HIGHWAY WORK PROPOSAL

Wisconsin Department of Transportation
06/2017 s.66.0901(7) Wis. Stats

Proposal Number: 010

COUNTY	STATE PROJECT	FEDERAL	PROJECT DESCRIPTION	HIGHWAY
Kenosha	1030-31-72	N/A	Ns Freeway, Rest Area 26; Safety Rest Area Improvements	OFF SYS
Kenosha	3738-08-70	N/A	104th Street, V Pleasant Prairie; Pleasant Prairie Welcome Center	STH 165

This proposal, submitted by the undersigned bidder to the Wisconsin Department of Transportation, is in accordance with the advertised request for proposals. The bidder is to furnish and deliver all materials, and to perform all work for the improvement of the designated project in the time specified, in accordance with the appended Proposal Requirements and Conditions.

Proposal Guaranty Required: $75,000.00 Payable to: Wisconsin Department of Transportation	Attach Proposal Guaranty on back of this PAGE.
Bid Submittal Date: May 8, 2018 Time (Local Time): 9:00 am	Firm Name, Address, City, State, Zip Code SAMPLE NOT FOR BIDDING PURPOSES
Contract Completion Time September 28, 2018	
Assigned Disadvantaged Business Enterprise Goal 0%	This contract is exempt from federal oversight.

This certifies that the undersigned bidder, duly sworn, is an authorized representative of the firm named above; that the bidder has examined and carefully prepared the bid from the plans, Highway Work Proposal, and all addenda, and has checked the same in detail before submitting this proposal or bid; and that the bidder or agents, officer, or employees have 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 this proposal bid.

Do not sign, notarize, or submit this Highway Work Proposal when submitting an electronic bid on the Internet.

Subscribed and sworn to before me this date _____

(Signature, Notary Public, State of Wisconsin)	(Bidder Signature)
(Print or Type Name, Notary Public, State Wisconsin)	(Print or Type Bidder Name)
(Date Commission Expires)	(Bidder Title)

Notary Seal

Type of Work: For Department Use Only

Mill, Continuous Diamond Grinding, Grade, Base, Culvert Pipe, Storm Sewer, Concrete Pavement, Asphalt Pavement, Curb & Gutter, Sidewalk, Signing, Lighting, Overhead Sign Support, Marking, Rest Area Building Improvements

Notice of Award Dated	Date Guaranty Returned

PLEASE ATTACH
PROPOSAL GUARANTY HERE

Effective with November 2007 Letting

PROPOSAL REQUIREMENTS AND CONDITIONS

The bidder, signing and submitting this proposal, agrees and declares as a condition thereof, to be bound by the following conditions and requirements.

If the bidder has a corporate relationship with the proposal design engineering company, the bidder declares that it did not obtain any facts, data, or other information related to this proposal from the design engineering company that was not available to all bidders.

The bidder declares that they have carefully examined the site of, and the proposal, plans, specifications and contract forms for the work contemplated, and it is assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, special provisions and contract. It is mutually agreed that submission of a proposal shall be considered conclusive evidence that the bidder has made such examination.

The bidder submits herewith a proposal guaranty in proper form and amount payable to the party as designated in the advertisement inviting proposals, to be retained by and become the property of the owner of the work in the event the undersigned shall fail to execute the contract and contract bond and return the same to the office of the engineer within fourteen (14) days after having been notified in writing to do so; otherwise to be returned.

The bidder declares that they understand that the estimate of quantities in the attached schedule is approximate only and that the attached quantities may be greater or less in accordance with the specifications.

The bidder agrees to perform the said work, for and in consideration of the payment of the amount becoming due on account of work performed, according to the unit prices bid in the following schedule, and to accept such amounts in full payment of said work.

The bidder declares that all of the said work will be performed at their own proper cost and expense, that they will furnish all necessary materials, labor, tools, machinery, apparatus, and other means of construction in the manner provided in the applicable specifications and the approved plans for the work together with all standard and special designs that may be designed on such plans, and the special provisions in the contract of which this proposal will become a part, if and when accepted. The bidder further agrees that the applicable specifications and all plans and working drawings are made a part hereof, as fully and completely as if attached hereto.

The bidder, if awarded the contract, agrees to begin the work not later than ten (10) days after the date of written notification from the engineer to do so, unless otherwise stipulated in the special provisions.

The bidder declares that if they are awarded the contract, they will execute the contract agreement and begin and complete the work within the time named herein, and they will file a good and sufficient surety bond for the amount of the contract for performance and also for the full amount of the contract for payment.

The bidder, if awarded the contract, shall pay all claims as required by Section 779.14, Statutes of Wisconsin, and shall be subject to and discharge all liabilities for injuries pursuant to Chapter 102 of the Statutes of Wisconsin, and all acts amendatory thereto. They shall further be responsible for any damages to property or injury to persons occurring through their own negligence or that of their employees or agents, incident to the performance of work under this contract, pursuant to the Standard Specifications for Road and Bridge Construction applicable to this contract.

In connection with the performance of work under this contract, the contractor agrees to comply with all applicable state and federal statutes relating to non-discrimination in employment. No otherwise qualified person shall be excluded from employment or otherwise be subject to discrimination in employment in any manner on the basis of age, race, religion, color, gender, national origin or ancestry, disability, arrest or conviction record (in keeping with s.111.32), sexual orientation, marital status, membership in the military reserve, honesty testing, genetic testing, and outside use of lawful products. This provision 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 further agrees to ensure equal opportunity in employment to all applicants and employees and to take affirmative action to attain a representative workforce.

The contractor agrees to post notices and posters setting forth the provisions of the nondiscrimination clause, in a conspicuous and easily accessible place, available for employees and applicants for employment.

If a state public official (section 19.42, Stats.) or an organization in which a state public official holds at least a 10% interest is a party to this agreement, this contract is voidable by the state unless appropriate disclosure is made to the State of Wisconsin Ethics Board.

Effective with August 2015 Letting

BID PREPARATION

Preparing the Proposal Schedule of Items

A General

(1) Obtain bidding proposals as specified in section 102 of the standard specifications prior to 11:45 AM of the last business day preceding the letting. Submit bidding proposals using one of the following methods:

1. Electronic bid on the internet.
2. Electronic bid on a printout with accompanying diskette or CD ROM.
3. Paper bid under a waiver of the electronic submittal requirements.

(2) Bids submitted on a printout with accompanying diskette or CD ROM or paper bids submitted under a waiver of the electronic submittal requirements govern over bids submitted on the internet.

(3) The department will provide bidding information through the department's web site at:
http://wisconsindot.gov/Pages/doing-bus/contractors/hcci/bid-let.aspx

The contractor is responsible for reviewing this web site for general notices as well as information regarding proposals in each letting. The department will also post special notices of all addenda to each proposal through this web site no later than 4:00 P.M. local time on the Thursday before the letting. Check the department's web site after 5:00 P.M. local time on the Thursday before the letting to ensure all addenda have been accounted for before preparing the bid. When bidding using methods 1 and 2 above, check the Bid Express™ on-line bidding exchange at http://www.bidx.com/ after 5:00 P.M. local time on the Thursday before the letting to ensure that the latest schedule of items Expedite file (*.ebs or *.00x) is used to submit the final bid.

(4) Interested parties can subscribe to the Bid Express™ on-line bidding exchange by following the instructions provided at the www.bidx.com web site or by contacting:

Info Tech Inc.
5700 SW 34th Street, Suite 1235
Gainesville, FL 32608-5371
email: mailto:customer.support@bidx.com

(5) The department will address equipment and process failures, if the bidder can demonstrate that those failures were beyond their control.

(6) Contractors are responsible for checking on the issuance of addenda and for obtaining the addenda. Notice of issuance of addenda is posted on the department's web site at:
http://wisconsindot.gov/Pages/doing-bus/contractors/hcci/bid-let.aspx

or by calling the department at (608) 266-1631. Addenda can ONLY be obtained from the departments web site listed above or by picking up the addenda at the Bureau of Highway Construction, Room 601, 4802 Sheboygan Avenue, Madison, WI, during regular business hours.

(7) Addenda posted after 5:00 PM on the Thursday before the letting will be emailed to the eligible bidders for that proposal. All eligible bidders shall acknowledge receipt of the addenda whether they are bidding on the proposal or not. Not acknowledging receipt may jeopardize the awarding of the project.

B Submitting Electronic Bids

B.1 On the Internet

(1) Do the following before submitting the bid:

1. Have a properly executed annual bid bond on file with the department.
2. Have a digital ID on file with and enabled by Info Tech Inc. Using this digital ID will constitute the bidder's signature for proper execution of the bidding proposal.

(2) In lieu of preparing, delivering, and submitting the proposal as specified in 102.6 and 102.9 of the standard specifications, submit the proposal on the internet as follows:

1. Download the latest schedule of items reflecting all addenda from the Bid Express web site.
2. Use Expedite™ software to enter a unit price for every item in the schedule of items.
3. Submit the bid according to the requirements of Expedite™ software and the Bid Express™ web site. Do not submit a bid on a printout with accompanying diskette or CD ROM or a paper bid. If the bidder does submit a bid on a printout with accompanying diskette or a paper bid in addition to the internet submittal, the department will disregard the internet bid.
4. Submit the bid before the hour and date the Notice to Contractors designates.
5. Do not sign, notarize, and return the bidding proposal described in 102.2 of the standard specifications.

(3) The department will not consider the bid accepted until the hour and date the Notice to Contractors designates.

B.2 On a Printout with Accompanying Diskette or CD ROM

(1) Download the latest schedule of items from the Wisconsin pages of the Bid Express™ web site reflecting the latest addenda posted on the department's web site at:

http://wisconsindot.gov/Pages/doing-bus/contractors/hcci/bid-let.aspx

Use Expedite ™ software to prepare and print the schedule of items. Provide a valid amount for all price fields. Follow instructions and review the help screens provided on the Bid Express™ web site to assure that the schedule of items is prepared properly.

(2) Staple an 8 1/2 by 11 inch printout of the Expedite™ generated schedule of items to the other proposal documents submitted to the department as a part of the bidder's sealed bid. As a separate submittal not in the sealed bid envelop but due at the same time and place as the sealed bid, also provide the Expedite™ generated schedule of items on a 3 1/2 inch computer diskette or CD ROM. Label each diskette or CD ROM with the bidder's name, the 4 character department-assigned bidder identification code from the top of the bidding proposal, and a list of the proposal numbers included on that diskette or CD ROM as indicated in the following example:

Bidder

Name

BN00

Proposals: 1, 12, 14, & 22

(3) If bidding on more than one proposal in the letting, the bidder may include all proposals for that letting on one diskette or CD ROM. Include only submitted proposals with no incomplete or other files on the diskette or CD ROM.

(4) The bidder-submitted printout of the Expedite™ generated schedule of items is the governing contract document and must conform to the requirements of section 102 of the standard specifications. If a printout needs to be altered, cross out the printed information with ink or typewriter and enter the new information and initial it in ink. If there is a discrepancy between the printout and the diskette or CD ROM, the department will analyze the bid using the printout information.

(5) In addition to the reasons specified in section 102 of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:

1. The check code printed on the bottom of the printout of the Expedite™ generated schedule of items is not the same on each page.
2. The check code printed on the printout of the Expedite™ generated schedule of items is not the same as the check code for that proposal provided on the diskette or CD ROM.
3. The diskette or CD ROM is not submitted at the time and place the department designates.

C Waiver of Electronic Submittal

(1) The bidder may request a waiver of the electronic submittal requirements. Submit a written request for a waiver in lieu of bids submitted on the internet or on a printout with accompanying diskette or CD ROM. Use the waiver that was included with the paper bid document sent to the bidder or type up a waiver on the bidder's letterhead. The department will waive the electronic submittal requirements for a bidding entity (individual, partnership, joint venture, corporation, or limited liability company) for up to 4 individual proposals in a calendar year. The department may allow additional waivers for equipment malfunctions.

(2) Submit a schedule of items on paper conforming to section 102 of the standard specifications. The department charges the bidder a $75 administrative fee per proposal, payable at the time and place the department designates for receiving bids, to cover the costs of data entry. The department will accept a check or money order payable to: "Wisconsin, Dept. of Transportation."

(3) In addition to the reasons specified in section 102 of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:

1. The bidder fails to provide the written request for waiver of the electronic submittal requirements.
2. The bidder fails to pay the $75 administrative fee before the time the department designates for the opening of bids unless the bidder requests on the waiver that they be billed for the $75.
3. The bidder exceeds 4 waivers of electronic submittal requirements within a calendar year.

(4) In addition to the reasons specified in section 102 of the standard specifications, the department may refuse to issue bidding proposals for future contracts to a bidding entity that owes the department administrative fees for a waiver of electronic submittal requirements.

PROPOSAL BID BOND

Wisconsin Department of Transportation

DT1303 1/2006

Proposal Number	Project Number	Letting Date
Name of Principal		
Name of Surety	State in Which Surety is Organized	

We, the above-named Principal and the above-named Surety, are held and firmly bound unto the State of Wisconsin in the sum equal to the Proposal Guaranty for the total bid submitted for the payment to be made; we jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. The condition of this obligation is that the Principal has submitted a bid proposal to the State of Wisconsin acting through the Department of Transportation for the improvement designated by the Proposal Number and Letting Date indicated above.

If the Principal is awarded the contract and, within the time and manner required by law after the prescribed forms are presented for signature, enters into a written contract in accordance with the bid, and files the bond with the Department of Transportation to guarantee faithful performance and payment for labor and materials, as required by law, or if the Department of Transportation shall reject all bids for the work described, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect. In the event of failure of the Principal to enter into the contract or give the specified bond, the Principal shall pay to the Department of Transportation **within 10 business days of demand** a total equal to the Proposal Guaranty as liquidated damages; the liability of the Surety continues for the full amount of the obligation as stated until the obligation is paid in full.

The Surety, for value received, agrees that the obligations of it and its bond shall not be impaired or affected by any extension of time within which the Department of Transportation may accept the bid; and the Surety does waive notice of any such extension.

IN WITNESS, the Principal and Surety have agreed and have signed by their proper officers and have caused their corporate seals to be affixed this date: **(DATE MUST BE ENTERED)**

PRINCIPAL

(Company Name) **(Affix Corporate Seal)**

(Signature and Title)

(Company Name)

(Signature and Title)

(Company Name)

(Signature and Title)

(Company Name)

(Signature and Title)

(Name of Surety) **(Affix Seal)**

(Signature of Attorney-in-Fact)

NOTARY FOR PRINCIPAL

(Date)

State of Wisconsin)
) ss.
_____ County)

On the above date, this instrument was acknowledged before me by the named person(s).

(Signature, Notary Public, State of Wisconsin)

(Print or Type Name, Notary Public, State of Wisconsin)

(Date Commission Expires)

Notary Seal

NOTARY FOR SURETY

(Date)

State of Wisconsin)
) ss.
_____ County)

On the above date, this instrument was acknowledged before me by the named person(s).

(Signature, Notary Public, State of Wisconsin)

(Print or Type Name, Notary Public, State of Wisconsin)

(Date Commission Expires)

Notary Seal

IMPORTANT: A certified copy of Power of Attorney of the signatory agent must be attached to the bid bond.

CERTIFICATE OF ANNUAL BID BOND

Wisconsin Department of Transportation

DT1305 8/2003

Time Period Valid (From/To)
Name of Surety
Name of Contractor
Certificate Holder Wisconsin Department of Transportation

This is to certify that an annual bid bond issued by the above-named Surety is currently on file with the Wisconsin Department of Transportation.

This certificate is issued as a matter of information and conveys no rights upon the certificate holder and does not amend, extend or alter the coverage of the annual bid bond.

Cancellation: Should the above policy be cancelled before the expiration date, the issuing surety will give thirty (30) days written notice to the certificate holder indicated above.

(Signature of Authorized Contractor Representative) (Date)

March 2010

LIST OF SUBCONTRACTORS

Section 66.0901(7), Wisconsin Statutes, provides that as a part of the proposal, the bidder also shall submit a list of the subcontractors the bidder proposes to contract with and the class of work to be performed by each. In order to qualify for inclusion in the bidder's list a subcontractor shall first submit a bid in writing, to the general contractor at least 48 hours prior to the time of the bid closing. The list may not be added to or altered without the written consent of the municipality. A proposal of a bidder is not invalid if any subcontractor and the class of work to be performed by the subcontractor has been omitted from a proposal; the omission shall be considered inadvertent or the bidder will perform the work personally.

No subcontract, whether listed herein or later proposed, may be entered into without the written consent of the Engineer as provided in Subsection 108.1 of the Standard Specifications.

Name of Subcontractor	Class of Work	Estimated Value

DECEMBER 2000

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS - PRIMARY COVERED TRANSACTIONS

Instructions for Certification

1. By signing and submitting this proposal, the prospective contractor 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 contractor 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 contractor 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 determined to enter into this transaction. If it is later determined that the contractor knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government the department may terminate this transaction for cause or default.

4. The prospective contractor shall provide immediate written notice to the department to whom this proposal is submitted if at any time the prospective contractor 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 meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

6. The prospective contractor agrees by submitting this proposal that, should this contract 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 entering into this transaction.

7. The prospective contractor further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," which is included as an addendum to PR-1273 - "Required Contract Provisions Federal Aid Construction Contracts," without

modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. The contractor may rely upon a certification of a prospective subcontractor/materials supplier that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A contractor may decide the method and frequency by which it determines the eligibility of its principals. Each contractor may, but is not required to, check the Disapproval List (telephone # 608/266/1631).

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 contractor 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 6 of these instructions, if a contractor 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 may terminate this transaction for cause or default.

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

(1) The prospective contractor 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 any 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 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 offense enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective contractor is unable to certify to any of the statements in this certification, such prospective contractor shall attach an explanation to this proposal.

Special Provisions

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SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for Project 1030-31-72, NS Freeway, Rest Area 26, Safety Rest Area Improvements, Non-Highway, Kenosha County, Wisconsin and Project 3738-08-70, STH 165 (104th Street), Village of Pleasant Prairie, Pleasant Prairie Welcome Center, Village of Pleasant Prairie, Kenosha County, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2018 Edition, as published by the department, and these special provisions.

If all or a portion of the plans and special provisions are developed in the SI metric system and the schedule of prices is developed in the US standard measure system, the department will pay for the work as bid in the US standard system.
100-005 (20171130)

2. Scope of Work.

The work under this contract shall consist of safety rest area improvements, grading, pavement removal, base aggregate dense, concrete pavement, HMA pavement, culvert installations, erosion control, storm sewer, concrete curb and gutter, concrete sidewalk, pavement marking, permanent signing, temporary traffic control, diamond grinding, lighting and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.
104-005 (20090901)

3. Prosecution and Progress.

Begin work within ten calendar days after the engineer issues a written notice to do so.

