (IES) of North America.

1.04 DELIVERY, STORAGE AND HANDLING

- A. All fixtures, ballasts and lamps shall be delivered in manufacturer's cartons and shall be stored inside, away from construction until just prior to installation. Under no circumstances shall they be stored outdoors or subject to weather.

1.05 SUBMITTALS

- A. Submittals will be required on all lighting fixtures, poles and accessories to be used at this facility.

1.06 QUALIFICATIONS

- A. Manufacturer, catalog number, type, wattage, and lamp data for each fixture as listed in Light Fixture Schedule on drawings establish acceptable minimum standard of quality, type of construction, and size of respective item.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner..

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Fluorescent Fixtures:

Fluorescent fixtures shall be as shown in Light Fixture Schedule on drawings, or equal. Light fixtures and lamps shall conform to latest Federal Agency Policy requirements for efficiency. Ballasts shall be NEC Class P with automatic resetting thermal protection adjacent to coil and non-resetting protection for capacitor. Ballasts shall be UL labeled, CBM certified by ETL, HPF, and shall have an "A" sound rating. Ballasts shall be Advance, General Electric, Jefferson, Universal, or equal. All fixtures shall be listed as suitable for use in wet areas, except for lay-in style for installation in drop ceiling grids.

All fluorescent fixtures installed after January 1, 2008 shall be furnished with an integral power disconnecting means which complies with NEC Article 410.73(G). Disconnecting means shall be Thomas & Betts LD2 or LD3, or equivalent.

Sealed Fluorescent Fixtures specified with emergency battery packs for application in wet or damp locations listing shall utilize battery systems which do not void any certifications or listings on the equipment. All submittals on emergency fluorescent fixtures with wet or damp listings shall clearly indicate equipment remains sealed (not vented) and maintains UL approval and listing with battery packs installed.

- B. Fluorescent Lamps:

All fluorescent lamps shall be furnished and installed by electrical contractor. Fluorescent lamps shall be as shown in Light Fixture Schedule on drawings.

- C. H.I.D. Fixtures:

H.I.D. fixtures shall be as shown in Light Fixture Schedule on drawings, or equal. Ballasts shall have Class H insulation and shall be high power factor with minimum of 90% power factor for high pressure sodium or metal halide units. Capacitors shall be of non-PCB type. H.I.D. lamp socket shall be of mogul base type. Internal wiring shall be suitable for 150°C. minimum. All fixtures shall be listed as suitable for use in wet areas.

- D. H.I.D Lamps:

All H.I.D. lamps shall be furnished and installed by electrical contractor.

- E. Unless otherwise noted on the drawings, furnish exterior wall mounted fixtures with individual integral photocell control.
- F. Light fixtures shall include all mounting hardware and appurtenant materials and equipment as required to provide a complete and operational lighting system.

PART 3 EXECUTION

3.01 INSPECTION

- A. All light fixtures and hardware shall be inspected for physical damage and corrected as required prior to installation. Gasketing shall be inspected for proper fit and sealing. Any defective or broken lamps and hardware shall be replaced at no cost to contract.

3.02 INSTALLATION

- A. Light fixtures shall be installed at locations shown on drawings or as directed by Owner's representative. All fixtures shall be cleaned inside and out just prior to installation. All fixtures shall be located such that they may be easily maintained.

3.03 TESTING

- A. All luminaires shall be tested for proper operation after installation and defective equipment shall be replaced at no cost to contract.

END OF SECTION 16510

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DIVISION 16 - ELECTRICAL
Section 16671 – Surge Protective Devices

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This specification describes the requirements for Surge Protective Devices (formerly called “Transient Voltage Surge Suppression” or “TVSS”). Surge Protective Device equipment shall be furnished for all locations where noted on project Drawings, referenced in other equipment specifications or as described herein.

1.02 RELATED SECTIONS

- A. Section 16010 - General Electrical Requirements.
- B. Section 16170 - Grounding and Bonding.
- C. Section 16470 – Panelboards

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code (most current issue).
- B. U.L. 1449/ANSI “3rd Edition” - Surge Protective Devices
- C. U.L. 1283 – Electromagnetic Interference Filters.
- D. IEEE C62.41– Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits
- E. IEEE C62.45 – Guide on Surge Testing for Equipment Connected to Low-Voltage Power Circuits
- F. NEMA LS-1 – Low Voltage Surge Protection Devices

1.04 DELIVERY, STORAGE AND HANDLING

- A. Electrical surge protection equipment shall be stored in a clean dry place, away from construction.