If contract time expires prior to completing all work specified in the contract, liquidated damages will be affixed according to standard spec 108.11.

Provide the start date to the engineer in writing within a month after executing the contract but at least 14 calendar days before the preconstruction conference. Upon approval, the engineer will issue the notice to proceed within ten calendar days before the approved start date.

To revise the start date, submit a written request to the engineer at least two weeks before the intended start date. The engineer will approve or deny that request based on the conditions cited in the request and its effect on the department's scheduled resources.

Project 1030-31-72:

The rest area shall remain open to public access during the summer travel season. Maintain access to public areas at all times. Perform work in a neat and orderly fashion, cleaning up periodically as the work progresses. Clean up and secure the work areas at the end of each day.

Use measures to protect the public from hazards including but not limited to; flying debris, falling objects, tripping, slipping, construction dust, chemicals, solvents and attractive nuisances such as unattended power tools, wet cement, paint and adhesives.

Project 3738-08-70:

Schedule weekly coordination meetings with the department, and provide a 2-week schedule of operations for all anticipated work, including a description of the type of work, and all anticipated closures for the upcoming weeks.

Notify the engineer two weeks prior to beginning work on 120th Ave and STH 165, to allow for coordination with the local businesses.

A Schedule of Operations

The schedule of operations shall conform to the requirements described below, unless modifications are approved in writing by the engineer.

Perform the work in the order shown on the Construction Staging plans and as hereinafter detailed. The construction operations listed in the construction staging descriptions below are not a complete list of the operations required to complete this project; additional operations may be required

Construction activities on STH 165 and for the left turn lane extension on 120th Ave may not begin until Tuesday, September 4, 2018.

The following construction and traffic control activities are anticipated for the various stages. Additional construction staging concepts are shown in the plan details.

Stage 1: Construct Welcome Center Exit

- Construct Welcome Center Exit from Station 22+69.11A to Station 28+18.12A.
- Construct RV Parking Expansion from Station 19+00.00C to Station 23+22.00C.
- Begin Northbound Exit Ramp removal.

Stage 2: Complete removal of the Northbound Exit Ramp

- Construct Northbound Exit Ramp removal and new curb.
- Construct Access from Car Parking to Welcome Center Exit from Station 21+16.11A to Station 22+52.63A.

Stage 3A: Car Parking Diamond Grinding

- Diamond-grind Car Parking area and restripe the parking stalls.

Stage 3B: Construct STH 165 Right Lane and 120th Ave Left Turn Lane Extension

- Construct STH 165 right lane extension from Station 406+00.00J to Station 411+79.33J.
- Construct left turn lane extension on 120th Ave from Station 91+25.00D to Station 96+00.00D.

4. Traffic.

Project 1030-31-72:

The project is not anticipated to significantly impact traffic or use of the facility. Locate construction vehicles, trailers, dumpsters, stockpiles and equipment in a manner that minimizes obstruction to the general public's use of the facility.

Project 3738-08-70:

A General

IH-94 Northbound Exit Ramp

Keep the IH-94 Northbound Exit Ramp to STH 165 open to at least one lane of traffic at all times.

STH 165

Maintain two lanes open to traffic on STH 165 eastbound at all times with the exception of maintaining one lane open to traffic to complete the concrete pavement replacement on the existing outside lane. Maintain a minimum of an 11' lane width at all times on STH 165.

Construction activities on STH 165 may not begin until Tuesday, September 4, 2018.

120th Ave

Keep northbound through lane and one left turn lane on 120th Ave open at all times. One turn lane may be temporarily closed as needed to complete construction of left-turn lane extension. The width of the southbound through-lane on 120th Ave may be reduced to a minimum of 11' as needed to complete construction of the 120th Ave left-turn lane extension. Construction activities for the left turn lane extension on 120th Ave may not begin until Tuesday, September 4, 2018.

The width of the southbound through-lane on 120th Ave may be reduced to a minimum of 11' as needed to complete construction of the Welcome Center Exit. All work on 120th Ave. should be completed in a timely manner.

Welcome Center Car Parking
The car parking lot in the Welcome Center may be closed overnight for up to 3 consecutive nights in order to complete the diamond grinding and pavement marking. Place a PCMS in the car lot 10 days before the start of the diamond grinding operation to advise patrons about the planned lot closure.

Welcome Center RV Parking
The contractor may close four parking spaces in the RV parking lot for work related to the existing concrete island at the south end of the lot as well as completing tie-in work for the proposed RV Expansion.

Welcome Center Truck Parking
The contractor may close three parking spaces in the truck parking lot during Stage 1. Do not close the existing northbound entrance ramp to IH-94 from the truck parking lot.

B Traffic Control Description

Stage 1

- Close the Northbound IH-94 Exit Slip Ramp into the Welcome Center. Maintain access to the Welcome Center from the STH 165 entrance.

Stage 2

- Open Welcome Center Exit from truck parking to 120th Ave.

Stage 3A

- Close car parking overnight, as needed, for diamond grinding of the car parking area and pavement marking application.

Stage 3B

- Close outside lane on eastbound STH 165 to complete the right turn lane extension work.
- Close inside left-turn lane to complete the 120th Ave left-turn lane extension.

C Definitions
The following definitions shall apply to this contract:

Night-Time Work Hours:
9:00 PM to 6:00 AM

Wisconsin Lane Closure System Advance Notification
Provide the following advance notification to the engineer for incorporation into the Wisconsin Lane Closure System (LCS).

TABLE 108-1 CLOSURE TYPE AND REQUIRED MINIMUM ADVANCE NOTIFICATION

Closure type with height, weight, or width restrictions (available width, all lanes in one direction < 16')	MINIMUM NOTIFICATION
Lane and shoulder closures	7 calendar days
Full roadway closures	7 calendar days
Ramp closures	7 calendar days
Detours	7 calendar days
Closure type without height, weight, or width restrictions (available width, all lanes in one direction ≥16')	MINIMUM NOTIFICATION
Lane and shoulder closures	3 business days
Ramp closures	3 business days
Modifying all closure types	3 business days

Discuss LCS completion dates and provide changes in the schedule to the engineer at weekly project meetings in order to manage closures nearing their completion date.
stp-108-057 (20161130)

The department has the authority to disallow any requested closures or width restrictions.

5. Holiday Work Restrictions.

Project 3738-08-70:
Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying IH41/IH94 or STH 165 traffic, and entirely clear the traveled way and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following holiday periods:

- From noon Friday, May 25, 2018 to 6:00 AM Tuesday, May 29, 2018 for Memorial Day;
- From noon Friday, June 29, 2018 to 6:00 AM Monday, July 9, 2018 for Independence Day;
- From noon Friday, August 31, 2018 to 6:00 AM Tuesday, September 4, 2018 for Labor Day.

107-005 (20050502)

6. Utilities.

Project 1030-31-72:
This contract does not come under the provision of Administrative Rule Trans 220.
107-065 (20080501)

This project is not anticipated to impact utilities. Use caution to ensure the integrity of any overhead and underground utility.

Project 3738-08-70:
The provisions of administrative rule TRANS 220 apply to this project.

Underground and overhead utility facilities are located within the project limits. Utility adjustments are required for this construction project as noted below. Coordinate construction activities with a call to Diggers Hotline or a direct call to the utilities that have facilities in the area as required per statutes. Use caution to insure the integrity of underground facilities and maintain code clearances from overhead facilities at all times.

Contact each utility company listed in the plans, prior to preparing bids, to obtain current information on the status of existing and any new utility relocation work.
107-SER2 (20101021)

The following utilities have facilities within the construction limits.

- WisDOT Lighting has existing underground and overhead lighting facilities within the project limits. Remove, adjust, reconstruct, discontinue and leave in place the lighting facilities as shown in the plans.
- WisDOT Signals has existing underground and overhead signal facilities within the project limits. Remove, adjust, reconstruct, discontinue and leave in place the signal facilities as shown in the plans.
- We Energies – gas will be replacing the gas service to the welcome center itself, at station 22+84 in the RV parking expansion area. Contact Nicole Mullen at (414) 221-5617.
- We Energies –electric has electric pole at approximately at station 28+15. This unit will be moved about 120-ft North and will require extension of the conduit and wire. Contact Nicole Mullen at (414) 221-5617.

The following utilities have facilities within the construction limits, however, no adjustments are anticipated:

- WisDOT STOC
- Midwest Fiber Networks
- Frontier

We Energies Gas and Electric have facilities within the construction limits. It is imperative that the highway contractor contact We Energies if removing any gas facilities or electrical underground cables, to verify that they have been discontinued and carry no natural gas or electrical current. The contractor must not assume that unmarked facilities have been discontinued. At no time is it acceptable to push, pull, cut or drill an unmarked facility without explicit consent from We Energies. Contractor must call the We Energies 24 hour Dispatch lines to arrange for this verification. We Energies Electric Dispatch #1 (800) 662-4797; We Energies Gas Dispatch #1 (800) 261-5325.

If utility conflicts occur, they will be adjusted during construction in coordination with the contractor.

7. Information to Bidders, U.S. Army Corps of Engineers Section 404 Permit.

The department has obtained a U.S. Army Corps of Engineers Section 404 permit. Comply with the requirements of the permit in addition to requirements of the special provisions. A copy of the permit is available from the regional office by contacting Christopher Hager at (414) 750-1487.

107-054 (20080901)

8. Mandatory Pre-Bid Meeting.

Add the following to standard spec 102.3.1:

Prospective bidders are required to attend a mandatory pre-bid meeting at 9:00 AM, April 18, 2018, at the Rest Area 26 building, Highway I-94, Exit 347, Kenosha County, WI.

No meeting minutes will be prepared. Issues discovered at the meeting will be handled by addendum.
stp-102-010 (20150630)

9. General Requirements for Rest Area 26

The safety rest area improvements under Project 1030-31-72 shall be performed according to the requirements of the “General Requirements for Building Construction and Technical Specifications.” A copy of these specifications is attached to these special provisions.

10. Erosion Control.

The contractor shall prepare and submit an erosion control implementation plan (ECIP) for the project including borrow sites, material disposal sites, dust control, and dewatering according to Chapter TRANS 401 requirements. The erosion control implementation plan shall supplement information shown on the plans and shall not reproduce it. The erosion control implementation plan shall identify how the contractor intends to implement the project's erosion control plan.

Provide the ECIP 14 calendar days prior to the pre-construction conference. Provide 1 copy of the ECIP to WisDOT and 1 copy of the ECIP to the WDNR Liaison (Craig Webster, (262) 547-2141, craig.webster@wisconsin.gov). Pursue operations in a timely and diligent manner, continuing all construction operations methodically from the initial removals and topsoil stripping operations through the subsequent grading, paving, and re-topsoiling to minimize the period of exposure to possible erosion. Do not implement the ECIP until it has been approved by the department.

Re-topsoil of graded areas, as designated by the engineer, immediately after grading is completed within those areas. Seed, fertilize, and mulch/erosion mat top-soiled areas, as designated by the engineer, within 5 calendar days after placement of topsoil. If graded areas are left exposed for more than 14 calendar days, seed those areas with temporary seed and mulch.

When performing roadway cleaning operations, the contractor shall use equipment having vacuum or water spray mechanism to eliminate the dispersion of dust. If vacuum equipment is employed, it shall have suitable self-contained particulate collectors to prevent discharge from the collection bin into the atmosphere.

When performing sawcutting operations, concrete slurry shall be squeegeed off to the shoulder gravel and not allowed into ditches or wetlands.

Stockpile excess material or spoils on upland areas away from wetlands, floodplains and waterways. Stockpiled soil shall be protected against erosion. If stockpiled material is left for more than 14 calendar days, seed the stockpile with temporary seed and mulch.

Do not pump water from the construction site to a storm water conveyance without the water first passing through a sediment trap or filter bag.

11. Information to Bidders, Use of Recovered Material.

The department encourages the use of waste materials and recovered industrial byproducts as material substitutions (106.2.1), provided they meet standard specification gradation requirements, conform to NR 538 requirements, and follow standard engineering practice for their intended use.

SEF Rev. 14_1211

12. Notice to Contractors – Existing Cabinet Removal.

The existing cabinet located at Station 22+25'A', 18.5' RT, will be salvaged and removed by the department. At least two weeks prior to when the cabinet must be removed, contact: Russell Lewis, (608) 516-5754, Wisconsin Department of Transportation, Continuous Count Program, to coordinate removal of the cabinet. Coordination with WE Energies to remove power to the cabinet will be required.

Removal of concrete base is paid for separately.

13. Select Borrow.

Conform to standard spec 208 as modified in this special provision.

Material
Furnish and use material that consists of granular material meeting the following requirements: granular backfill, Grade Number 2, according to standard spec 209.2.
stp-208-005 (20031103)

14. QMP Base Aggregate.

A Description
A.1 General
(1) This special provision describes contractor quality control (QC) sampling and testing for base aggregates, documenting those test results, and documenting related production and placement process changes. This special provision also describes department quality verification (QV), independent assurance (IA), and dispute resolution.
(2) Conform to standard spec 301, standard spec 305, and standard spec 310 as modified here in this special provision. Apply this special provision to material placed under all of the Base Aggregate Dense and Base Aggregate Open Graded bid items, except do not apply this special provision to material classified as reclaimed asphaltic pavement placed under the Base Aggregate Dense bid items.
(3) Do not apply this special provision to material placed and paid for under the Aggregate Detours, Breaker Run, Select Crushed, Pit Run, Subbase, or Riprap bid items.
(4) Provide and maintain a quality control program, defined as all activities related to and documentation of the following:

1. Production and placement control and inspection.
2. Material sampling and testing.

(5) Chapter 8 of the department's construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes required sampling and testing procedures.
http://wisconsindot.gov/rdwy/cmm/cm-08-00toc.pdf

A.2 Small Quantities

(1) The department defines a small quantity, for each individual Base Aggregate bid item, as a contract quantity of 9000 tons or less of material as shown in the schedule of items under that bid item.

(2) The requirements under this special provision apply equally to a small quantity for an individual bid item except as follows:

A.2.1 Quality Control Plan

(1) Submit an abbreviated quality control plan consisting of the following:

1. Organizational chart including names, telephone numbers, current certifications with HTCP numbers, and expiration dates, and roles and responsibilities of all persons involved in the quality control program for material under affected bid items.

A.2.2 Contractor Testing

1. Testing frequency:

Contract Quantity	Minimum Required Testing per source
≤ 6000 tons	One stockpile test before placement, and two production or one loadout test. *[1] [2]*
> 6000 tons and ≤ 9000 tons	One stockpile and Three placement tests *[3] [4] [5]*

[1] Submit production test results to the engineer for review before incorporating the material into the work. Production test results are valid for a period of 3 years.

[2] If the actual quantity overruns 6,000 tons, on the next day of placement perform one randomly selected placement test for each 3000 tons, or fraction of 3000 tons, of overrun.

[3] If the actual quantity overruns 9000 tons, on the next day of placement perform one randomly selected placement test for each 3000 tons, or fraction of 3000 tons, of overrun.

[4] For 3-inch material or lift thickness of 3 inch or less, obtain samples at load-out.

[5] Divide the aggregate into uniformly sized sublots for testing.

2. Stockpile testing for concrete pavement recycled in place will be sampled on the first day of production.

3. Until a four point running average is established, individual placement tests will be used for acceptance. Submit aggregate load-out and placement test results to the engineer within one business day of obtaining the sample. Assure that all properties are within the limits specified for each test.

4. Material represented by a sublot with any property outside the specification limits is nonconforming. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

A.2.3 Department Testing

(1) The department will perform testing as specified in B.8 except as follows:

- Department testing may be waived for contract bid item quantities of 500 tons or less.

B Materials

B.1 Quality Control Plan

(1) Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not place base before the engineer reviews and comments on the plan. Construct the project as that plan provides.

(2) Do not change the quality control plan without the engineer's review. Update the plan with changes as they become effective. Provide a current copy of the plan to the engineer and post in each of the contractor's laboratories as changes are adopted. Ensure that the plan provides the following elements:

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication means that will be used, and action time frames.
3. A list of source and processing locations, section and quarter descriptions, for all aggregate materials requiring QC testing.
4. Test results for wear, sodium sulfate soundness, freeze/thaw soundness, and plasticity index of all aggregates requiring QC testing. Obtain this information from the region materials unit or from the engineer.
5. Descriptions of stockpiling and hauling methods.
6. Locations of the QC laboratory, retained sample storage, and where control charts and other documentation is posted.
7. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.

B.2 Personnel

(1) Have personnel certified under the department's highway technician certification program (HTCP) perform sampling, testing, and documentation as follows:

SAMPLING AND TESTING ROLES	TEST STANDARD	REQUIRED CERTIFICATION
Random Sampling of Materials Sampling Aggregates	ASTM D3665 AASHTO T2 [1]	Transportation Materials Sampling Technician (TMS) Aggregate Technician I (AGGTEC-I) AGGTEC-I Assistant Certified Technician (ACT-AGG)
Percent passing the 200 Sieve Gradation Moisture Content Fractured Faces	AASHTO T11 AASHTO T27 AASHTO T255 ASTM D5821	Aggregate Technician I (AGGTEC-I) AGGTEC-I Assistant Certified Technician (ACT-AGG)
Liquid and Plasticity Index	AASHTO T89 AASHTO T90	Aggregate Testing for Transportation Systems (ATTS) Grading Technician I (GRADINGTEC-1) Grading Assistant Certified Technician (ACT-Grading)
Plasticity Check	AASHTO T90	Aggregate Technician I (AGGTEC-I) AGGTEC-I Assistant Certified Technician (ACT-AGG) Grading Technician I (GRADINGTEC-1) Grading Assistant Certified Technician (ACT-Grading)

[1] Plant personnel under the direct observation of an aggregate technician certified at level one or higher may operate equipment to obtain samples.

(2) A certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician ensure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

B.3 Laboratory

(1) Perform QC testing at a department-qualified laboratory. Obtain information on the Wisconsin laboratory qualification program from:

Materials Management Section
3502 Kinsman Blvd.
Madison, WI 53704
Telephone: (608) 246-5388
http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/tools/appr-prod/qual-labs.aspx

B.4 Quality Control Documentation

B.4.1 General

(1) Submit base aggregate placement documentation to the engineer within 10 business days after completing base placement. Ensure that the submittal is complete, neatly organized, and includes applicable project records and control charts.