1.05 SUBMITTALS

- A. Product Data: Provide catalog data for electrical surge protection equipment.
- B. Provide information to verify 3rd party testing certification on assembled equipment ratings. Ratings on individual components will not meet this requirement and will not be considered.
- C. Provide verification that the SPD complies with the required ANSI/UL 1449 3rd Edition listing by Intertek (ETL), Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratorys (NRTL). Compliance may be in the form of a file number that can be verified on ETL’s or UL’s website or on any other NRTL’s website, as long as the website contains the following information at a minimum: model number, SPD Type, system voltage, phases, modes of protection, Voltage Protection Rating (VPR), and Nominal Discharge Current (I_n).

- D. Manufacturer's Instructions
Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Electrical surge protection equipment shall be furnished by manufacturer regularly engaged in the construction of electrical surge protection equipment, having minimum of five years experience in the manufacture of Surge Protective Device hardware.
- B. Third party tested for compliance.

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. As a minimum, all equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. UL Category Code VZCA = UL 1449 3rd Edition Surge Protective Devices.
- B. All Electrical Surge Protection hardware shall be U.L. Listed and labeled as "Surge Protective Devices" under the latest edition of UL 1449 "3rd Edition".
- C. Visual indication that surge suppressors are functioning properly shall be furnished in the form of display, pilot light or LED for each device. If manufacturer utilizes LED's or pilot lights, one indicator shall be provided for each leg of a multi-phase device.
- D. Where Surge Protective hardware is not an integral part of a factory-assembled

piece of equipment (such as factory installed in a switchboard or MCC), manufacturer or Contractor shall furnish all equipment, brackets and appurtenances necessary in order to properly install suppressors to manufacturer's requirements.

E. Electrical Requirements – Power Distribution Equipment

1. Unit operating voltage and configuration – Refer to Drawings
2. SPD Types:

Type 1: Can be installed before service disconnect overcurrent device. (Old equivalent: Secondary surge arrester, lightning arrester.) Nominal Discharge Current Rating - 10kA or 20kA.

Type 2: Can only be installed after service disconnect overcurrent device. (Old equivalent: TVSS) Nominal Discharge Current Rating - 3kA, 5kA, 10kA or 20kA.

Type 3: Point of Utilization SPD. Installed a minimum 10m (30ft) of conductor between service disconnect overcurrent device and surge protective device. (Old equivalent: Plug-In surge strips, surge receptacles).

Type 4: Component SPD. Does not have full enclosure; intended solely for installation in another listed device. Must pass all tests relevant to installation location (Type 1 or Type 2). (Old equivalent: UR recognized component.)

3. The suppression system shall incorporate thermally protected metal oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cell, air gaps, etc.
4. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall be greater than 125% of the nominal system operating voltage.
5. Protection Modes: The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:

LN = Line to Neutral
LL = Line to Line
LG = Line to Ground
NG = Neutral to Ground

Wye System: LN-A Phase, LN-B Phase, LN-C Phase, LG-A Phase, LG-B Phase, LG-C Phase, NG

Delta System: LL-A Phase, LL-B Phase, LL-C Phase, LG-A Phase, LG-B Phase, LG-C Phase

Single Phase System: LN-A Phase, LN-B Phase, LG-A Phase, LG-B Phase, NG

High Leg Delta: LN-A Phase, LN-B Phase, LN-C Phase, LG-A Phase, LG-B Phase, LG-C Phase, NG

6. Voltage Protection Ratings (VPR) shall not exceed the following per UL-1449:

Modes	208Y/120	480Y/277
L-N; L-G; N-G	600 V	1000 V
L-L	900 V	1800 V

7. ANSI/IEEE Cat. C3 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20 kV, 10 kA) shall be less than:

Modes	208Y/120	480Y/277
L-L	1240V	2060V
L-G	1000V	1580V
L-N, N-G	890 V	1370 V

8. ANSI/IEEE Cat. B3/C1 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ringwave (6000V, 3000A) shall be less than:

Modes	208Y/120	480Y/277
L-L	900V	1640V
L-G	550V	1050V
L-N, N-G	520 V	980 V

9. Each unit shall include an EMI/RFI filter. Filter shall comply with UL-1283.

10. Where practical, and to aid in keeping power lead/bus length short, Surge Protective Devices may be integrated into electrical distribution equipment enclosures.

11. In order to isolate the Surge Protective Devices under fault conditions, the assembly shall be U.L. rated for the same short circuit fault duty rating as the equipment to which it is connected. Provide supplemental fusing, if required, in order to meet this requirement. All overcurrent protection components shall be tested in compliance with UL 1449 – Limited Current Test and AIC Ratings.

12. Devices shall be provided with integral thermal protection to disconnect

the suppression components during an overheated MOV condition.

13. Minimum Repetitive Surge Current Capability: The device shall be repetitive surge tested in every mode utilizing Category C3 waveshapes at minimum of one minute intervals without suffering either performance degradation or more than 10% deviation of clamping voltage at a specified surge current. The minimum repetitive surge current capability as per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 shall be:
 - a. Service Entrance: 12,000 impulses per mode.
 - b. Branch Location (MCC's & Switchboards): 500 impulses per mode.
 - c. Branch Location Panelboard: 100 impulses per mode.

14. Voltage Protection Rating: The residual (limiting) voltage for a 6000V, 3000A, 8x20µs surge waveform that the Surge Protective Device is capable of withstanding shall be no less than that shown in the following table:

Minimum total Surge Current and Withstand Capability with Compliance to ANSI/IEEE C62.41 and NEMA LS-1			
Application	Per Phase	Per Mode	Surge Withstand Capabilities ANSI/IEEE C3 Wave (10kA)
<u>All Service Entrance Equipment</u> (Switchgear, Switchboards, MCC's, and other S.E. listed equipment)	240 kA	120kA	12,000 events
Branch Locations (Non-S.E. MCC's & Switchboards)	120 kA	60 kA	500 events
Branch Locations (Non-S.E. Panelboards)	40 kA	20 kA	100 events

15. Lighting and Distribution Panelboard Requirements. The following additional requirements shall apply when drawings indicate that the Surge Protective equipment is to be integral to the panelboard and mounted within the enclosure housing.
 - a. The Surge Protection units shall be tested to demonstrate suitability for ANSI/IEEE C62.41 Category C1 environments.
 - b. The Surge Protective Device shall not limit the use of Through-feed lugs, Sub-feed lugs and Sub-feed breaker features, where applicable.
 - c. The Surge Protective Device shall be immediately installed on the load side of the main breaker.
 - d. The panelboard shall be capable of re-energizing upon removal of the Surge Protective Device.
 - e. A direct bus bar connection shall be used to mount the Surge Protective component to the panelboard bus bar to reduce the impedance of the shunt path.
 - f. The Surge Protected panelboard shall be constructed using a

- direct bus bar connection.
 - g. The surge Protective Device shall be included and mounted within the panelboard by the manufacturer of the panelboard.
 - h. The complete panelboard, including the Surge Protection Device shall be UL-67 listed.
- 16. Switchgear, Switchboard, MCC and other Service Entrance equipment
 - a. The Surge Protection Devices covered under this section shall be 3rd party tested and suitable for ANSI/IEEE C62.41 Category C3 environments.
 - b. Surge Protection Device Nominal Discharge Current Rating: 20kA.
 - c. The Surge Protection Device shall be located on the load side of the main disconnect device, as close as possible to the phase conductors and ground/neutral bar.
 - d. Provide a 30-amp disconnect. The disconnect shall be directly integrated to the suppressor assembly.
 - e. Provide factory-installed digital surge counter and form C dry-contact alarm that changes state if any of the three phases detect a faulted, open or other reduced protection condition.
 - f. All monitoring diagnostic features shall be visible from the front of the equipment.
- F. Control Panels (120 VAC Supply): All fabricated control panels utilizing 120 VAC power which house relays, timers or other electrical and electronic equipment shall be provided with Surge Protective Devices on the 120 VAC supply. This 120 VAC Surge Protective Device is in addition to any upstream three-phase Surge Protection units required elsewhere. Each 120 VAC Surge Protective Device unit shall include an isolated dry-contact "failure-alarm" for remote monitoring. Control Panel Surge Protective Devices units shall be Transtector ACP Model 100-BW3R, or equivalent. To permit remote monitoring, connect the "Alarm" dry-contact to a Programmable Logic Controller (PLC) Digital Input, if applicable on project.
- G. Instrumentation Signal Protection. All analog instrumentation 4-20 ma signal cables which originate or terminate on an instrument installed on building exterior shall be individually protected with surge suppression at both ends of cable.
 - 1. All Instrumentation Signal Surge Suppressors mounted within control panels shall be Transtector Model DRDC-24 (DIN Rail mount), or equivalent.
 - 2. All Instrumentation Signal Surge Suppressors mounted at field mounted equipment shall be ½" pipe nipple mount Transtector Model PDS-1 (dead-ended) or PDS-2 (thru-design), or equivalent.
- H. Surge Protection for DeviceNet Network
On projects involving DeviceNet, or where shown on the drawings, provide UL-497B DeviceNet surge protection devices. Surge protection may be installed within DeviceNet equipment where practical. Where other enclosures are unavailable, provide suitably sized NEMA 4X Non-Metallic enclosure to house