B.4.2 Records

(1) Document all placement observations, inspection records, and control adjustments daily in a permanent field record. Also include all test results in the project records. Provide test results to the engineer within one business day after obtaining a sample. Post or distribute tabulated results using a method mutually agreeable to the engineer and contractor.

B.4.3 Control Charts

(1) Plot gradation and fracture on the appropriate control chart as soon as test results are available. Format control charts according to CMM 8.30. Include the project number on base placement control charts. Maintain separate control charts for each base aggregate size, source or classification, and type.

(2) Provide control charts to the engineer within one business day after obtaining a sample. Post or distribute charts using a method mutually agreeable to the engineer and contractor. Update control charts daily to include the following:

1. Contractor individual QC tests.
2. Department QV tests.
3. Department IA tests.
4. Four-point running average of the QC tests.

(3) Except as specified under B.8.2.1 for nonconforming QV placement tests, include only QC placement tests in the running average. The contractor may plot process control or informational tests on control charts, but do not include these tests, conforming QV tests, or IA tests in the running average.

B.5 Contractor Testing

(1) Test gradation, fracture, liquid limit and plasticity index during placement for each base aggregate size, source or classification, and type.

(2) Perform one stockpile test from each source before placement. One stockpile test may be used for multiple projects up to 60 calendar days.

(3) Test gradation once per 3000 tons of material placed or fraction thereof. Determine random sample locations and provide those sample locations to the engineer. Obtain samples after the material has been bladed, mixed, and shaped but before watering and compacting; except collect 3-inch samples or lift thickness of 3 inch or less from the stockpile at load-out. Do not sample from material used to maintain local traffic or from areas of temporary base that will not have an overlying pavement. On days when placing only material used to maintain local traffic or only temporary base that will not have an overlying pavement, no placement testing is required.

(4) Split each contractor QC sample and identify it according to CMM 8.30. Retain the split for seven calendar days in a dry, protected location. If requested for department comparison testing, deliver the split to the engineer within one business day.
(5) The engineer may require additional sampling and testing to evaluate suspect material or the technician's sampling and testing procedures.
(6) Test fracture for each gradation test until the fracture running average is above the lower warning limit. Subsequently, the contractor may reduce the frequency to one test per 10 gradation tests if the fracture running average remains above the warning limit.
(7) Test the liquid limit and plasticity index for the first gradation test. Subsequently, test the liquid limit and plasticity index a minimum of once per 10 gradation tests.

B.6 Test Methods

B.6.1 Gradation

(1) Test gradation using a washed analysis conforming to the following as modified in CMM 8.60:

Gradation.....AASHTO T 27

Material finer than the No. 200 sieve.....AASHTO T 11

(2) For 3-inch base, if 3 consecutive running average points for the percent passing the No. 200 sieve are 8.5 percent or less, the contractor may use an unwashed analysis. Wash at least one sample out of 10. If a single running average for the percent passing the No. 200 sieve exceeds 8.5 percent, resume washed analyses until 3 consecutive running average points are again 8.5 percent passing or less.
(3) Maintain a separate control chart for each sieve size specified in standard spec 305 or standard spec 310 for each base aggregate size, source or classification, and type. Set control and warning limits based on the standard specification gradation limits as follows:

1. Control limits are at the upper and lower specification limits.
2. There are no upper warning limits for sieves allowing 100 percent passing and no lower control limits for sieves allowing 0 percent passing.
3. Dense graded warning limits, except for the No. 200 sieve, are 2 percent within the upper and lower control limits. Warning limits for the No. 200 sieve are set 0.5 percent within the upper and lower control limits.
4. Open graded warning limits for the 1-inch, 3/8-inch, and No. 4 sieves are 2 percent within the upper and lower control limits. Upper warning limits for the No. 10, No. 40, and No. 200 sieves are 1 percent inside the upper control limit.

B.6.2 Fracture

(1) Test fracture conforming to CMM 8.60. The engineer will waive fractured particle testing on quarried stone.
(2) Maintain a separate fracture control chart for each base aggregate size, source or classification, and type. Set the lower control limit at the contract specification limit, either specified in another special provision or in table 301-2 of standard spec 301.2.4.5. Set the lower warning limit 2 percent above the lower control limit. There are no upper limits.

B.6.3 Liquid Limit and Plasticity

(1) Test the liquid limit and plasticity according to AASHTO T 89 and T 90.

(2) Ensure the material conforms to the limits specified in standard spec table 301-2.

B.7 Corrective Action

B.7.1 General

(1) Consider corrective action when the running average trends toward a warning limit. Take corrective action if an individual test exceeds the contract specification limit. Document all corrective actions both in the project records and on the appropriate control chart.

B.7.2 Placement Corrective Action

(1) Do not blend additional material on the roadbed to correct gradation problems.

(2) Notify the engineer whenever the running average exceeds a warning limit. When two consecutive running averages exceed a warning limit, the engineer and contractor will discuss appropriate corrective action. Perform the engineer's recommended corrective action and increase the testing frequency as follows:

1. For gradation, increase the QC testing frequency to at least one randomly sampled test per 1000 tons placed.
2. For fracture, increase the QC testing frequency to at least one test per gradation test.

(3) If corrective action improves the property in question such that the running average after four additional tests is within the warning limits, the contractor may return to the testing frequency specified in B.5.3. If corrective action does not improve the property in question such that the running average after four additional individual tests is still in the warning band, repeat the steps outlined above starting with engineer notification.

(4) If the running average exceeds a control limit, material starting from the first running average exceeding the control limit and ending at the first subsequent running average inside the control limit is nonconforming and subject to pay reduction.

(5) For individual test results significantly outside the control limits, notify the engineer, stop placing base, and suspend other activities that may affect the area in question. The engineer and contractor will jointly review data, data reduction, and data analysis; evaluate sampling and testing procedures; and perform additional testing as required to determine the extent of potentially unacceptable material. The engineer may direct the contractor to remove and replace that material. Individual test results are significantly outside the control limits if meeting one or more of the following criteria:

1. A gradation control limit for the No. 200 sieve is exceeded by more than 3.0 percent.
2. A gradation control limit for any sieve, except the No. 200, is exceeded by more than 5.0 percent.
3. The fracture control limit is exceeded by more than 10.0 percent.

B.8 Department Testing

B.8.1 General

(1) The department will conduct verification testing to validate the quality of the product and independent assurance testing to evaluate the sampling and testing. The department will provide the contractor with a listing of names and telephone numbers of all QV and IA personnel for the project, and provide test results to the contractor within two business days after the department obtains the sample.

B.8.2 Verification Testing

B.8.2.1 General

(1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in B.2 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.

(2) The department will conduct QV tests of each base aggregate size, source or classification, and type during placement conforming to the following:

1. Perform one stockpile test from each source before placement.
2. At least one random test per 30,000 tons, or fraction of 30,000 tons, placed.

(3) The department will sample randomly, at locations independent of the contractor's QC work, collecting one sample at each QV location. The department will collect QV samples after the material has been bladed, mixed, and shaped but before watering and compacting; except, for 3-inch aggregates or for a lift thickness of 3 inch or less, the department will collect samples at load-out. The department will split each sample, test half for QV, and retain half.

(4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor's QC tests. The department will use the same methods specified for QC testing.

(5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to the specification, the department will take no further action. If QV test results are nonconforming, add the QV to the QC test results as if it were an additional QC test.

B.8.3 Independent Assurance

(1) Independence assurance is unbiased testing the department performs to evaluate the department's QV and the contractor's QC sampling and testing including personnel qualifications, procedures, and equipment. The department will perform an IA review according to the department's independent assurance program. That review may include one or more of the following:

1. Split sample testing.
2. Proficiency sample testing.
3. Witnessing sampling and testing.
4. Test equipment calibration checks.

5. Reviewing required worksheets and control charts.
6. Requesting that testing personnel perform additional sampling and testing.

(2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in B.9.

B.9 Dispute Resolution

(1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.

(2) Production test results, and results from other process control testing, may be considered when resolving a dispute.

(3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

C (Vacant)

D (Vacant)

E Payment

(1) Costs for all sampling, testing, and documentation required under this special provision are incidental to this work. If the contractor fails to perform the work required under this special provision, the department may reduce the contractor's pay. The department will administer pay reduction under the non-performance of QMP administrative item.

(2) For material represented by a running average exceeding a control limit, the department will reduce pay according to CMM 8-10.5.2 for the affected Base Aggregate bid items listed in subsection A. The department will administer pay reduction under the Nonconforming QMP Base Aggregate Gradation or Nonconforming QMP Base Aggregate Fracture Administrative items. The department will determine the quantity of nonconforming material as specified in B.7.2.

stp-301-010 (20171130)

15. Concrete Pavement Joint Layout, Item 415.5110.S.

A Description
This special provision describes providing a concrete pavement or concrete base joint layout design for intersections and marking the location of all joints in the field

B (Vacant)

C Construction
Plan and locate all points necessary to establish the horizontal position of the transverse and longitudinal joints in the concrete to prevent uncontrolled cracking. Submit a joint layout design to the engineer at least 7 calendar days before paving each intersection. Do not lay out joints until the engineer has reviewed the joint layout design. Mark the location of all concrete joints in the field. Follow the plan details for joints in concrete making adjustments as required to fit field conditions.

D Measurement
The department will measure Concrete Pavement Joint Layout as a single lump sum unit for all joint layout designs and marking acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
415.5110.S	Concrete Pavement Joint Layout	LS

Payment is full compensation for providing the intersection joint layout designs and marking all joints in the field.

The department will adjust pay for crack repairs as specified in standard spec 415.5.3
stp-415-020 (20170615)

16. Lighting Systems.

General
Add the following to standard spec 651, 652, 653, 654, 655, 656, 657 and 659:

All the work necessary to comply with revisions to standards specifications mentioned herewith shall be incidental to associated pay items or to the project including coordination, materials, and labor. No additional payment shall be made to the contractor.

Add the following to standard spec 651.2:

Materials indicated to be returned to the department shall be hauled to one of the following two locations:

- State Electrical Shop at 935 South 60th street, West Allis, as directed by Ms. Bree Johns-Konkel, tel. (414) 266-1170.
- Milwaukee County Grounds, 10191 West Watertown Plank Road, Wauwatosa, as directed by Mr. Pat Stoetzel, tel. (414) 750-5306.

Arrange pickups and deliveries 3 days in advance and during regular business hours (Monday – Thursday 7:00 AM to 3:45 PM).

Add the following to standard spec 651.3.1:

Any circuit that the contractor does not personally tag out at the disconnect shall be considered live, and will be subject to being activated by another person with no notice to the contractor. Make tagouts with manufactured tags, and endorse them with the date and the name of the contractor. Clear tagouts at the end of the workday. The department does not employ a load dispatcher and has no intent to do so. Each electrical worker is responsible for their own protection from automatic switching and from switching by others.

Add the following to standard spec 653.3(1):

This provision modifies the standard detail drawing for pull boxes and thereby both the standard items and SPV pay item for pull boxes. Lighting pull box covers shall read "LIGHTING".

Add the following to standard spec 655.3.1:

Wet location splices are not anticipated on this project and not shown in the plans. In the event that the engineer allows wet location splices, make pull box splices with engineer approved epoxy kit.

At each pull point or access point, indicate the line side bundle with a lap of blue tape.

Add the following to standard spec 655.3.7(4):

Where two or more wire networks pass through a pull point, tag each circuit network (i.e. A/B/N and C/D/N) with approved all-weather tags.

Add the following to standard spec 657.2:

Non-breakaway poles (mounted on structures, concrete bases or behind noise wall barriers without transformer base, as well as at stems of sign bridges) containing electrical wires are to be double nutted and ontractor shall install galvanized rat screen enclosing the bottom of pole area; extra nuts and screen incidental.

Add the following to standard spec 657.3.1 and 657.3.5:

Corrosion protection measures described in standard spec 657.3.1 and 657.3.5 are invoked for breakaway transformer bases and aluminum light poles. The contractor shall avoid contact of dissimilar metals in erecting the pole on its foundation and/or breakaway device. Any concern of trapped moisture or potential corrosion cell shall be resolved to the satisfaction of the engineer.

Add the following to standard spec 659.3:

Install Plaques Light Pole on all poles located in the median at a mounting height of 6-inch above the highest adjacent safety barrier or obstruction.

Add the following to standard spec 659.3.1:

During construction, adequate lighting shall be maintained. Construction shall be staged to maintain existing or permanent lighting system operation. Contractor may install temporary lighting to maintain adequate light during construction. This work shall be incidental to associated pay items.

17. Signs Type I and II.

Furnish and install new mounting brackets per approved product list for type II signs on overhead sign supports incidental to sign. For type II signs on sign bridges use aluminum vertical support beams noted above incidental to sign. New mounting brackets are incidental to the sign being installed.

Add the following to standard spec 637.2.4:

Use stainless steel bolts, washers and nuts for type I and type II signs mounted on sign bridges or type I signs mounted on overhead sign supports. Use clips on every joint for Sign Plate A 4-6 when mounted on a sign bridge or overhead sign support. Inspect installation of clips and assure bolts and nuts are tightened to manufacturers recommended torque values.

Use aluminum vertical sign support beams that have a 5-inch wide flange and weigh 3.7 pounds per foot, if the L-brackets are 4 inches wide then use 4 inch wide flange beams weighing 3.06 pounds per foot. Contractor shall measure the width of the L-brackets on existing structures of determine the width needed for sign support beams.

Use beams a minimum of six feet in length or equal to the height of the sign to be supported, whichever is greater. Use U-bolts that are made of stainless steel, one-half inch diameter and of the proper size to fit the truss cords of each sign bridge. Install vertical sign support beams on each sign and use new U-bolts to attach each beam to the top and bottom cord of the sign bridge truss.

For type II signs on overhead sign supports follow the approved product list for mounting brackets.

Replace standard spec 637.2.4.1(2)2 with the following:

Clips may be either stainless steel or ASTM B 108, aluminum alloy, 356.0-T6.

Add the following to standard spec 637.3.3.2(2):

Install Type I Signs at the offset stated in the plan, which shall be the clear distance between the edge of mainline pavement right edgeline and the near edge of the sign.

Add the following to standard spec 637.3.3.3(3):

Furnish and install new aluminum vertical sign support beams on each sign and new U-bolts to attach each beam to the top and bottom cord of the sign bridge truss for Type I or Type II Signs and Type I signs on overhead sign supports incidental to sign. New I-beams are incidental to the sign being installed.

Add the following to standard spec 641.2.9(3):

Submit shop drawings for overhead sign supports to SE Region, Traffic Operations Engineer. Submit shop drawings for sign bridges to Bureau of Structures with a copy to SE Region Traffic Ops

637-SER1 (20120401)

18. Blue Specific Service Signs.

Add the following to standard spec 638.3.4:

Do not remove or move blue specific service signs or their associated posts. Specific service signs are signs with logos that identify commercial entities providing gas, food, lodging, camping, or attractions. A separate contractor, Interstate Logos - Wisconsin, is responsible for these signs. Contact Interstate Logos - Wisconsin at (844) 496-9163 a minimum of 14 calendar days in advance to coordinate removing, moving, or re-installation of these signs.

The contractor is responsible for damage done to these signs due to contractor operations.
638-010 (20150630)

19. General Requirements for Electrical Work.

Replace standard spec 651.3.3 (3) with the following:

(3) Request a signal inspection of the completed signal installation to the engineer at least five working days prior to the time of the requested inspection. Notify the department's

Electrical Field Unit at (414) 266-1170 to coordinate the inspection. The department's Region Electrical personnel will perform the inspection. In the event of deficiencies, request a re-inspection when the work is corrected. The engineer will not authorize turn-on until the contractor corrects all deficiencies.

20. Electrical Conduit.

Replace standard spec 652. 5 (2) with the following:

(2) Payment for Conduit Rigid Metallic, Conduit Rigid Nonmetallic, Conduit Reinforced Thermosetting Resin, and Conduit Special bid items is full compensation for providing the conduit, conduit bodies, and fittings; for providing all conduit hangers, clips, attachments, and fittings used to support conduit on structures; for pull wires or ropes; for expansion fittings and caps; for making necessary connections into existing pull box, manhole, junction box or communication vault; for excavating, bedding, and backfilling, including any sand, concrete, or other required materials; for disposing of surplus materials; and for making inspections.

21. Removing Picnic Shelter, Item 204.9060.S.01.

A Description
This special provision describes removing picnic shelter in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

B (Vacant)

C (Vacant)

D Measurement
The department will measure Removing Picnic Shelter in each picnic shelter removal, acceptably completed.

E Payment
Add the following to standard spec 204.5:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.01	Removing Picnic Shelter	EACH

204-025 (20150630)

22. Removing Luminaires, Item 204.9060.S.02.

A Description
This special provision describes removing existing luminaires and lamps from light poles or bridge decks as shown on the plans, according to the pertinent provisions of standard spec 204, and as hereinafter provided. Light poles or bridge deck shall remain in service.

B Material
Removed luminaires and lamps become the property of the contractor and shall be disposed off the project site. Lamps, which are considered a hazardous material, shall be disposed of an environmentally sound manner.

C Construction
No removal work will be permitted without approval from the engineer. Removal shall start as soon as the temporary lighting or permanent lighting, as applicable, is placed in approved operation. An inspection and approval by the engineer will take place before any associated proposed permanent or temporary lighting is approved for operation.

D Measurement
The department will measure Removing Luminaires by each individual unit, acceptably completed.

E Payment
Add the following to standard spec 204.5:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.02	Removing Luminaires	EACH

SER-204.11 (20171021)

23. Removing Lighting Units, Item 204.9060.S.03.

A Description
This special provision describes the removing lighting units as shown on the plans, according to the pertinent provisions of standard spec 204, and hereinafter provided.

B Materials
All removed material shall become the property of the contractor and be disposed off the project site. Lamps, which are considered a hazardous material, become property of the contractor and shall be disposed of an environmentally sound manner.

C Construction
Remove lighting units consisting of pole, arm, luminaire, lamp, wires, breakaway device, and associated hardware and appurtenances.

No removal work will be permitted without approval from the engineer. Removal shall start as soon as the temporary lighting or permanent lighting, as applicable, is placed in approved operation. An inspection and approval by the engineer will take place before any associated proposed permanent or temporary lighting is approved for operation.

D Measurement
The department will measure Removing Lighting Units by each individual unit removed, acceptably completed.

E Payment
Add the following to standard spec 204.5:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.03	Removing Lighting Units	EACH

SER-204.15 (20171021)

24. Removing Loop Detector Wire and Lead-in Cable STH 165 & East Frontage Rd (120th Ave), Item 204.9105.S.04.

A Description
This special provision describes removing loop detector wire and lead-in cable at the STH 165 & East Frontage Rd (120th Ave) as shown on the plans, according to the pertinent provisions of 204 of the standard specs, and as hereinafter provided.

B (Vacant)

C Construction
Notify the department's Electrical Field Unit at (414) 266-1170 at least five working days prior to the removal of the loop detector wire and lead-in cable.

Remove and dispose of detector lead-in cable including loop wire for abandoned loops off the project site.

D Measurement
The department will measure Remove Loop Detector Wire and Lead-in Cable as a single lump sum unit for each intersection, acceptably completed.

E Payment
Add the following to standard spec 204.5:

204.9105.S.04	Removing Loop Detector Wire and Lead-In Cable STH 165 & East Frontage Rd (120th Ave)	LS

25. Automatic Flush Valves - Urinal, Item SPV.0060.01.

A Description
This special provision describes furnishing and installing automatic flush valves as described in Part 1 of Section 224000 of the General Requirements for Building Construction and Technical Specifications.

B Materials
Furnish automatic flush valves that are according to Part 2 of Section 224000 of the General Requirements for Building Construction and Technical Specifications.

C Construction
Install automatic flush valves according to manufacturer's recommendations and according to the pertinent requirements of Part 3 of Section 224000 of the General Requirements for Building Construction and Technical Specifications.

D Measurement
The department will measure Automatic Flush Valves - Urinal as each individual automatic flush valve, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.01	Automatic Flush Valves - Urinal	EACH

Payment is full compensation for removal and disposal of existing flush valve, furnishing and installing piping and fittings, electrical wiring, electrical boxes, electrical connections, transformers, conduit, automatic flush valves, motion detectors, and cleanup.

26. Automatic Flush Valves - Water Closet, Item SPV.0060.02.

A Description
This special provision describes furnishing and installing automatic flush valves as described in Part 1 of Section 224000 of the General Requirements for Building Construction and Technical Specifications.

B Materials
Furnish automatic flush valves that are according to Part 2 of Section 224000 of the General Requirements for Building Construction and Technical Specifications.

C Construction
Install automatic flush valves according to manufacturer's recommendations and according to the pertinent requirements of Part 3 of Section 224000 of the General Requirements for Building Construction and Technical Specifications.

D Measurement
The department will measure Automatic Flush Valves – Water Closet as each individual automatic flush valve, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.02	Automatic Flush Valves – Water Closet	EACH

Payment is full compensation for removal and disposal of existing flush valve, furnishing and installing piping and fittings, electrical wiring, electrical boxes, electrical connections, transformers, conduit, automatic flush valves, motion detectors, and cleanup.

27. Family Assisted Restrooms, Item SPV.0060.03.

A Description

This special provision describes furnishing and constructing Family Assisted Restrooms according to the plans and General Requirements for Building Construction and Technical Specifications.

B Materials

Furnish materials according to the plans and General Requirements for Building Construction and Technical Specifications.

Furnish one electrical/USB bollard, combined electrical and USB outlets, and wiring for the outlets as listed and shown in the plans.

C Construction

Construct one family assisted restroom at a time to maintain front entrance accessibility to the rest area and according to the plans and General Requirements for Building Construction and Technical Specifications.

Cut, demo, and patch to match to existing and adjacent interior in the lobby area as necessary to complete the work on the restrooms. Colors for patching ceramic tile and other finish materials shall be selected by the department from the manufacturer's full range of colors.

Install the electrical/USB bollard and outlets in the lobby at the location shown in the plans.

D Measurement

The department will measure Family Assisted Restrooms as each individual restroom, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.03	Family Assisted Restrooms	EACH

Payment is full compensation for removal, disposal, transporting, furnishing and installing all materials and equipment, activating and testing, and cleanup.

Any cutting, demolition, removal of debris, and patching in the lobby area that is necessary to complete the work on the restrooms shall be considered incidental to the item Family Assisted Restrooms.

The furnishing, installation, and testing of the electrical/USB bollard, outlets, and wiring, as shown in the plans, shall be considered incidental to the item Family Assisted Restrooms.

28. Vestibules, Item SPV.0060.04.

A Description
This special provision describes furnishing and constructing Vestibules according to the plans and General Requirements for Building Construction and Technical Specifications.

B Materials
Furnish materials according to the plans and General Requirements for Building Construction and Technical Specifications.

C Construction
Construct one vestibule at a time to maintain front entrance accessibility to the rest area and according to the plans and General Requirements for Building Construction and Technical Specifications**.**

D Measurement
The department will measure Vestibules as each individual vestibule, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.04	Vestibules	EACH

Payment is full compensation for removal, disposal, transporting, furnishing and installing all materials and equipment, activating and testing, and cleanup.

29. Lighting Units Walkway LED, Item SPV.0060.21.

A Description
This special provision describes furnishing and installing Lighting Units Walkway LED.

B Materials
Add the following to standard spec. 659.2:

(2) Furnish black finish Lighting Units Walkway LED with Post Top Luminaire Utility LED. Luminaires shall be IESNA Type V Medium distribution, delivering a minimum of 4,500 lumens; UL listed, and rated IP 55 or higher. The housing access shall be tool-free.

LED lamps shall be in the 4,000K color temperature range with a minimum of 70 CRI.
The luminaire shall be equipped with a voltage-sensing LED driver, to accommodate 120-277V with 90% power factor and THD 20% max at full load. Surge protection shall

be provided and tested according to the specifications. The luminaire shall also be equipped with a quick-disconnect plug for connecting the pole riser wires to the terminal block. A strain relief shall retain the pole riser wires within the luminaire.

Furnish shop drawings as specified in standard spec 506.3.2, except submit 5 copies with the materials list. Ensure the drawings contain sufficient detail to allow satisfactory review and show the dimensions of all equipment shown in the plans.

C Construction
Replace standard spec 659.3.4 (2) with the following:

(2) Under the Lighting Units Walkway LED bid item, provide standards and post-top luminaires utility LED, together with the hardware and fittings and all necessary miscellaneous accessories to complete the installation.

The contractor shall follow manufacturer's instructions regarding luminaire installation.

Three single-conductor No. 12 stranded wires shall be used to connect the luminaires to their respective branch conductors in the pole base. Each luminaire feeder wire shall be protected by one 5-amp fuse. Fuses and fuse holders shall be as per the details in the plan.

All exposed threaded equipment mounting hardware shall be stainless steel.

The contractor shall coat all threaded stainless steel hardware and dissimilar metal, threaded hardware with an approved zinc-based anti-seize compound (Loctite or Jet-Lube prior to assembly.

D Measurement
The department will measure Lighting Units Walkway LED as each individual lighting unit, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.21	Lighting Units Walkway LED	EACH

Payment is full compensation for providing all materials, including pedestal base standards, post-top luminaires LED, fuses, fuse holders, and all hardware and fittings needed to integrate the components into units connected to lighting branch circuit. The department will pay for the concrete base under a separate bid item.

30. Post Top Luminaires Utility LED, Item SPV.0060.22.

A Description
This special provision describes furnishing and installing Post Top Luminaires Utility LED. Conform to standard spec 659 and as follows.

B Materials
Add the following to standard spec 659.2

(2) Furnish black finish Post Top Luminaire Utility LED. Luminaires shall be IESNA Type V Medium distribution, delivering a minimum of 4,500 lumens; UL listed, and rated IP 55 or higher. The housing access shall be tool-free.

LED lamps shall be in the 4000K color temperature range with a minimum of 70 CRI.

The luminaire shall be equipped with a voltage-sensing LED driver, to accommodate 120-277V with 90% power factor and THD 20% max at full load. Surge protection shall be provided and tested according to the specifications. The luminaire shall also be equipped with a quick-disconnect plug for connecting the pole riser wires to the terminal block. A strain relief shall retain the pole riser wires within the luminaire.

Furnish shop drawings as specified in standard spec 506.3.2, except submit 3 copies with the materials list. Ensure the drawings contain sufficient detail to allow satisfactory review and show the dimensions of all equipment shown in the plans.

C Construction
Replace standard spec 659.3.4 (2) with the following:

(2) Under the Post Top Luminaires Utility LED bid item, provide post-top luminaires utility LED 70W, together with the hardware and fittings and all necessary miscellaneous accessories to complete the installation.

The contractor shall follow manufacturer’s instructions regarding luminaire installation.

Three single-conductor No. 12 stranded wires shall be used to connect the luminaires to their respective branch conductors in the pole base. Each luminaire feeder wire shall be protected by one 5-amp fuse. Fuses and fuse holders shall be as per the details in the plan.

All exposed threaded equipment mounting hardware shall be stainless steel.

The contractor shall coat all threaded stainless steel hardware and dissimilar metal, threaded hardware with an approved zinc-based anti-seize compound (Loctite or Jet-Lube prior to assembly.

D Measurement

The department will measure Post Top Luminaires Utility LED as each individual unit, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.22	Post Top Luminaires Utility LED	EACH

Payment is full compensation for furnishing and installing all materials, installing a complete luminaire; and for furnishing all documentation.

31. Repair Picnic Table, Type 1, Item SPV.0060.25.

A Description

This special provision describes removing the picnic table from the existing concrete slab, repairing, sandblasting and painting picnic tables and replacing boards according to the plans and as hereinafter provided.

B Materials

B.1 Recycled Plastic Planks

Provide planks that meet the following requirements:

1. Planks shall be made from 95% post-consumer or post-industrial recycled type 2 HDPE plastic.
2. Plastic shall be impregnated with finish color and protected with a UV inhibitor to prevent fade.
3. Color shall be dark brown or a shade of dark red brown color, and shall be uniform for all planks within a table unit.
4. Plastic shall be able to sustain normal loadings at temperatures ranging from -26 degrees to 100 degrees Fahrenheit without cracking or excessive warping. Plastic shall be subject to the approval from the engineer.

B.2 Structural Steel Frame

All steel tubes shall be ASTM A500 Grade B, cold-formed electric resistance welded tubing; all other steel shall be minimum ASTM A36M.

B.3 Hardware

Provide bolts that are galvanized steel carriage-type bolts of the sizes specified on the plan.

B.4 Paint

Use one of the following paint systems, or approved equal:

Producer	Coat	Products
Ameron Protective Coating Division 201 North Berry St. Brea, CA 92621 1 (800) 344-0025	1st 2nd 3rd	Amercoat 68HS Amercoat 399 Amercoat 450H
Carboline 350 Hanley Industrial St Louis, MO 63144 (314) 644-1000	1st 2nd 3rd	Carbozinc 859 Carboguard 888 Carbothane 133LH
International Paint, Inc 6001 Antoine Drive Huston, Tx 77091 (920) 869-6373	1st 2nd 3rd	Interzinc 52 Interguard 475 HS Interthane 870
Sherwin Williams 12261 Nicollet Avenue Burnsville, Mn 55337 (612) 804-6264	1st 2nd 3rd	Zinc Clad III HS Macropoxy 646 Acrolon 218HS
Tnemec 6800 Corporate Drive Kansas City, MO 64120 (816) 483-3400	1st 2nd 3rd	Tneme-Zinc 90-97 F.C. Typoxy, Series 2 Endura Shield, Serie

C Construction

C.1 Steel Fabrication

All welding of structural steel shall conform to the requirements of these specifications and to AASHTO/AWS D 1.2, under structural steel and angle iron of the Bridge Welding Code.

C.2 Painting

Prior to painting, clean by sandblasting all metal including miscellaneous structural steel to a SSPC-10, commercial blast finish. Sand blasting must be completed in a commercial shop equipped to contain and properly dispose of all removed paint according to all local, state and federal regulations. Use primer and finish coat paint that is from the same manufacturer and primer recommended for use with finish coat. Shop-apply the primer, the first coat, and the second finish coat. Perform all painting in strict compliance to the paint manufacturer's instructions for surface preparation and application requirements. After field installation, repaint all areas damaged during transport or installation.

D Measurement
The department will measure Repair Picnic Table, Type 1 as each individual repaired picnic table, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.25	Repair Picnic Table, Type 1	EACH

Payment is full compensation for removal, repairing, sandblasting, painting, installing new boards and reinstalling the picnic tables.

32. Rest Area Picnic Shelters, Item SPV.0060.26.

A Description
This special provision describes the work for constructing new picnic shelters at Rest Area 26, and all incidental items necessary to complete the work according to the plans and General Requirements for Building Construction and Technical Specifications.

B Technical Specifications
Technical specification sections that apply to this item include:

010000	Summary of Work
061000	Rough Carpentry
076200	Flashing and Sheet Metal
079200	Joint Sealants
099100	Painting

C Construction
Match the asphalt shingle roofing system, materials and color used on the picnic shelters to that used on the main rest area building.

D Measurement
The department will measure Picnic Shelters as each individual unit, acceptably completed. Picnic Tables Single Pedestal and concrete sidewalk will be measured separately.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.26	Rest Area Picnic Shelters	EACH

Payment for Rest Area Picnic Shelters is full compensation for providing materials, transporting, disposal, furnishing and installing all materials and equipment, and for supplying all labor, tools, equipment, and incidentals necessary to complete the work.

33. Grading, Shaping and Finishing Picnic Shelters, Item SPV.0060.27.

A Description
This special provision describes excavating, backfilling, grading, shaping, finishing, topsoil, seeding, fertilizing and mulching the picnic shelter building sites, as necessary to restore the landscape around the new picnic shelters, as shown on the plans and according to the pertinent requirements of the standard specifications and as hereinafter provided.

B Materials
Use seed mixture number 40.

C Construction
Excavate, dispose of excess material, backfill, grade, shape, and finish slopes for the picnic shelters at the locations shown in the plans. Furnish the following materials conforming to the following:

Common excavation and material disposal…. standard spec 205
Borrow…….. standard spec 208
Topsoil……. standard spec 625
Mulching……..standard spec 627
Fertilizer…….. standard spec 629
Seeding…….. standard spec 630

D Measurement
The department will measure Grading, Shaping, and Finishing Picnic Shelters as each individual location, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.27	Grading, Shaping, and Finishing Picnic Shelters	EACH

Payment is full compensation for all excavating, grading, shaping, and compacting; and for providing and placing fill, topsoil, fertilizer, seed, and mulch.

The concrete items will be measured and paid for under the pertinent items provided in the contract.

34. Salvage & Reinstall Ramp Gate Assembly, Item SPV.0060.29.

A Description
This special provision describes salvaging and reinstalling an existing ramp gate assembly, which includes removing the existing pole assembly; disconnecting wire; storing until it is installed on a new base and making all reconnections.

B Materials

Hardware

Furnish galvanized steel nuts and bolts conforming to ASTM A307 except where designated as high strength (HS), conform to ASTM A325.

C Construction

Salvage, store, protect and reinstall the ramp closure gate at the location the plans show. Avoid damaging the gate pole assembly, as it will be reused. Do not use any equipment or devices that might damage structures, facilities, or property to be preserved and retained. Complete all operations necessary to remove ramp closure gates that might endanger the new construction before constructing new work.

Apply marine grade anti seize compound to all bolt threads and to the interface between the aluminum base and steel pole. The engineer may direct adjustment of the gate arm assembly to ensure the correct vertical and angular orientation of the completed closure gate.

Verify the attachment of the male side of the 4 conductor electrical connector, mercury switch, wiring harness, and the three LED flasher units to the portion of the flasher assembly mounted on the breakaway portion of the gate arm.

Adjust mercury switch so that as the gate arm is lowered to a maximum of 45 degrees from the vertical, the gate flasher assembly is energized, and the LEDs begin to flash. Ensure that when the gate arm is raised to a minimum of 15 degrees from vertical, the mercury switches the gate flasher assembly off.

The engineer may allow alternates equal to specified manufactured components. The engineer may require plan detail modifications to accommodate alternates. The engineer may accept alternate arms or mounting adaptors only if the contractor can demonstrate that the department can easily remove and replace the arms.

D Measurement

The department will measure Salvage and Reinstall Ramp Gate Assembly by each individual unit, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.29	Salvage & Reinstall Ramp Gate Assembly	EACH

Payment is full compensation for disassembly of the existing unit as needed; for disconnecting wire, for storing of the unit, for reassembly on a new location; for providing all electrical connections and grounding; and for all testing. Base is paid for separately.

35. Concrete Pavement Corner Repair Partial Depth, SPV.0085.01.

A Description

This special provision describes partial depth repairs of concrete pavement using hot applied synthetic resin as shown on the plans.

B Materials

Furnish one of the following materials, or approved equal:

- Fibrecrete G by Marketing Associates, Inc. and bulking stone
- TechCrete FiberMastic by Crafco, Inc. and bulking stone
- TechCrete R by Crafco, Inc. and bulking stone
- TechCrete TBR by Crafco, Inc.

C Construction

Remove existing patching materials and deteriorated concrete with jackhammers or other engineer approved methods. Milling will not be allowed unless approved by the engineer for repair areas that are sufficiently large or uniform in size to avoid removing excess quantities of sound pavement.

Prepare the repair area and apply patch material according to manufacturer's recommendations.

Do not open partial depth concrete repair locations to traffic until material has cooled sufficiently to support vehicle loads.

D Measurement

The department will measure Concrete Pavement Corner Repair Partial Depth by the pound of prepackaged synthetic resin material, acceptably placed. Bulking stone, where required, is incidental and will not be measured.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0085.01	Concrete Pavement Corner Repair Partial Depth	LB

Payment is full compensation for removing and disposing of existing patching materials and deteriorated concrete; for providing all required materials, including primer and bulking stone, if required; for preparing the repair area; and for applying patch material.

36. Exterior Painting, Item SPV.0105.03.

A Description

This special provision describes providing Exterior Painting of the rest area building as described in Part 1 of Section 099100 of the General Requirements for Building Construction and Technical Specifications.

B Materials
Furnish paint and stain that are according to Part 2 of Section 099100 of the General Requirements for Building Construction and Technical Specifications.

C Construction
Paint the building according to manufacturer's recommendations and according to the pertinent requirements of Part 3 of Section 099100 of the General Requirements for Building Construction and Technical Specifications.

D Measurement
The department will measure Exterior Painting, completed according to the contract and accepted, as a single complete lump sum unit of work.

E Payment
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.03	Exterior Painting	LS

Payment is full compensation for furnishing all materials, surface preparation, cleaning, priming painting, and cleanup.

37. Video Surveillance - Indoor, Item SPV.0105.01.

A Description
This special provision describes providing indoor video surveillance with network video recorder as described in Section 282000 of the General Requirements for Building Construction and Technical Specifications.

B Materials
Furnish indoor video surveillance, network equipment and network video recorder in accordance of Section 272000 and 282000 of the General Requirements for Building Construction and Technical Specifications.