Surge Protection equipment. DeviceNet Surge Protection devices shall be Leviton Model #3863-DEV.

- I. Surge Protection for Ethernet Network
On projects involving metallic-wire Ethernet which extends to building exterior, or where shown on the drawings, provide UL-497B Ethernet surge protection devices. Surge protection may be installed within other Ethernet equipment, Local Control Panels or PLC enclosures, whichever best suits particular project networking architecture and equipment. Where other enclosures are unavailable, provide suitably sized NEMA 4X Non-Metallic enclosure to house Surge Protection equipment. Ethernet Surge Protection devices shall be furnished with standard RJ-45 Input and Output jacks. Ethernet Surge Protection devices shall be Leviton Model #3861-ETH.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Control panel surge protection shall be installed per manufacturer's instructions by panel builder prior to shipment.
- B. Surge protection equipment for all other locations shall be installed per manufacturer's instructions and requirements.

END OF SECTION 16671

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DIVISION 16 - ELECTRICAL
Section 16903 – Programmable Logic
Control Panels

PART 1 GENERAL

1.01 WORK INCLUDES

Work under this section is to provide the Programmable Logic Control Panels (PLC's), including the fiber-optic data network between Existing Vault and New Vault as described herein and/or as detailed on project drawings.

1.02 DESCRIPTION

- A. All PLC control panels shall be furnished complete; including but not limited to, fabrication, testing, programming, field installation, debugging, start-up, commissioning, cable, conduit and terminations in order to provide a fully functional system to the satisfaction of the Engineer and Owner.
- B. To ensure sole-source responsibility, a single Systems Integrator shall furnish all PLC control panels, networking, programming, start-up and commissioning.

1.03 RELATED SECTIONS

- A. Section 16160 - Cabinets and Enclosures.

1.04 REFERENCE

- A. ANSI/NFPA 70 - National Electrical Code (most current issue).
- B. NECA - National Electrical Contractors Association.
- C. NEMA ICS 1 - General Standards for Industrial Control Systems.
- D. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers & Assemblies.
- E. NEMA ICS 3 - Industrial Systems.
- F. U.L. 508 – Industrial Control Equipment

1.05 SUBMITTALS

- A. Product Data: Provide catalog data for all control panel components and modules.
 - 1. Data submittals shall include complete, detailed, annotated schematics, product data on all components, product layout and dimensions, mounting details, including supports.
 - 2. PLC logic printouts are not required as submittal information. However, Contractor shall be solely responsible for providing a functional system meeting all the requirements and sequence of operation as specified herein. As part of the Record Drawings, the Contractor shall furnish "as-built" PLC logic as required in Part 2 of this specification.

- C. U.L. Identification Number for Control panel manufacturing facility
- D. Manufacturer's Instructions: Indicate applicable conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation and operation of Product.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section.
- B. System Integrator: Company specializing in and experienced in integrating PLC's and related equipment into a fully functional control system.

1.07 QUALITY ASSURANCE

- A. To assist in quality assurance, PLC control panels shall be assembled and wired by a UL 508 listed panel manufacturer, requiring only installation and connection to external wiring in field.
- B. All control panel Discrete Inputs, Discrete Outputs, Analog Inputs, Analog Outputs and programming shall be tested prior to delivery to jobsite.