C Construction
Install indoor video surveillance, network video equipment and network video recorder according to manufacturer's recommendations and according to the pertinent requirements of Sections 271000, 272000, and 282000 of the General Requirements for Building Construction and Technical Specifications.

D Measurement
The department will measure Video Surveillance - Indoor, completed according to the contract and accepted, as a single complete lump sum unit of work.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.01	Video Surveillance - Indoor	LS

Payment is full compensation for removal, disposal, transporting, furnishing and installing all materials and equipment, including a network video recorder, activating and testing, and cleanup.

INDEX OF VIDEO SURVEILLANCE SPECIFICATIONS

271000	STRUCTURED CABLING SYSTEM
272000	DATA COMMUNICATIONS ACTIVE EQUIPMENT
282000	VIDEO SURVEILLANCE SYSTEM

38. Video Surveillance - Outdoor, Item SPV.0105.02.

A Description

This special provision describes providing outdoor video surveillance as described in Section 282000 of the General Requirements for Building Construction and Technical Specifications.

B Materials

Furnish outdoor video surveillance and network equipment according to of Sections 272000 and 282000 of the General Requirements for Building Construction and Technical Specifications.

C Construction

Install outdoor video surveillance according to manufacturer's recommendations and according to the pertinent requirements of Section 260543, 271000, 272000 and 282000 of the General Requirements for Building Construction and Technical Specifications.

D Measurement

The department will measure Video Surveillance - Outdoor, completed according to the contract and accepted, as a single complete lump sum unit of work.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.02	Video Surveillance - Outdoor	LS

Payment is full compensation for removal, disposal, transporting, furnishing and installing all materials and equipment, activating and testing, and cleanup.

INDEX OF VIDEO SURVEILLANCE SPECIFICATIONS

260543	UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
271000	STRUCTURED CABLING SYSTEM
272000	DATA COMMUNICATIONS ACTIVE EQUIPMENT
282000	VIDEO SURVEILLANCE SYSTEM

39. Repair Dam, Item SPV.0105.04.

A Description

Perform this work according to the applicable provisions of standard spec 519 and as hereinafter provided.

B Materials

Conform to standard spec 519.

C Construction

Remove, mortar and re-set the top four layers of stones and mortar joints as directed by the engineer.

Remove existing mortar for all other joints to a depth of 2 inches using hard or pneumatic chisels or by hand.

All joints shall be raked back to sound, solid, back up material. Raking out shall leave a clean, square face at the back of the joint to provide for maximum contact of pointing mortar with the masonry back up mortar. Shallow or feather edging will not be permitted.

Do not widen the existing joints. Do not spall or chip the surrounding stones in the process of mortar removal. Damage to surrounding stone resulting from rotary blade over running shall not be permitted. Contractor shall replace stone damaged during mortar removal with replacement units that match the original as determined by the engineer.

Contractor shall verify dimensions prior to ordering materials.

D Measurement

The department will measure Repair Dam as a single lump sum unit, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.04	Repair Dam	LS

Payment is full compensation for furnishing all required materials, including masonry; properly disposing of surplus material; and for cleaning out and restoring the work site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

40. Lighting System Integrator, Item SPV.0105.11.

A Description

These special provisions describe coordinating lighting with various parties; record keeping, and documentation. Where the department is responsible for freeway lighting operation, maintenance, or utility locates on existing systems or systems overlapping project boundaries, the contractor's freeway lighting integrator will serve as the contractor's liaison to the department's electrical operations unit.

B Personnel Qualifications

Assign personnel experienced in underground utility construction and department lighting specifications and practices.

C Construction

At any one time during the project, the contractor shall assign one individual person as the freeway lighting integrator.

The freeway lighting integrator shall:

- Familiarize himself with the location and nature of existing lighting circuits. This familiarity shall include the extent of any lighting system that overlaps project limits.
- Maintain a file of applicable permits or licenses issued to the contractor, and convey copies to the engineer.
- Keep with him at all times a contact list of affected lighting personnel.
- Maintain a record of tagouts and the clearance of tagouts.
- Interface with department electrical personnel to determine how contract limits might affect maintenance or operation of existing systems.
- Maintain ongoing contact with the department's Diggers' Hotline Coordinator to ensure that each of the two persons knows that all requested utility locates are marked in the field by the appropriate party. The intent here is to assure coordination. This special provision does not transfer additional utility locating responsibilities to the contractor, beyond those responsibilities already assigned to him by other provisions of the contract.
- Inform the department of any lighting outages, including outside the project limits where a lighting system crosses the project boundary.
- Maintain in any format real-time records of existing, removed and new lighting facilities. Include utility service extensions. Additional required records will include temporary connections and their ultimate removal.
- Maintain records of tests, including: "meg" tests, amperage draw per circuit leg, voltage reading at the disconnect, and voltage reading at the furthest pole per circuit leg. Convey these records at time of acceptance or partial acceptance.
- At the time of acceptance or partial acceptance, convey as-built drawings in both the following formats: plan redlines and .dgn electronic. Include utility service extensions.

- Secure copies of operators' manuals, tear sheets, etc. as may be provided by manufacturers of some lighting materials, and convey a minimum of three sets to the department.
- Work with the engineer to notify department electrical personnel of acceptance or partial acceptance.
- Perform related duties as may be needed to ensure continuity of freeway lighting during construction, and orderly transfer upon completion.

Complete WisDOT provided excel lighting distribution center record and return to SE Region Lighting Engineer once completed. Please contact SE Region Lighting Engineer for excel lighting distribution center record template.

D Measurement
The department will measure Lighting System Integrator as one complete lump sum unit item of work per each pay item for all required coordination, record-keeping, and documentation.

E Payment
The department will pay for measured quantities at the contract lump sum price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.11	Lighting System Integrator	LS

Payment is full compensation for personnel costs; and for all labor, tools, equipment and incidentals necessary to complete the contract work.

41. Lighting System Survey, Item SPV.0105.12.

A Description
These special provisions describe performing lighting system survey using Global Position System (GPS).

B Vacant

C Construction
Locate and survey using GPS all the lighting units and control cabinets. Maintain neat, orderly, and complete survey notes. Enter the coordinates into a Microsoft Excel 2007 spreadsheet along with other required fields as specified by WisDOT.

D Measurement
The department will measure Lighting System Survey for all lighting units and control cabinets as a single lump sum unit, acceptably completed.

E Payment
The department will pay for measured quantities at the contract unit prices under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.12	Lighting System Survey	LS

Payment is full compensation for locating and surveying all the lighting units and control cabinets and for furnishing all labor, tools, materials, equipment and incidentals necessary to complete the contract work.

42. General Requirements for Building Construction and Technical Specifications.

General Requirements for Building Construction and Technical Specifications

Kenosha County Rest Area 26
Rest Room Improvements

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DIVISION 1 - GENERAL REQUIREMENTS

010000 – Summary of Work

PART 1 GENERAL

1.01 Summary

A. Work Included in this package includes the following as further described in the Special Provisions and the attached drawings and specifications:

1. Replace existing urinal flush valves with automatic flush valves.
2. Replace existing water closet flush valves with automatic flush valves.
3. Provide and install new LED luminaires in locations indicated.
4. Construct 2 new family assisted restrooms.
5. Construct 2 new vestibules.
6. Provide and install a Surveillance System.

1.02. General Requirements

A Terms and Conditions of the Form of Agreement with Wisconsin Department of Transportation apply to the work.

B. Any file data or drawings of the existing facilities provided are for general reference only. Accuracy or completeness of file data/drawings is not guaranteed.

C. Contractor shall visit existing site/facility and review all documents provided to verify and take into account actual field conditions as may be pertinent to the work prior to submitting a proposal. Coordinate all site visits with the WIDOT representative.

D. The contractor shall field-check all pertinent dimensions and will be responsible for the correct fit of all components.

E. Any conflicts or discrepancies in the contract documents shall be brought to the architect/engineer’s attention for his assessment and determination which shall be final.

F. Work includes all labor, materials, equipment, services, fees, and any and all incidental work necessary to properly and completely perform the work and provide (furnish and install) complete systems, ready for use, meeting the given parameters.

G. Contractor shall perform all layout necessary from appropriate reference points.

H. Coordinate sequencing of all work with the owner and the work of other contractors who may be working concurrently on site. Coordinate each trade to receive and accommodate the work of other trades.

I. Coordinate work in or near existing facilities with the owner and perform portions of the work after facility operating hours as necessary to allow continued use of the facility by the public and the owner, with a minimum of interruptions.

J. Comply with owner requirements and protocols to maintain security of facilities and safety of the owner’s employees and the public.

K. Provide all barriers necessary for public safety and for security of the contractor's work and the owner’s property throughout the work.

L. Provide temporary controls and barriers to protect adjacent spaces and occupants from dust, odors, welding flash, and noise.

M. Provide temporary measures as necessary to effectively control dust, debris, pollution and erosion and comply with applicable requirements of governing agencies.

N. Provide temporary services of lights, electrical power and water if/as needed to complete the work. Extend from existing building utilities or arrange for temporary service as needed. Do not exceed ratings of existing systems. Any temporary service installation/removal costs shall be paid by the contractor. Any energy cost for heating temporary enclosures shall be paid by the contractor. Energy costs for non-heat related power and lighting will be paid by the owner.

O. Rest Area sanitary facilities are available for use by contractor personnel.

P. Provide temporary heat and/or cooling if/as needed to properly construct the work, using methods and equipment that will not adversely affect the finished installation. Provide temporary heat and/or cooling if/as necessary to maintain temperature of occupied spaces of existing buildings during temporary shutdowns of building HVAC equipment.

Q. Provide temporary portable fire extinguishers suitable for all possible classes and types of fire, in number and locations appropriate to the work, including in the immediate vicinity of welding operations.

R. Do not bring materials to site until needed for progress of the work. Coordinate location and limits of temporary staging areas with owner. Owner assumes no responsibility for materials stored on or off site.

S. Contractors shall obtain all permits necessary for construction of their work and shall pay all related fees.

T. Completely restore or replace any existing materials or finishes damaged while performing the work to match adjacent materials and finishes, to the owner’s satisfaction.

U. All joints and penetrations in building construction shall be sealed weather-tight and insect-proof with approved materials. All joints and penetrations in fire-rated construction shall be fire-safe to the appropriate rating with approved systems.

V. All products and materials shall be used, applied and installed in strict accordance with manufacturer's recommendations and installed with top quality workmanship by properly trained experienced tradesmen. All work shall meet pertinent industry codes and standards.

W. Contractor is responsible to employ whatever quality control/quality assurance measures may be necessary to ensure compliance with the contract documents, whether called for or not. Contractor shall hire a qualified independent testing agency to perform and provide test results for any specific field testing required by the contract documents.

X. Provide approved products and materials as specified. Submit confirming data for review and records as noted here and in other sections. Do not submit unapproved substitutions. Provide minimum of 4 sets/copies unless otherwise directed. Review will only be for information and general conformance with the design concept and Contract Documents. Contractor shall remain fully responsible for compliance of products and materials, correctness of quantities and dimensions, fit-up, installation requirements and coordination needed to meet all detailed requirements of the contract. Any and all proposed deviations from the contract requirements shall be fully highlighted and detailed in a written notice accompanying the actual submittal. All such proposed deviations will be subject to architect’s/engineer’s approval.

Y. Proposed substitutions for specified or “basis-of-design” products will only be considered in advance of formal submittals, at architect’s/engineer’s sole discretion, and only if accompanied by a sufficiently detailed feature and performance comparison to the specified product for complete evaluation.

Z. Where not specifically pre-selected, architect/engineer will select color, pattern and texture of each product from manufacturer’s full range of options, including both standard and premium items.

AA. Inspect all substrates prior to proceeding with subsequent work. Proceeding with work will imply contractor’s acceptance of conditions.

BB. Alert owner to the presence of potentially hazardous materials or contaminants.

CC. Remove and replace all work that is defective or does not meet specified requirements.

DD. Clean up work debris daily. Provide temporary waste containers appropriate for all construction debris, in location approved by owner. Provide tarps to capture and contain nails and debris and to exclude debris from lawns and landscaping. Perform thorough magnetic nail sweeps immediately after removal of existing materials as applicable to the work.

EE. Dispose of all removed and unused material and debris off-site in compliance with governing rules and agencies.

FF. At completion of project, thoroughly clean, sweep, wash, polish, and vacuum all work as necessary to remove foreign matter, splatter, spots and soil and put all work and equipment in a complete and finished condition ready for use.

GG. Keep a current set of project record documents at the jobsite marked with as-built conditions that vary from the original documents, and showing locations and vertical positions (eg: inverts) of underground and other concealed work and utilities with dimensions from permanent reference points. Submit record documents at project completion.

HH. Start up, clean, test, adjust, train owner personnel, and provide the owner with test results; use, care, operating and maintenance data; spare materials/parts lists; wiring diagrams and warranties for all systems provided. Provide minimum 3 bound copies of written data. Deliver spare parts and extra materials as specified.

II. All materials and workmanship shall be guaranteed for a period of not less than one (1) year from the date of acceptance of the entire project by the owner. Provide other warranties as noted in specifications.

DIVISION 3 - CONCRETE

030300 Quality Control – Concrete

PART 1 GENERAL

1.01 Summary
A. Provide quality control of concrete work. Comply with applicable provisions of General Requirements.

1.02 Submittals
A. Submit copy of field and laboratory reports to A/E.

1.03 Mix Designs
A. Provide concrete mix designs according to Section 033000

1.04 Testing
A. Contractor shall arrange and pay for services of a qualified testing agency acceptable to owner and independent of contractor.

B. Testing agency shall test concrete to measure slump, entrained-air content, and compressive strength to determine compliance with Section 033000. Furnish test apparatus and cylinders, perform on-site sampling and testing, submit samples and perform laboratory tests. Comply with applicable provisions of ACI SP-2, Manual of Concrete Inspection.

1.05 Special Tests
A. In addition to strength, slump and air tests specified, owner may authorize special tests performed including tests for cement content, chloride presence, or strength of cured concrete. Cost

of these special tests shall be borne by owner if tests show compliance with specifications and by contractor if tests fail to comply with specifications.

PART 2 PRODUCTS

2.01 Test Cylinders
A. 6" dia. by 12" high cylinder, ASTM C31.

2.02 Slump Cone
A. 12" high standard mold, ASTM C143.

PART 3 EXECUTION

3.01 Compressive Strength Tests
A. During progress of work, prepare 3 test cylinders per 150 cu. yards or fraction thereof for each class of concrete placed each day. Comply with ACI 318, Section 4.3 (samples secured - ASTM C172, cylinders prepared and cured - ASTM C31, and tested - ASTM C39) except as otherwise directed. Identify samples, moist cure at 70 deg. F. for five days, and ship samples to testing laboratory for one 7-day test and two 28-day tests.

3.02 Slump and Air Content Tests
A. Perform tests on concrete from same batch as sampled for strength tests and whenever there is a change in consistency of concrete. Test for slump according to ASTM C143. Test for air content according to ASTM C231.

3.03 Compliance
A. If measured slump or air content falls outside specified limits, immediately check another portion of same batch. In event of a second failure, concrete shall be rejected.

B. Average of any three consecutive strength tests for each class of concrete shall be equal to or greater than specified strength and no individual test shall fall more than 500 psi below specified strength. When test results indicate deficiencies, A/E may require additional tests according to ACI 318, Section 4.3, and may order remedial work. Specimens of cured concrete shall be tested according to ASTM C42.

032000 Concrete Reinforcement

PART 1 GENERAL

1.01 Summary
A. Provide concrete reinforcement including bars, welded wire fabric, ties, and supports as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Codes and Standards

A. Comply with provisions of following codes and standards, except as otherwise designated:

ACI 315 Details and Detailing of Concrete Reinforcement.
ACI 318 Building Code Requirements for Reinforced Concrete.
AWS D1.4 Structural Welding Code - Reinforcing Steel.
CRSI Manual of Standard Practice.

PART 2 PRODUCTS

2.01 Reinforcing Bars

A. ASTM A615, Grade 60, deformed, new billet steel.

2.02 Welded Wire Fabric (WWF)

A. ASTM A185, welded steel wire fabric, flat sheet stock

2.03 Supports for Reinforcement

A. Furnish bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place. Use wire bar type supports complying with CRSI specifications, unless otherwise indicated. Do not use wood, brick, or other unacceptable materials.

PART 3 EXECUTION

3.01 Placing Reinforcement

A. Comply with specified codes and standards, and CRSI recommendations.

3.02 Placing Fabric

A. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh, but not less than 6" on side joints and 12" on end joints; lace splices with 16 gage annealed iron wire.

3.03 Splices and Terminations

A. Comply with requirements of ACI 318, CRSI, and as shown.

B. Splices and laps shall be 30 bar diameters minimum and 12” minimum, unless otherwise noted.

C. Horizontal reinforcement in footings, foundations and walls at corners and intersections shall be made continuous using corner bars or "L" dowels of same diameter; lap 30 bar diameters.

3.04 Concrete Cover

A. Provide the minimum concrete cover over steel reinforcement per ACI recommendation or as noted on the drawings.

032500 Concrete Accessories

PART 1 GENERAL

1.01 Summary
A. Provide accessories for concrete work as shown and as specified. Comply with applicable provisions of General Requirements.

PART 2 PRODUCTS

2.01 Vapor Barrier
A. Vapor barrier materials of width to minimize edge laps and resistant to decay according to ASTM E154. Provide water resistant barrier paper consisting of heavy kraft papers laminated together with glass fiber reinforcement and overcoated with black polyethylene on each side or similar underslab vapor barrier product; Fortifiber "Moistop", Glas-Kraft "Ply-Bar Plus", Raven Industries "Rufco", Reef Industries "Griffolyn T-85", or equal.

2.02 Bond Breaker
A. 15-pound asphalt-impregnated felts.

2.03 Asphalt Expansion Joint Filler (Asphalt PJF)
A. Preformed bituminous strips, ASTM D994, 1/2" thick, of depth shown; Meadows Sealtite Asphalt, or equal.

2.04 Fiber Expansion Joint Filler (Fiber PJF)
A. Resilient bituminous type, nonextruding, ASTM D1751, 1/2" thick, of depth shown; Meadows Sealtite Fiber, Horn Fiber, Celotex Flexcell, Phillip Carey Elastite, or equal.

2.05 Moisture-Retaining Cover
A. Waterproof paper, polyethylene film, or polyethylene-coated burlap complying with ASTM C171.

PART 3 EXECUTION

3.01 Installation
A. Comply with manufacturer's instructions.

3.02 Vapor Barrier
A. Provide vapor barrier over prepared subgrade under interior floor slabs. Use widest practical seamless widths. Lap joints 6”. Seal joints and edges at foundations with manufacturer’s recommended mastic or pressure-sensitive tape. Carefully cut around projections. Seal penetrations and punctures with pressure-sensitive tape.