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Accept products on site in factory containers. Inspect for damage.
- B. Store products in clean, dry area; maintain temperature to NEMA ICS 1.

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. Furnish manufacturer's authorized service and maintenance of PLC system for a minimum period of one (1) year from date of substantial completion established by Owner.
- B. Furnish replacements for all defective PLC system components for a minimum period of one year from date of substantial completion established by Owner.

1.10 EXTRA MATERIALS (SPARE PARTS)

Note that spare unit quantities specified are for the entire PLC system. Quantities indicated are NOT required for each individual PLC control panel.

- A. Provide one (1) spare I/O module of each type and function used in the system including original manufacturer's packaging and instructions. These are to be retained by the owner for future repair purposes. These modules are over and above any modules utilized by the start-up technician during commissioning of the equipment.
- B. On systems with fiber-optic networking, furnish one (1) spare fiber-optic network interface unit including original manufacturer's packaging and instructions. This unit is to be retained by the owner for future repair purposes.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Programmable Logic Controllers (PLC's) and I/O Cards
 - 1. Allen-Bradley MicroLogix 1400 #1766-L32AWA, or equivalent.
 - 2. 8-Point 120VAC Digital Input Module, Allen-Bradley 1762-IA8, or equivalent.
 - 3. 8-Point 120VAC Digital Relay Output Module, Allen Bradley-1762-OW8, or equivalent.
- B. "Interposing" Relays
 - 1. 120 VAC relay with one form "C" 7.5A/12A rated contact, IDEC RJIS-CA120 with Din-Rail Socket, or equivalent.

2.02 PROGRAMMABLE LOGIC CONTROLLERS

- A. Description: Programmable Logic Controller (PLC) manufactured to NEMA ICS 3.
- B. Service Conditions:
 - Temperature (operating) 0 to 60°C
 - Temperature (non-operating) -40 to 85°C
 - Humidity.....5 to 95 %, non-condensing
 - Altitude..... up to 6600 feet (2000 meters)
 - Supply Voltage..... 120 VAC, 60 Hz
 - Electrical Noise Immunity.....NEMA ICS 2-30

C. Configuration:

1. PLC system: System is to include Two (2) PLC's interconnected thru a fiber-optic network.
2. Each PLC Assembly: Include enclosure, wire duct, terminal blocks, fuses or circuit breakers, PLC processor, power supply, Input/Output modules, backplane or rack, communication port(s), programming port, fiber-optic interface, "interposing" relays, UPS, surge protective device, interconnecting wiring and all programming for a complete & operational system.

D. Input/Output Modules

Provide sufficient unused I/O rack space to allow for future installation of 10% (minimum) additional I/O modules. If required, increase rack and enclosure sizes in order to accommodate.

1. I/O Modules for use with MicroLogix 1400 PLC
 - a. Digital Input (8-Point 120 VAC) 1762-1A8
 - b. Digital Output (8-Point 120 VAC relay contact)1762-OW8

E. Fiber-Optic Ethernet Network Module for Allen-Bradley PLC's

1. Ethernet switch, MOXA EDS-305-M-ST, or equivalent, with power supply.

F. PLC Processor Power Supply

1. Input Voltage (nominal) 120 VAC
2. CapacityAs Required for internal devices specified

G. Indicating Lights

As a minimum, provide each of the Programmable Logic Control Panels with the following door-mounted indicating lights:

1. 120V Push-To-Test LED White indicating light with engraved legend plate reading "POWER ON".
2. 120V Push-To-Test LED Red indicating light with engraved legend plate reading "COMMUNICATION FAILURE".

H. Provide each of the Programmable Logic Control Panels with a 10 Amp, 1-Pole DIN-Rail mounted circuit breaker for input power. Circuit Breaker shall be Allen-Bradley #1492-CB1G100, or equivalent.

I. Secondary 120 VAC Surge Arrester

Secondary surge arrester shall be provided by the control panel manufacturer and be as specified under Section 16671-2.01E. Install per manufacturer's directions, include mounting bracket or plate as required.