3.03 Joints

A. Place bond breaker at junctions of interior slabs-on-grade with vertical walls, and where shown. Place expansion joint fillers to isolate exterior slabs-on-grade from walls and other vertical building surfaces, and where shown.

B. Provide asphalt PJF or fiber PJF for exterior and concealed interior expansion joints, except use fiber PJF for pavement joints, unless otherwise shown. Seal fiber PJF with rubber-asphalt sealant.

3.04 Curing/Sealing

A. Provide a full 7-day wet cure to concrete floors, equipment pads, and slabs.

B. Apply moisture-retaining cover to wet cure all surfaces.

033000 Cast-in-Place Concrete

PART 1 GENERAL

1.01 Summary

A. Provide cast-in-place concrete work, including finishing and curing, as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Codes and Standards

A. Comply with provisions of following codes and standards, except as otherwise designated:

ACI 301 Specifications for Structural Concrete for Buildings.
ACI 304 Guide for Measuring, Mixing, Transporting, and Placing Concrete.
ACI SP-2 Manual of Concrete Inspection.
ACI 318 Building Code Requirements for Reinforced Concrete.
Wis. Adm. Code.

1.03 Submittals

A. Submit proposed mix designs to A/E 10 days prior to beginning concrete work. Do not begin concrete production until mixes have been reviewed.

B. Copies of all field and lab test reports.

1.04 Quality Assurance

A. Employ and pay for a qualified testing laboratory, acceptable to owner, to perform material tests and to design concrete mixes.

B. Comply with Section 030300.

PART 2 PRODUCTS

2.01 Portland Cement

A. ASTM C150, Type I.

2.02 Aggregates

A. Conform to ASTM C33. Do not use aggregates containing soluble salts or other substances which can cause stains on exposed concrete surfaces.

B. Fine Aggregate: Clean, sharp, natural sand, free of loam, clay, lumps and foreign material.

C. Coarse Aggregate: Clean, uncoated, processed aggregate free from clay, mud, loam, and other foreign matter. Aggregate may be crushed natural rock, crushed stone, or washed natural or crushed gravel. Use of pit or bank run gravel is not permitted.

2.03 Water

A. Clean, potable, and free from oil, acid, alkaline, and organics.

2.04 Admixtures

A. Air-entraining admixture shall conform to ASTM C260 and be compatible with water reducing and any other admixture; W.R. Grace Darex AEA, Master Builders MB-VR, W.R. Meadows Sealtight AEA, or equal.

B. Water reducing admixture shall conform to ASTM C494 and shall be an aqueous hydroxylated polymer solution containing blends of ligno-sulfonates, polymeric carbohydrates, organic accelerators and a normal setting formula; Master Builders Pozzolith Normal or equal.

C. Accelerating admixture shall conform to ASTM C494 and shall be an aqueous solution of sodium-thiocyanate and alkanolamines, free of calcium chloride; Master Builders Pozzutec 20, or equal.

2.05 Concrete Mixtures

A. Conform to minimum standards in Part 4 Schedules.

B. Prepare design mixes for each type of concrete on the basis of compressive strength by methods recommended in ACI 318. Use an independent materials laboratory for preparing and reporting proposed mix designs.

C. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on project for each class of concrete required. When laboratory trial batches are used to select concrete proportions, prepare test specimens according to ASTM C192 and conduct strength tests according to ASTM C39 as specified in ACI 301.

D. Provide water-reducing admixture for all concrete work. Provide air entraining admixture at exterior flatwork and curbs and as otherwise scheduled. At contractor's option, accelerating admixture may be used to reduce exposure of fresh concrete to adverse weather. Calcium chloride as an admixture or contained in an admixture is prohibited. No other admixtures will be permitted, unless approved in writing by A/E. Use admixtures in compliance with manufacturer's printed directions.

2.09 Penetrating Sealer

A. Penetrating silane sealer recommended by manufacturer for sealing concrete floors not receiving other finishes.

B. Master Builders “Master Seal Surface Guard” on Hydrozo “Enviroseal Surface Guard.”

PART 3 EXECUTION

3.01 Mixing and Delivery

A. Concrete shall be ready-mixed and delivered according to ASTM C94. Place concrete within 1 hour after water is added to batch.

B. No water shall be added on job unless authorized by A/E. If added, record amount of water on all copies of delivery tickets. If water is added to mixed concrete at job, provide twenty revolutions of additional mixing.

C. Concrete shall arrive at site of work having a temperature not less than 60 deg. F. (50 deg. F. for heavy sections) nor greater than 90 deg. F.

3.02 Concrete Placement

A. Before placing concrete, inspect and complete formwork installation, reinforcing steel, vapor barriers, and items to be embedded. Notify other crafts involved in ample time to permit installation of their work; cooperate with other trades in setting such work.

B. Place concrete as specified and according to ACI 304.

C. Screed concrete to proper level to avoid excessive skimming or grouting.

D. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or which has been contaminated by foreign materials. Do not use re-tempered concrete. Remove rejected concrete from project site.

E. Consolidate concrete in forms by mechanical vibrating equipment and supplement by hand-spading, rodding or tamping.

3.05 Placing Concrete Slabs

A. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until panel or section is complete.

B. Consolidate concrete during placing operations using mechanical vibrating equipment. Limit time of vibrating consolidation to prevent bringing an excess of fine aggregate to surface.

C. Bring slab surfaces to correct level with straight edge and strike off. Use bull floats or darbies to smooth surface, leaving it free of humps or hollows. Do not sprinkle water on plastic surface. Do not disturb slab surfaces prior to beginning finishing operations.

D. Depress slabs on grade to accommodate recessed floor grates, mats and floor finishes, and provide for final finish floor elevations. Maintain indicated slab thickness as a minimum.

E. Slope slabs to provide for final floor slopes of floor finish systems.

3.06 Cold Weather Placing

A. Protect concrete work from physical damage or reduced strength caused by frost, freezing actions, or low temperatures, in compliance with ACI 306.

3.07 Hot Weather Placing

A. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as specified below.

3.08 Construction Joints

A. Locate and install construction joints as shown and as otherwise approved.

3.09 Isolation and Expansion Joints

A. Provide bond breaker at junctions of interior slabs-on-grade with vertical surfaces, such as column pedestals, foundation walls, and grade beams, and where shown.

B. Provide expansion joint filler to isolate exterior slabs-on-grade from walls and other vertical building surfaces, and where shown. See Section 032500 for acceptable filler materials.

3.10 Contraction Joints

A. Provide contraction (control) joints in slabs-on-ground to form panels of patterns as indicated. Use saw cuts 1/8" x 1/4 slab depth unless otherwise indicated.

B. If joint pattern is not shown, provide joints not exceeding 15 ft. in either direction.

C. Fill joints with polymer-based control joint filler. Shave filler smooth and flush with adjacent floor surface.

D. Fill cracks, if any, with an approved epoxy mortar which will match floor finish in density and performance. Grind filler smooth and even with adjacent floor surface, free of bumps or depressions at crack.

3.11 Standard Smooth Form Finish

A. Provide standard smooth finish for formed surfaces exposed-to-view or to receive a covering applied directly or bonded to concrete, such as waterproofing, dampproofing, or paint. Standard smooth finish shall be the as-cast concrete surface obtained with form facing material, with defective areas repaired and patched and fins and other projections on surface completely removed and smoothed.

3.12 Slab - Float Finish

A. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified, and slab surfaces to be covered with membrane or elastic waterproofing, roofing, and as shown.

3.13 Slab - Trowel Finish

A. Apply trowel finish to monolithic slab surfaces exposed to view, unless otherwise shown, and slab surfaces to be covered with resilient flooring, carpeting, paint, or other thin-set tile or thin-film finish coating system, and other locations noted.

3.14 Slab - Non-Slip Broom Finish

A. Apply non-slip broom finish to exterior concrete sidewalks, steps, and ramps, and elsewhere as designated. Immediately after trowel finishing, slightly roughen concrete surface by brooming perpendicular to main traffic direction. Match texture and appearance of adjacent existing surfaces.

3.15 Equipment Pads

A. Unless specifically noted otherwise, furnish and install concrete pads for equipment as shown or necessary, using concrete of same type as specified for floor slabs. Provide smooth trowel finish.

3.16 Concrete Curing and Protection

A. Protect freshly placed concrete from premature drying, excessive cold or hot temperatures, and mechanical injury. Maintain concrete with minimal moisture loss at a relatively constant temperature for period necessary for hydration and proper hardening.

B. Start initial curing as soon as free water has disappeared from concrete surface. Keep continuously moist for not less than 72 hrs. Thereafter, continue wet cure and protect concrete for 7 days at temperatures above 50 deg. F. Avoid rapid drying at end of final curing period.

C. Do not apply membrane-forming curing compounds in lieu of wet cure.

3.17 Penetrating Sealer

A. Apply penetrating sealer to interior concrete floor surfaces not scheduled to receive other finishes or systems as scheduled on the room finish schedule.

B. Install after concrete has cured and dried sufficiently according to manufacturer.

PART 4 SCHEDULES

4.01 Concrete Mix

Min. Comp. Strength @ 28 days, p.s.i.	Max. Slump	Max. Agg. Size	Min. Cement, Bags/ C.Y.	Max. Water, Gal/ C.Y.	Max. Water-Cement Ratio	Air Content, % By Volume
3500	3-1/2"	3/4"	5-3/4	33	0.48	1-3%*

* For exterior concrete, air-entrainment shall be 4-6%.

DIVISION 6 – WOOD, PLASTICS & COMPOSITES

061000 Rough Carpentry

PART 1 GENERAL

1.01 Summary

A. Provide rough carpentry work as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Abbreviations

ALSC - American Lumber Standards Committee.
APA - The Engineered Wood Association.
AWPA - American Wood Preservers Association.
SPIB - Southern Pine Inspection Bureau.
WCLIB - West Coast Lumber Inspection Bureau.
WWPA - Western Wood Products Association.

1.03 Quality Assurance

A. Wood products shall be factory-marked to identify type, grade, inspection agency, producing mill and other qualities as specified.

1.04 Coordination

A. Obtain measurements and verify dimensions shown and shop drawing details before proceeding with carpentry work, wherever possible. Correlate location of furring, nailers, blocking, grounds and similar supports so that attached work will comply with design requirements. Fit carpentry work to other work. Scribe and cope as required for accurate fit.

B. Materials and installation requirements for other work, commonly assigned to carpentry trade, may be specified in other sections of these specifications. Contractor is responsible for assignment of such other work to proper trade.

1.05 Delivery, Storage and Handling

A. Keep carpentry materials dry during delivery. Store lumber and plywood in stacks with provisions for air circulation within stacks. Protect bottom of stacks against contact with damp or wet surfaces. Protect exposed materials against weather. Do not store dressed or treated lumber or plywood outdoors. Replace damaged materials.

PART 2 PRODUCTS

2.01 Lumber

A. Lumber shall comply with U.S. Product Standard PS-20 for American Softwood Lumber, U. S. Dept. of Commerce, and with rules of applicable manufacturer's association or authorized inspection bureau under which each species of lumber is produced.

B. Nominal sizes shown and specified refer to undressed lumber dimensions. Dress lumber four sides (S4S), unless otherwise shown or specified, and work to shapes and patterns shown. Detailed dimensions show actual sizes required.

C. Load bearing members: Unless otherwise indicated, provide No. 2 or better Douglas Fir, Western Larch, Western Hemlock (WWPA or WCLIB), or Southern Pine (SPIB) meeting the following design values (in psi):

1. Joists, rafters, and headers: not less than 1200 Fb.

D. Non-load bearing members: "No. 2" grade Douglas Fir, Western Larch, Western Hemlock (WWPA or WCLIB), or Southern Pine (SPIB).

E. Wood for support or attachment of other work such as cant strips, bucks, nailers, blocking, furring, grounds, stripping and similar members: "Standard" grade light framing or "No. 2 Common" grade boards of any WWPA, WCLIB, or SPIB species.

F. Maintain 19% maximum moisture content for all pieces of construction lumber. Mark lumber "DRY."

2.02 Plywood

A. Plywood shall comply with U. S. Product Standard PS-1 for Construction and Industrial Plywood, U.S. Dept. of Commerce, except as otherwise specified.

B. Plywood for interior exposure shall be interior-type plywood, APA Grade A-D or better. MDO where noted.

C. Plywood sheathing on exterior of building shall comply with U.S. Product Standard PS-2, and shall be Exterior-type plywood, APA Rated Grade C-C plugged sheathing in thickness as follows:

1. Roof sheathing: 5/8”, 40/20 span rating
2. Building walls: ½”, 24/16 span rating.

D. Plywood decking on interior elevated floors, framed ceilings: 3/4" T&G Sturdi-Floor.

2.03 Wood Preservative Treatment

A. Lumber and plywood designated as "Treated" shall comply with the applicable requirements of AWPA C2 (lumber) and C9 (plywood) and shall bear quality mark of an inspection agency approved by ALSC's Board of Review.

B. Pressure treat the following items with waterborne preservatives for above ground use to a minimum retention of 0.25 lb./cu. ft.

1. Wood cants, nailers, blocking, stripping, and members in connection with roofing, flashing, concrete, masonry, vapor barriers, and waterproofing.

C. If wood is cut after treatment, coat cut surfaces with heavy brush coat of same preservative used for treatment according to AWPA M4.

2.04 Rough Hardware

A. Provide nails, fasteners, anchors, etc., as designated and as required for proper assembly and erection. Rough hardware shall be of size to rigidly secure members in place.

B. Where rough carpentry wood is exposed to weather, in ground contact, or in areas of high humidity, provide hot-dip galvanized hardware (ASTM A153).

C. Provide stainless steel fasteners and hardware where in contract with preservative-treated wood.

2.05 Framing Connectors and Anchors

A. Provide anchors as described on Drawings complete with manufacturer’s fasteners.

2.06 Building Felt

A. 15 lb. asphalt saturated roofing felt.

PART 3 EXECUTION

3.01 Workmanship

A. Carpentry work shall be performed by skilled carpenters. Framing lumber shall be installed level, true and plumb. Notches, cuts, holes, and other fabrication shall be made clean, even and true. Carpenter shall inspect framing lumber before installation; lumber with defects that impair quality or safety shall be rejected.

3.02 Installation, General

A. Use sound, thoroughly seasoned, well-manufactured materials of longest practical lengths and sizes to minimize jointing.

B. Use materials free from warp which cannot be easily corrected by anchoring and attachment. Discard warped material and material with defects which impair the quality of the work.

C. Securely attach carpentry work to substrates by anchoring and fastening as shown or scheduled on drawings. If not indicated provide minimum fasteners required by Building Code and applicable industry standards. Provide washers under bolt heads and nuts in contact with wood. Nail plywood to comply with the recommendations of APA. Countersink nail heads on exposed carpentry work and fill holes. Use stainless steel connectors and fasteners where in contact with preservative treated wood, and elsewhere if noted.

D. Set carpentry work accurately to required levels and lines with members plumb and true and accurately cut and fitted. Shim with metal or slate for full-bearing on concrete or masonry substrates.

E. Furnish and erect blocking and nailers for installation of other equipment that may be required to properly complete the work. Provide framing around items recessed into walls. Cooperate and coordinate with others of their needs for blocking, nailers, and furring.

F. Install framing connectors in strict conformance to manufacturer's instructions, using fasteners specified or provided by manufacturer. Provide uplift connectors at both ends of all roof members.

G. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

I. Frame openings with two or more studs at each jamb; support headers on cripple studs.

3.03 Installation of Sheathing

A. Wall Sheathing: Secure panels perpendicular to framing members, with ends staggered and sheet ends over firm bearing.

1. Two-span condition, minimum, with long/strength axis perpendicular to supports.
2. Provide solid edge blocking between panels.
3. Provide solid edge blocking at perimeter edges
4. Nail panels to framing; staples are not permitted.
    a. Nail sheathing as follows with 10d common nails:
        1) 4 in. on center at panel edges, diaphragm edges, and blocking.
        2) 12 in. on center at intermediate supports/field of panel.
5. Provide 1/8" spacing between panels at edge and end joints.

3.04 Tolerances

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.05 Cleaning

A. Waste Disposal:

1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

072100 Thermal Insulation

PART 1 GENERAL

1.01 Summary

A. Provide building insulation work as shown and as specified. Comply with applicable provisions of Div. 1.

PART 2 PRODUCTS

2.01 Extruded Polystyrene Board Insulation

A. Extruded closed-cell polystyrene with integral high-density skin complying with ASTM C578, Type X, min. 25 psi compressive strength, 0.3% max. water absorption, thermal resistance (R-value at 40 deg. F.) of 5.0 per 1" thickness.

2.02 Fiberglass Batt Insulation

A. Glass fiber blankets with separate vapor barrier as specified below, complying with ASTM C665, type I unfaced thermal performance of R-13 per 3-1/2" thickness. Unfaced blanket shall be non-combustible as determined by ASTM E136.

2.03 Mineral Fiber Loose Fill Insulation

A. Inorganic fibers processed to form a loose resilient wool mass (for blowing) or granular nodules (for pouring), complying with ASTM C764; 1.0-lb. minimum in-place density; k-value of 0.30 where thickness is indicated, or thickness as required to provide "R" values as indicated; Class B (or Class A); provide type (blowing or pouring) as appropriate for configuration of space to be insulated, contractor's option where either is appropriate, unless otherwise indicated.

2.04 Vapor Barrier

A. 6 mil sheet polyethylene, clear, for exterior wall and roof surfaces; 10 mil where required / or indicated.

PART 3 EXECUTION

3.01 Installation

A. Extend insulation full thickness as shown over entire surface. Cut and fit tightly around obstructions, and fill joints and voids with insulation and mastic.

B. Comply with manufacturer's recommendations for particular conditions of installation.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or as required to make up total thickness.

D. Mastics used with polystyrene insulations shall be approved for use by insulation manufacturer.

E. In exterior masonry cavity walls, provide two continuous layers of 1" thick extruded polystyrene board, with all joints staggered and joints on outside layer sealed with an approved mastic.

3.02 Vapor Barrier Installation

A. Install polyethylene vapor barrier on warm side of exterior wall and ceiling insulation. Vapor barrier shall be continuous and complete. Tape all projections through barrier to form a seal. Lap all joints 6". Tape joints and edges at ceiling and at floor.

3.03 Miscellaneous Insulation

A. Insulate miscellaneous voids and cavity spaces as designated. Apply vapor barrier where necessary to prevent infiltration of outside air.