J. Uninterruptible Power Supply (UPS)

Provide each PLC panel with an internal Off-Line UPS to power all components within each panel in the event of power outage or disruption. Both Input and Output of the UPS shall be 120 VAC, 60 Hz. UPS capacity shall be no less than 500VA/325W. Unit shall be DIN Rail mountable. UPS shall be Allen-Bradley 1609-U, or equivalent.

- a. Provide two NEMA 5-20R receptacles on the interior of each PLC Control Panel. One receptacle is to be fed directly from the incoming "raw" 120 VAC supply power from the upstream lighting panelboard. The second receptacle is to be fed from the 120 VAC output of the UPS described above.
- b. The "PLC line power" terminals for the PLC panel shall be connected to a NEMA 5-15P plug thru a five (5) foot length of "SO" cord.
- c. Under normal conditions, the UPS "line" plug will be inserted into the "raw" receptacle and the "PLC line power" plug will be inserted into the receptacle fed from the output of the UPS.
- d. The intent of the above arrangement is to permit removal of the UPS for service or repair by directly plugging the "PLC line power" plug directly into the "raw" 120 VAC supply power receptacle. (It is recognized that this action will require a momentary shut-down of the PLC.)
- e. Provide a sufficiently sized NEMA 4X PLC enclosure such that the UPS can be DIN rail mounted near the bottom of each enclosure.

K. Enclosure Light

Provide each LCP/PLC control panel with interior door-activated fluorescent light. Unit shall be Hoffman A-LTDB1 or X-LF16D18 as applicable for enclosure size.

- L. PLC enclosure shall be provided with 300 Volt DIN-Rail mount tubular compression type terminal blocks for all field wiring connection points. All PLC I/O points and supply conductors shall be factory wired to terminal blocks. Provide minimum 10% spare terminal blocks.

M. Documentation & Software

1. Programming Software:
Include one (1) Windows compatible PLC programming package, complete with documentation for the manufacturer of the model of PLC provided. License shall be in the name of the owner.
2. Final Program
Provide (1) copy of the final program logic complete with annotation to the Owner after start up and all de-bugging and commissioning has been completed. The PLC data image shall be as provided by the programming software specified above. PLC logic shall be furnished on minimum of three (3) CD-ROM copies and also provide one (1) copy of hard copy printout on bound 8.5"x 11" paper.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Equipment supplier shall develop and enter PLC control logic based upon the existing L-821 Panel Sequence of Operation.
- C. Connect input and output devices as indicated on the plans.
- D. Contractor and supplier shall furnish any other items not specifically noted or detailed in order to provide for a functional system as described in these specifications.

3.03 FIELD QUALITY CONTROL

- A. Perform operational testing on control systems to verify proper operation and field wiring connections.

3.04 DEMONSTRATION AND TRAINING

- A. Demonstrate operation and programming of PLC system.
- B. Provide minimum of Two (2) hours of instruction each for two people, to be conducted at project site by manufacturer's representative technician familiar with this specific project, equipment and functionality requirements.

END OF SECTION 16903

DIVISION 16 - ELECTRICAL
Section 16950 - Testing Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Contractor shall note that this section shall be considered a Supplement to testing requirements outlined or described in other sections of these specifications.

1.02 WORK INCLUDES

- A. Extent of Work as required by the Drawings and these Specifications.

1.03 RELATED WORK

- A. Specified elsewhere:
1. Section 16010 - General Electrical Requirements.
 2. Section 16123 - Building Wire and Cable.
 3. Section 16141 - Wiring Devices.
 4. Section 16160 - Cabinets and Enclosures
 5. Section 16170 - Grounding and Bonding.
 6. Section 16185 - Mechanical Equipment Wiring
 7. Section 16422 - Temporary Power
 8. Section 16461 - Dry Type Transformers.
 9. Section 16470 - Panelboards.
 10. Section 16481 - Enclosed Motor Controllers.
 11. Section 16485 - Contactors.
 12. Section 16510 - Luminaires
 13. Section 16671 - Surge Protective Devices (SPD)
 14. Section 16903 - Programmable Logic Control Panels

1.04 QUALITY ASSURANCE

- A. Regulatory requirements:
1. Governing codes:
 - a. NFPA 70 - National Electrical Code (most current issue).