079200 Joint Sealants

PART 1 GENERAL

1.01 Summary

A. Provide joint sealer work as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Submittals

A. Submit manufacturer's product data, recommendations and installation instructions for each type of sealant, caulking compound and associated materials according to Division 1. Include manufacturer's published data, letter of certification or certified test laboratory report that each material complies with requirements and is intended for applications shown.

B. Furnish color charts and actual material color samples; color will be selected from manufacturer's colors.

1.03 Quality Assurance

A. Employ only skilled, experienced tradesmen for sealant application.

PART 2 PRODUCTS

2.01 General Building Sealants

A. Interior: Acrylic terpolymer, solvent-based, one part, thermo-plastic sealant compound, solids not less than 95% acrylic; complying with ASTM C920, Type S, Grade NS; recommended by manufacturer for general use as an exposed building construction sealant. Furnish Tremco Mono, Pecora 60 Unicrylic, DAP Acrylic, or equal.

B. Control joints in horizontal tile floors shall be sealed with an urethane sealant complying with ASTM C920, type S or M, Grade P, Class 25, use T with a Shore A hardness of 35 or greater. Control joints in vertical surfaces shall be the same as above except grade NS and use NT.

C. Exterior: Urethane, one-part, air curing, elastomeric sealant, complying with ASTM C920, Type S, Grade NS, Class 25; Tremco Dymonic, Pecora Dynatrol I, Sika Sikaflex 1a, Sonoborn Sonolastic NP1, or equal. Colors to be selected from manufacturer’s standard colors for various substrates, as approved by A/E.

2.02 Washroom and Toilet Room Sealant

A. For plumbing fixtures provide silicone rubber, mildew-resistant; GE SCS 1702, Dow Corning 786, or equal, in colors to match adjacent surfaces subject to architect’s/engineer’s approval.

2.03 Joint Cleaner

A. Provide type of joint cleaner recommended by sealant manufacturer for the particular joint sealant.

2.04 Joint Primer/Sealer

A. Provide type of joint primer/sealer recommended by sealant manufacturer for the particular joint sealants and substrates.

2.05 Bond Breaker Tape

A. Polyethylene tape or other plastic tape, as recommended by sealant manufacturer, to be applied to sealant contact surfaces where bond to substrate or joint filler must be avoided for performance of sealant. Provide self-adhesive tape where applicable.

2.06 Sealant Backer Rod

A. Compressible closed-cell rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent durable non-absorptive material recommended by sealant manufacturer. Provide size and shape of rod which will control joint depth for sealant placement, break bond of sealant and form optimum shape of

sealant bead on back side, and provide a highly compressible backer to minimize sealant extrusion when joint is compressed.

PART 3 EXECUTION

3.01 Installation, General

A. Provide sealing and caulking to produce weather tight conditions throughout. Caulk around all exterior and interior masonry openings; seal construction joints as shown, and caulk elsewhere as noted or required to exclude water from between adjacent materials and provide finished appearance. Joints shall be caulked before painting adjacent work.

B. Examine joint surfaces, backing and anchorage of units forming sealant rabbet, and conditions under which sealant work is to be performed; notify of conditions detrimental to proper and timely completion of work and performance of sealants. Do not proceed until unsatisfactory conditions are corrected.

3.02 Weather and Site Conditions

A. Do not proceed with installation of sealants when wind-borne dirt or adverse weather conditions are anticipated, nor when temperatures are outside manufacturer's recommended limitations. Proceed only when conditions are favorable for proper cure and development of bond strength. Wherever joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures.

3.03 Joint Surface Preparation

A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant or caulking compound.

B. Masonry and wood shall be sound and dry. Cure concrete a minimum of 28 days. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.

3.04 Installation

A. Comply with sealant manufacturer's instructions except where more stringent requirements are shown or specified. Prime or seal joint surfaces as recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

B. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or as recommended by sealant manufacturer.

C. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Horizontal joints between a horizontal surface and a vertical surface shall be filled to form a slight cove, so that joint will not trap moisture and dirt.

D. Install sealants to depths as shown, or if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of bead.

1. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
2. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.
3. For sidewalks, pavements, floor expansion joints and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, but neither more than 5/6" deep nor less than 3/8" deep.

E. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces including rough textures such as exposed aggregate panels. Use masking tape or other devices to prevent staining of adjoining surfaces, by either the primer/sealer or the sealant/caulking compound.

F. Remove excess and spillage of compounds promptly as the work progresses. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to the adjoining surfaces or finishes.

3.05 Curing

A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.

B. Protect sealants and caulking compounds during curing and throughout construction period to prevent dirt pick-up, deterioration or damage (other than normal wear and weathering).

3.06 Post Construction Inspection

A. Coordinate with the owner to return to the project 12-18 months after substantial completion of this work to inspect for and replace any failed or failing joint sealants. Provide report of inspection results and repairs made.

DIVISION 8 - DOORS & WINDOWS

081113 Hollow Metal Doors and Frames

PART 1 GENERAL

1.01 Summary
A. Provide steel doors and frames as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Submittals
A. Submit shop drawings according to Division 1 indicating location, elevation of door, frame type (wall thickness and corners), materials, methods of assembling, requirements for hardware, joints, and connections.

1.03 Quality Assurance
A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

B. Comply with BHMA requirements and HMMA guide specifications.

C. Wherever fire-resistance classification (hour rating or classification) is shown or scheduled, provide fire-rated steel doors and frames that are tested, listed, and labeled by Underwriters Laboratories, Inc. (UL). Identify each fire door and frame with UL labels indicating applicable fire rating of both door and frame.

PART 2 PRODUCTS

2.01 Doors
A. Interior steel doors shall be 1-3/4" thick, constructed of commercial quality cold rolled full pickled, sheet steel face panels of thickness as scheduled on drawings (min. 16 ga.) or as otherwise required for fire rating, spot welded to 20 ga. internal stiffeners. Fill inner core with manufacturer's standard core material. Top and bottom of doors shall have continuous steel channel welded to face plates. Provide min. 14 ga. steel reinforcement for locks and surface applied hardware, and 3/16" thick reinforcement for mortise hinges, with factory drilling and tapping for hardware per BHMA and HMMA. Joints and seams shall be continuously welded and ground smooth. Provide rigid vinyl top cap. Latch/lock edge shall be beveled.

B. Exterior doors shall be similar to interior doors with full thickness polystyrene insulated core, and integral seal, inverted channel or suitable shapes welded to face sheets at top and bottom edges to completely seal doors from weather, with door tops closed flush.

C. Clearance for doors, except fire doors, shall be 1/8" at jambs and heads, 1/4" at meeting stiles of doors, 3/4" between bottom of doors and finished floor and 3/8" between bottom of door and top of threshold unless indicated otherwise. Verify clearance requirements for floor coverings. Provide clearance for fire doors as required by Underwriters' Laboratories.

D. Provide 1 ¾” by 12 gauge overlapping full height astragal welded on active leaf at pairs of exterior doors.

2.02 Welded Steel Frames

A. Provide welded steel frames for doors conforming to size and shape as shown.

B. Fabricate frames of prime quality cold rolled steel, thickness as scheduled on drawings, (14 ga. minimum) or as otherwise required of for fire rating. Provide standard configuration and profiles for scheduled face widths and depths unless noted otherwise.

C. Frame joints shall be mitered or butted and continuously arc-welded for full depth and width of frame, with welds on exposed surfaces dressed smooth and flush.

D. Frames shall be provided with removable spreaders securely fastened to bottom of jambs, 3/16" thick steel reinforcement for mortise hardware, and 12 ga. steel reinforcement prepared at factory for surface-applied hardware. Frame shall be punched for silencers and for hardware from templates furnished by hardware supplier. Cut-outs shall be protected with dust covers and mortar boxes.

E. Provide closed or tubular mullions, butt welded to head frames.

F. Reinforce joints between members with concealed clip angles of same thickness as frame.

G. Each jamb shall be provided with 14 ga. steel angle floor clips punched with 5/16" holes. Frames in masonry walls shall be provided with three jamb anchors per jamb up to 84” high, four per jamb over 84” high of type suitable for conditions. In masonry walls where masonry can be built up around frame, utilize adjustable type corrugated strap anchors; otherwise, provide bolt-through anchorage consisting of prepunched countersunk bolt holes in face of stop, frame sleeve and backplate and 5/16" expansion bolts with flat Philips head. Provide hot-dipped galvanized anchors at masonry.

H. Custom fit special application frames if/as shown on drawings.

2.03 Stops

A. Doors and frames receiving fixed glass, or air transfer grilles, shall be equipped with plain rectangular steel stops and trim as required. Screws shall be countersunk, flat Philips head type.

B. Unless specifically shown otherwise, frames shall be designed with loose stops on interior or room side of frame.

2.04 Door Louvers

A. Provide door louvers (grilles) of size as indicated; see architectural and mechanical drawings and schedules.

B. Louvers shall be 60 deg. chevron sight-tight cold rolled steel, 20 ga. frame and blades in prime finish, flush face frame both sides of door and adjustable with a nominal 1-1/8" louver depth.

2.05 Fabrication

A. Manufacturer shall provide cut-outs as required, closed with channel or plate, and reinforced as required. Confirm hardware requirements before fabrication and make adjustments required to accommodate hardware specified.

B. Frames shall be mortised and reinforced for hardware. Mortised hardware reinforcements shall be factory-drilled and tapped. Surface applied hardware may be field drilled. Reinforce all frames and doors on both sides so door closers or holders can be applied to either side.

2.06 Finish

A. Clean steel doors and frames of rust, dirt, grease, oil and foreign substances. Apply and bake-on 1 coat of rust inhibitive primer. Fill irregularities and apply an additional coat of manufacturer's standard primer, baked on. Apply finish paint according to Section 099100.

PART 3 EXECUTION

3.01 Installation, General

A. Install frames and doors according to shop drawings, manufacturer's recommendations, U.L. label requirements and as specified herein. Hardware shall be installed under Section 087100.

3.02 Frames

A. Erect hollow metal frames in a straight, plumb, true and secure manner. Provide bracing to hold frames in proper place until built into structure or partition where shown. No less than 3 anchors shall be installed at each jamb of each frame for securing frame to wall construction.

B. Coordinate special application frame requirements with other trades for proper fit-up, custom-fit joints and field connections. Special field joints shall be carefully prepared and installed for a tight fit.

C. Where frame width exceeds 6'-6" in width, provide secure anchorage at mid-point of head.

D. Type of anchorage items shall be determined by wall and head construction and as recommended by frame manufacturer. Anchor each jamb and mullion to floor through standard or special attached clip angles, using 1/4" expansion bolt or 1/4" power driven stud. Do not remove angle spreaders until entire installation is complete.

E. Fully grout all frames installed in masonry wall construction.

3.03 Doors

A. Install doors with equal width spaces on each side, to fit snugly without binding. After doors are fitted, remove them to allow painter to finish tops and bottoms as well as faces and edges. Rehang doors in proper manner.

3.04 Adjust and Clean

A. Touch-up prime coats immediately after erection.

B. Remove protective films, from prefinished doors just prior to final inspection.

C. Check and readjust operation.

D. Clean premises of litter, dirt and debris created by the work of this section.

083113 Access Doors and Frames

PART 1 GENERAL

1.01 Summary

A. Provide access doors as shown and as specified. Comply with applicable provisions of Div. 1.

1.02 Submittals

A. Submit shop drawings according to Division 1. Indicate size, finish, type, style, and method of anchoring. Indicate location for each access door.

1.03 Coordination

A. Coordinate access door locations with work of mechanical and electrical trades.

PART 2 PRODUCTS

2.01 Access Doors - Gypsum Board Ceilings

A. Access panels or doors indicated in gypsum ceilings shall be specifically manufactured for taping and finishing with gypsum board. Flanges shall be concealed in taping operations. Each door shall be provided with cylinder key lock. Doors shall be prime coated baked enamel.

B. Provide access doors by one of the following, or approved equal:

StyleDW:Milcor.
StyleWB:J.L.Industries.
StyleKDW:KARPAssociates.
StyleG:MMSystemsCorp.
StyleSR-1:Cesco-AdvancedAir.

PART 3 EXECUTION

3.01 Installation

A. Install access doors according to shop drawings and manufacturer's recommendations. Locate doors where shown or where directed by A/E for best access to space being served.

084113 Aluminum Entrances, Windows and Glazing

PART 1 GENERAL

1.01 Summary

A. Relocate, rework, modify and/or provide new aluminum entrances and windows as shown and as specified. Glazing should not be re-used if the color of the glazing does not match the existing glazing. Contractor must provide the existing glazing. For break metal wrapping or infill of aluminum, contractor shall provide aluminum material that matches the aluminum framing. Comply with applicable provisions of General Requirements.

1.02 Submittals

A. Shop Drawings and Product Data: Submit shop drawings for fabrication and installation of new aluminum doors, frames, windows, glass, operators, hardware, and appurtenances. Include wall elevations at 1/2" scale, and half-size detail sections of every typical composite member. Show anchors, joint system, expansion provisions, and other components not included in manufacturer's standard data. Include product data on hardware and glazing details.

B. Samples: Submit sample of specified color of finish coating. Submit samples of each glass type and color alternates as specified.

C. Test Reports: Submit certified laboratory test results for quality assurance requirements below.

D. Delegated Design Submittals: Analysis data signed and sealed by the qualified professional engineer for framing system and for glass to confirm compliance with performance requirements.

E. Qualification Data: For manufacturing of insulating glass and tinted transom glass units.

F. Product certifications: From glass manufacturer.

G. Warranty: Submit two copies of written warranties as specified herein.

H. Make submittals according to Division 1.

1.03 Quality Assurance - Entrances

A. Comply with the requirements and recommendations in applicable specifications and standards by NAAMM, AAMA and AA, including terminology definitions, and specifically including the "Entrance Manual" by NAAMM, except to extent more stringent requirements are indicated.

B. Fabricate exterior door and frame units, including weatherstripping and thresholds (if any), to prevent uncontrolled penetration of air and water under normal severe weather conditions.

C. Uncontrolled penetration of water is defined as interior accumulation in any one hour of more than 0.01 gal. of water per lin. ft. of operable door perimeter, during heavy rain (1 gal/s.f./hr.) with wind velocity of 25 mph.

D. Uncontrolled penetration of air is defined as infiltration of air at a rate in excess of 0.5 cu. ft. of air per minute per lin. ft. of operable door perimeter, during direct exposure to wind velocity of 25 mph.

1.04 Quality Assurance - Windows

A. All windows must meet or exceed the minimum requirements of performance class HC for the design load specified below according to ANSI/AAMA 101.

B. Design load shall be 40 psf. Air infiltration shall not exceed 0.37 cfm/ft. for ventilators. Water resistance shall be tested at a static air pressure difference of 10 psf. Uniform load deflection test shall be conducted at a static air pressure difference of 40± psf. Uniform load structural test shall be conducted at a static air pressure difference of 60± psf. Condensation resistance factor (CRF) shall not be less than 56. Conductive thermal transmittance (U-value) shall not be more than 0.56.

1.05 Quality Assurance - Glass

A. Use a qualified insulating-glass manufacturer approved by coated glass manufacturer.

B. Use a qualified glass laminator approved by the tinted interlayer manufacturer.

C. Obtain products from a single source and manufacturer.

D. Comply with GANA publications for laminated glass and IGMA publication for insulating glass.

E. Permanently mark safety glazing and insulating glass units with appropriate certification labels.

1.06 Warranty

A. Provide written warranty signed by manufacturer, agreeing to replace aluminum doors, frames, and windows which are defective in materials or workmanship within 3 years of date of Substantial Completion. Defective materials or workmanship shall include (but not be limited to) failures in operation of doors and hardware, excessive leakage or air infiltration, excessive deflections, delamination of panels, deterioration of finish or metal in excess of normal use, and defects in accessories and components.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorates within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorates within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

D. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 Curtain Wall Systems

A. Thermally-broken aluminum entrance, curtain wall, and window framing systems from a single manufacturer.

Subject to compliance with requirements and intent to match existing aluminum frame systems, provide Kawneer Trifab VG45IT, center pane, 2” sightline, 4 ½” depth, thermal break framing system and 360 series, medium stile Insul-clad thermal entrances, or approved comparable products by Tubelite, United States Aluminum or Vistawall Architectural Products.

B. Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated, including structural design criteria indicated on drawings.

C. General Performance: Systems shall withstand the effects of the following without exceeding performance criteria and without failing due to defective design, manufacture, fabrication, installation or other defect in construction:

1. Building moment, including story drift, deflection from live/snow/wind loads, and thermal stress.
2. Dimensional tolerances of building frame and adjacent construction.

2.02 Aluminum Entrances

A. Re-use existing aluminum storefront framing. Provide proprietary aluminum door, frame, and hardware system in quantity and locations shown. Refer to drawings and details for sizes and general configuration. Provide medium wide stile unless otherwise necessary to match existing.

B. Provide thermal-break framing system at exterior framing. Provide heavy gage extruded aluminum sill and trim as scheduled or detailed.

C. New hardware shall be manufacturer's standard door hardware as follow unless noted otherwise:

Continuous, full-height gear-type fully concealed hinge
Deadlatch Mortise, BHMA Grade 1, Doggable, interior lever (Adams Rite 4510 W-4565 lever, or equal)
Cylinder: See Section 087100
Closer: See Section 087100
Door stop: See Section 087100
Push and pull hardware: 1” round offset pull w/8-10” centers; 1” round bent type push bar, unless otherwise necessary to match existing.
Threshold: No higher than 1/2", thermally broken aluminum.
Weather-stripping: Manufacturer's standard system.
Power operator (If existing ones do not function): See Section 087100

D. Hardware finish shall match finish on door and frame. Cylinders per Section 087100.

E. Provide glazing system as shown for doors and entrance systems and as designated. Glazing shall be clear or tinted as indicated on drawings.

2.03 Aluminum Windows

A. Subject to compliance with requirements and intent to match existing aluminum frame systems, extrusions shall be 6063-T5 alloy and temper (ASTM B221 alloy G.S. 10A-T5). Fasteners, where exposed, shall be 300 series stainless steel. Perimeter anchors shall be aluminum or steel, providing the steel is properly insulated from the aluminum.

B. Glazing shall be of materials compatible with aluminum and those sealants and sealing materials used in composite structure which have direct contact with gasket. Standard exterior glazing gasket shall be a dry glazed closed cell elastomer according to ASTM C509. Optional exterior glazing materials shall be glazing tapes according to AAMA 806-1 or silicone sealant with a compatible backup. Interior glazing shall be with aluminum glazing beads of the snap-in type and compression wedge of dense elastomer per ASTM C864.