1.05 SUBMITTALS

- A. Test Reports:
- a. Test of entire electrical system as noted herein. Submit to the Engineer in triplicate.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Furnish all equipment, tools, manpower, and labor to perform specified testing.

PART 3 EXECUTION

3.01 TESTING

- A. After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. When fault condition is present, the trouble shall be rectified, then re-tested. Where cable is found defective or damaged, it shall be removed and replaced in entirety, do not field repair. Cost for correction shall be considered incidental to the project.
- B. Voltage test shall be made at each lighting and distribution panel. When potential is not within 2 percent of rated voltage, the conditions shall be corrected by tap changes or power company correction of line voltage.
- C. Voltage test shall be made between Neutral (White) and Ground (Green) conductors and/or busbar at each lighting and distribution panel. Measured volts shall not exceed 0.2 mV. Locations exceeding this value shall be corrected and re-tested.
- D. A voltage test shall be made on the last outlet of each circuit and the potential drop shall not exceed 3 percent of rated voltage.
- E. All wiring devices and electrical apparatus furnished under this contract, when ground or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing all defective parts and materials. Cost of correction is considered incidental to the project.
- F. All feeder cables, Motor Control Centers (MCC's), Switchboards, Panelboards, Transformers and other power distribution apparatus shall have a Megger resistance test conducted to determine that insulation resistance is not less than that recommended by the manufacturer, or as noted below.

Unless otherwise recommended by the manufacturer, insulation resistance testing shall meet or exceed the following on 600 Volt equipment utilizing 500 Volt resistance test instrument:

Conductors	50 Meg-Ohms
Motors.....	5 Meg-Ohms
Switchboards, MCC's and Panelboards	25 Meg-Ohms
Power Transformers	5 Meg-Ohms

- G. Contractor shall furnish all tests and shall provide all test equipment, meters, instruments, cable connections or apparatus necessary for performing tests as specified herein. All costs for testing shall be considered incidental to this item and will not be paid for separately.
- H. Examine connections to equipment for proper phase relationships. Rotate phase conductors as necessary in order to correct.
- I. All motors shall be tested under Article 16220. All motors shall be tested for correct direction of rotation. Run tests on all motors and verify that proper overload devices have been installed. Coordinate this task with motor supplier.
- J. Testing of Ground System
 - 1. Each and all grounded cases and metal parts associated with electrical equipment shall be tested for continuity of connection with the ground bus system by the Contractor in the presence of the Engineer or his representative.
 - 2. All grounding electrode conductors brought in from the ground field shall be tested for satisfactory continuity and by resistance measurement between the electrical equipment ground bus and the ground field. The grounding path shall not exceed 0.010 ohms.
 - 3. Each Ground Field shall be tested for resistance to earth a "three-terminal" or "fall-of-potential" test as described in IEEE Standard #81. As an alternate, a specially designed clamp-on instrument such as AEMC Model 3710 or 3730 may be used if found acceptable to the engineer. Based upon measured field data, the Contractor shall calculate the ground field resistance and furnish record copies to the Engineer and Owner for record. In no case shall the ground field resistance exceed 25 ohms. If the resistance is found to be higher than 25 ohms, one additional rod shall be driven with a minimum separation equal to the length of the ground rod used and connected in parallel with the rod under test.
 - 4. Exterior ground field resistance testing shall not be measured during unusually wet weather and should be performed during normal weather and soil conditions. Any tests incorrectly performed or not performed to the satisfaction of the engineer will be repeated. Costs for all such re-testing shall be considered incidental to the project.
 - 5. All specified maximums and minimums of this specifications must be met. Complete test records of all tests shall be made and shall show resistance values obtained and calculations of same, showing method of test and calculation.

- K. Fire alarm equipment testing and certification shall be performed by the Alarm company representative and installing Contractor in the presence of the Owner, Engineer and any Fire Protection Authority as applicable. Correct any deficiencies found and re-test. Copies of all test results are to be forwarded to the Engineer for record. Costs for all such testing are considered incidental to the project.

3.03 CORRECTION OF DEFECTS

- A. When tests disclose any unsatisfactory workmanship or equipment furnished under this contract, correct defects and retest. Repeat tests until satisfactory results are obtained.
- B. When any wiring or equipment is damaged by tests, repair or replace such wiring or equipment. Test repaired items to ensure satisfactory operation.

END OF SECTION 16950