C. All glass pockets shall be wept to provide positive drainage. Water shall be wept to the exterior via frame weep slots protected by snap-in weep covers or integral drips.

D. Weather-stripping shall be a high quality material capable of meeting environmental exposure and performance requirements.

E. Subject to compliance with requirements and intent to match existing aluminum frame systems, window framing members shall be 2-1/4" in depth and of one part construction incorporating a 3/8" thermal barrier, consisting of a two-part, chemically curing, and high density polyurethane. Frame extrusions shall be minimum 0.125" typical).

F. Provide extruded aluminum sill members, heat receptors, and cover plate trim as shown or otherwise necessary for conditions.

2.04 Finish

A. All aluminum work shall receive an anodized finish. Color shall match existing.

2.05 Glass

A. Performance requirements:

1. Installed glazing systems shall withstand normal thermal movement, and design wind loads without failure, including loss or glass breakage attributable to defective manufacture, fabrication or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
2. Delegated design: Design glass, including comprehensive engineering analysis according to ASTM E1300 and the governing building code, by a qualified professional engineer using design criteria established on the structural drawings and determining design processes applicable to the project according to ASCE/SEI 7.
3. For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1-inch, whichever is less.
4. Design glass to resist thermal stresses induced by differential shading within individual glass lights.
5. Allow for thermal movements from 120°F ambient and 180°F surface temperature changes.

B. Materials

1. Where glass thickness is indicated, it is a minimum. Provide glass in thicknesses needed to comply with performance requirements.
2. Float glass: ASTM C1036, Type I, Quality-Q3, class I (clear); annealed, Kind HS heat-treated float-glass, or Kind FT heat-treated float glass as needed to comply with performance requirements.
3. Heat-strengthened float glass: ASTM C1048; type I; Quality -Q3, Class I; Kind HS heat-treated float-glass or Kind FT heat treated float-glass as needed to comply with performance requirements.
4. Fully-tempered glass: ASTM C1048; Kind FT heat-treated float glass.
5. Laminated glass: ASTM C1172, with polyvinyl butyral inter layer.

6. Insulating glass: ASTM E 2190, factory-assembled units of sealed lights of glass separated by dehydrated argon-filled interspace; with primary and secondary sealing system, stainless steel spaces and Low-E coating.

2.06 Glass Schedule

A. Exterior glazed doors and windows:

1. Sealed, insulated units, double pane, stainless steel edge.
2. Total unit thickness: 1 inch.
3. Outer pane: laminated glass pane with clear interlayer, ¼" minimum, overall thickness.
4. Space: Argon
5. Inner pane: laminated glass pane with clear interlayer between heat-strengthened clear glass layers, ¼" minimum overall thickness, with Low-E coating on #3 surfaces.
6. Provide clear and tinted glass in locations noted on drawings or as such to match existing exterior glazing.

B. Interior glazed doors and windows:

1. Single pane: laminated glass pane with clear interlayer, ½" minimum overall thickness.
2. Provide tinted glass in locations noted on drawings, or in those areas to match existing.

C. Tinted Glass: Reflective, low-transmittance insulating glass consisting of glass exterior pane, sealed air space and glass interior pane.

1. Basis of Design: Pilkington – Sun Management Glass System
2. Outer pane: Pilkington Grey Eclipse Reflective Glass (Basis of Design) or approved equivalent.
   Glass Type: Fully tempered, Pyrolytic float glass, ASTM C1036, Type 1, Class 2, Quality q3.
   Glass Color: 26 Grey
   Glass Thickness: ¼" minimum
3. Air Space: ½" wide, hermetically sealed, argon-filled
4. Inner pane: Pilkington Energy Advantage Low-E (Basis of Design) or approved equivalent.
   Glass Type: Laminated Low-Emmisivity Pyrolytic float glass, ASTM C1036, Type 1, Class 1, Quality q3.
   Glass Color: Clear
   Glass Thickness: 3/8" minimum.
5. Minimum Performance Characteristics:
   Visible Light Transmittance: 18 percent
   Visible Light Reflectance: 16 percent
   Total Solar Energy Transmittance: 19 percent

Total Solar Energy Reflectance: 14 percent
UV Transmittance: 5 percent
Summer U-value: 0.34
Winter U-value: 0.30
Solar Heat Gain Coefficient: 0.30
Shading Coefficient: 0.34

6. Unit edge seals: Aluminum spacers with mitered corners and primary and secondary sealing system, meeting ASTM E 773.

PART 3 EXECUTION

3.01 Installation

A. Field verify all dimensions and conditions before ordering or fabricating window units.

B. Coordinate preparation and installation of frames to accommodate concealed wiring or devices.

C. Install doors, frames, windows, and hardware according to shop drawings and manufacturer's recommendations.

D. Set units plumb, level and true to line, without warp or rack of frames, doors or panels. Anchor securely in place. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with dissimilar metals.

E. Set sill, threshold, and other members in a bed of sealant compound or with joint fillers or gaskets.

F. Clean aluminum surfaces promptly after installation of frames and doors, exercising care to avoid damage of protective coating (if any). Remove excess glazing and sealant compounds, dirt and other substances.

G. Where protective coating has been damaged, remove coating completely as soon as completion of construction activities no longer requires its retention.

3.02 Protection

A. Protect doors, frames, and windows from damage or deterioration (other than normal weathering) until Substantial Completion.

087100 Door Hardware

PART 1 GENERAL

1.01 Summary

A. Provide finish hardware work as shown and as specified. Comply with applicable provisions of General Requirements.

B. The extent of finish hardware is shown on drawings and specified herein. Finish hardware is defined to include all items known commercially as builders' hardware which is required for doors, except special types of hardware specified in same section as door and frame. Examine drawings and other sections of specifications for related work.

C. Relocated Existing Entrance Doors: Replace existing hardware with equal quality new hardware. Verify fit and match finishes. Re-prep existing doors and frames as necessary. Provide new power assist operators as indicated.

1.02 Submittals

A. Submit 3 copies of manufacturer's product data for each item of finish hardware. Include information to show compliance with specified requirements.

B. Submit 4 copies of final hardware schedule. Final hardware schedule shall be based on finish hardware requirements as indicated. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, swing, function, and finish of hardware. Organize hardware schedule into "hardware sets", indicating complete designation of every item required for each door or opening. Submit schedule at earliest possible date, in order to facilitate fabrication of other work (such as hollow metal frames).

C. Submit 4 copies of separate key schedule showing how owner's instructions on keying of locks have been fulfilled.

D. Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper installation of hardware.

E. Prepare hardware schedules for coordination of the work. Review and acceptance by A/E or owner does not relieve contractor of its exclusive responsibility to fulfill requirements as shown and as specified.

1.03 Fire Rated Openings (if any)

A. Provide hardware for fire-rated openings in compliance with NFPA 80. Provide only hardware which has been tested and listed by UL for types and sizes of doors required, and complies with requirements of door and door frame labels.

B. Where emergency exit devices are required on fire-rated doors (with supplementary marking on door UL label indicating "Fire Door to be Equipped with Fire Exit Hardware"), provide UL label on exit devices indicating "Fire Exit Hardware".

1.04 Product Handling

A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions in package. Deliver individually packaged hardware items at proper times and locations (shop or field) for installation.

B. Provide secure lockup for hardware delivered to project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of work will not be delayed by hardware losses.

1.05 Guarantee

A. Closers, overhead holders, and locksets shall be guaranteed for a period of 2 years from date of substantial completion. Other items shall have standard 1 year guarantee.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

A. Products identified in this Section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality, type, and function. Unless otherwise indicated, products of the following manufacturers, or equal, may be substituted for those listed, provided the substitution is equal in quality, type, and function and meets the specified requirements:

Butts and Hinges: Stanley, Hager, McKinney.
Closers: Corbin Russwin, LCN, Norton, Sargent.
Locksets, Dead Locks: Schlage
Push Plates and Pulls: Hiawatha, Quality, Ives, Burns, Rockwood.
Thresholds and Weather-stripping: Zero, Reese, Pemko, National Guard.
Exit Devices: Corbin Russwin, Von Duprin, Sargent, Precision, Monarch.
Kick plates, Armor Plates: Hiawatha, Quality, Ives, Burns, Rockwood.
Door Operator: LCN, Stanley, DORMA, Sargent, Besam

2.02 Base Metals

A. Produce hardware units of basic metal indicated, using manufacturer's standard metal alloy, composition, temper and hardness.

2.03 Forming

A. Form base metal into required shapes and sizes by manufacturer's standard production method for class or quality of hardware units required.

2.04 Fasteners

A. Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

B. Furnish screws for installation with each hardware item. Provide Phillips flathead screws, except as otherwise indicated. Finish exposed screws to match hardware finish.

C. Provide concealed fasteners for hardware units which are exposed when door is closed. Do not use through bolts for installation where bolt head or nut on opposite face is exposed under any condition.

D. Provide fasteners which are compatible with both unit fastened and substrate, and which will not cause corrosion or deterioration of hardware, base material or fastener.

2.05 Finishes

A. Match finish of hardware units at each door or opening to greatest extent possible. In general, match finish of latch and lockset (or push-pull units if no latch-lock sets) for color and texture.

B. Designations used in schedules and elsewhere to indicate hardware finishes are those of ANSI/BHMA A156.18 "Materials and Finishes" and traditional U.S. finishes used by certain manufacturers.

2.06 Keying

A. Hardware supplier shall meet with owner to develop a keying schedule. Key locks according to owner's instructions. Provide 2 keys with each lock and furnish 6 master keys. Coordinate keying with Isobel O'Rourke, Building & Grounds Services, Phone: (262) 496-0010.

2.07 Standards

A. Hardware shall meet appropriate BHMA Grade 1 standards for heavy commercial applications.

B. All hardware shall comply with ADA ANSI A117.1, and the building code.

PART 3 EXECUTION

3.01 Hardware Mounting Heights

A. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by the Door and Hardware Institute, except as otherwise specifically indicated or required to comply with governing regulations.

B. Mount door closers on interior side of exterior doors and on non-public side of interior doors. Provide arm style accordingly.

3.02 Installation

A. Install hardware items in compliance with manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished, install each item completely and then remove and store in a secure place. After completion of finishes, reinstall each item.

B. Provide solid wood blocking behind wall stops, magnetic holders, and other hardware items mounted on adjacent stud wall partitions.

C. Adjust and check each operating item of hardware and each door to ensure proper operation or function, initially, and after one week of normal operation frequency. Lubricate moving parts with type of lubrication recommended by manufacturer; use graphite-type if no other type is

recommended. Replace units which cannot be adjusted and lubricated to operate freely and smoothly.

D. Instruct owner's personnel in proper operation and maintenance of hardware and hardware finishes during final adjustment of hardware.

PART 4 SCHEDULES

4.01 Door Hardware Sets

SET 1 – Exterior Aluminum Entrance (manual leaf)

A. 2 pivot hinges (existing to remain).

B. One mortise aux dead latch, doggable, interior lever (See section 084113).

C. Exterior cylinder, BHMA A-156-5, grade 1, 6-pin

D. One strike (see section 084113)

E. One pull, offset (see section 084113)

F. One push bar, (see section 084113)

G. One closer, BHMA A156.4, grade 1, adjustable back check and closing power.

H. One weather-strip set, (see section 084113).

I. One weather sweep (see section 084113)

J. One threshold, see section 084113, thermally broken aluminum

K. One door stop, overhead, concealed, BHMA A156.8 type 4.

SET 2 – Exterior Aluminum Entrance (power assisted leaf)

A. All items listed for set 1, except closer

B. One low-energy power-assist door operator: BHMA A156.19
   a. Electromechanical, power-open/spring-close.
   b. RF–receiver.
   c. Interior, battery powered, RF actuator with 4 ½" round engraved stainless steel plate with accessibility symbol.
   d. Exterior, battery powered RF actuator with 4 ½" round engraved stainless steel plate with accessibility symbol.
   e. Flush and surface mount boxes as applicable.

f. Related parts and components as necessary.
g. Adjustable: opening and closing speed and force; back check, hold-open time, time-delay, acceleration.
h. Finish and color to match door and frame.
i. Safety interlocks to prevent activation of operator if door is latched or bolted.

SET 3 – Interior Aluminum Entrance (manual leaf)

A. 2 pivot hinges, (see section 084113)

B. One pull, offset (see section 084113)

C. One push bar, (see section 084113)

D. One closer: BHMA A156.4, Grade 1

E. One weather-strip set, (see section 084113)

F. One door stop, overhead, concealed, BHMA A156.8, type 4

SET 4 – Interior Aluminum Entrance (power assisted leaf)

A. All items listed for Set 3, except closer

B. One low-energy power-assist door operator as listed for Set 2

SET 5 – Family Assisted Restroom

A. Three ball bearing full mortise, stainless steel butt hinges, US32D
Provide reverse spring to auto open (Hager 1257)

B. One passage latch set, ANSI F75, bored, US32D
Schlage, ND-Series; Athens design lever trim

C. One latch set strike, US32D

D. One auxiliary deadlock with “occupied” indicator, mortise, exterior cylinder, US32D

SET 6 – Existing Double Door in Front Window Wall

A. One commercial threshold stop seal, full width of double door, interior face. Pemco 184AT (mill finish aluminum). Mount to existing aluminum threshold.

B. One self-adjusting magnetic astragal set (2 piece), full height, inside face. Reese 195D-195D (Dark Bronze).

SET 7 – Existing Doors to have Locksets Changed-out

A. Remove existing Schlage locksets as shown on the plans. Replace with a S-Series Schlage lockset with a core that is identical to the lockset removed. Locksets shall have a Saturn lever and a 626 finish. Provide new strike as applicable.

4.01 Hardware Schedule
Note: Repetition of BHMA references, manufacturer names and finish designation may have been omitted for convenience. Identical items of hardware shall be furnished by one manufacturer.

DIVISION 9 - FINISHES

092900 Gypsum Board Systems

PART 1 GENERAL

1.01 Summary
A. Provide gypsum board systems as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Submittals
A. Submit product data on joint treatment materials, gypsum board primer, and texture finish products.

B. Submit min. 6" x 6" gypsum board sample with each type of spray texture required.

1.03 Fire-Resistant Ratings
A. Comply with fire-resistance ratings as shown and as required by governing authorities and codes. Provide materials, accessories, and application procedures which have been listed by UL or tested according to ASTM E119 for type of construction shown.

1.04 Delivery, Storage, and Handling
A. Schedule delivery to minimize storage periods at project site. Deliver materials according to manufacturer's instructions; ship unopened containers or packages, fully identified with manufacturer's name, brand, type and grade. Store boards flat with uniform support. Protect from weather and damage as recommended by manufacturer.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers - Gypsum Board
A. Products identified in this Section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality, type, and function. Unless otherwise indicated, gypsum board products and accessories of the following manufacturers or equal may be substituted for those listed, provided the substitution is equal in quality, type, and function and meets the specified requirements:

Georgia-Pacific (G-P).
National Gypsum/Gold Bond Building Products Div.
U. S. Gypsum (USG).

2.02 Gypsum Board

A. Standard: 5/8" thick gypsum wallboard unless otherwise indicated or necessary to match adjacent existing thickness, complying with ASTM C36, with paper face surface suitable to receive decorated finish and long edges tapered to receive standard joint treatment, in lengths as required for minimum number of joints. Use where other types are not scheduled or specified or required for conditions.

B. Impact-Resistant: High-impact abuse-resistant rated product complying with ASTM C36, manufactured to produce greater resistance to surface indentation and through-penetration than standard gypsum panels, with core type indicated, 5/8” thick unless noted otherwise or necessary to match adjacent existing thickness, with long edges tapered. Use in all public areas (Lobby, Entryways, and similar applications and as noted).

1. Acceptable products include:
   a. National Gypsum Company: Gold Bond Hi-Abuse Wallboard
   b. United States Gypsum Co.: Sheetrock Brand Abuse-Resistant Gypsum Panels
   c. Approved Equal

2.03 Gypsum Board - Mold and Mildew Resistant (GBMR)

A. 5/8” gypsum wallboard with moisture and mold resistant core and surfaces, long edges tapered to receive standard joint treatment. Use in ceilings of toilet rooms and plumbing chases and elsewhere as noted.

2.04 Cement Board (GBC)

A. 5/8” cementitious backer units complying with ANSI A118.9 or ASTMC 1325, in maximum lengths to minimize end-to-end butt joints. Use at framed walls of toilet rooms to receive tile.

2.05 Gypsum Board - Fire Rated (GBX)

A. Gypsum wallboard, ASTM C36, Type "X", 5/8" thick, unless otherwise indicated, with paper face surface suitable to receive decorated finish and long edges tapered to receive manufacturer's standard joint treatment, unless otherwise shown. Use at fire-rated walls and ceilings.

2.06 Gypsum Board Fasteners

A. Provide type and size recommended by manufacturer for applications shown. Review fire-rated assembly requirements for fastener spacing. In general, fasten gypsum board with self-drilling screws designed for gypsum board, ASTM C1002.

B. Screws shall be self-tapping when used with metal framing up to 12 gage. Heads shall be designed for covering with finishing compound if exposed in face layers.

2.07 Gypsum Board Metal Trim Accessories

A. Provide trim accessories of sizes required for applications shown, fabricated of galvanized steel, complying with ASTM C1047 as follows:

B. External Corners: Metal corner bead with smooth rigid nose and perforated and knurled metal flanges.

C. Control Joints: Where shown and as required in Part 3 Execution, one-piece joint assembly of non-corrosive metal or extruded vinyl with continuous unperforated V-slot for insertion into joint and perforated flanges for attachment to face of gypsum board with slot opening covered with removable strip.

D. Where face panels abut dissimilar materials, at reveals, and where designated: Shaped metal trim designed to be concealed by taping operations; USG No. 200-B metal trim, Fry Reglet FDM-625, or approved equal.

E. Exposed panel edges and where designated: J-shape casing beads designed to be concealed by taping.

2.08 Joint Treatment Materials

A. Joint Tape: Plain or perforated paper, ASTM C475.

B. Joint Compound: Factory-prepackaged vinyl based products, ASTM C475. Provide in dry powder form for mixing with water at jobsite or factory pre-mixed, for single or two-compound treatment.

1. Taping compound shall be formulated for embedding tape and first coat over fasteners and flanges of corner beads and edge trim.
2. Topping compounds shall be formulated for fill (second) and finish (third) coats.
3. All-purpose compounds shall be formulated for use as both taping and topping compounds.

2.09 Gypsum Board Primer

A. USG "Sheetrock First Coat", Gold Bond "Drywall Primer", or equal. Paint primers, as specified in Section 09900 Painting, will not be accepted as equal to this product.

2.10 Interior Texture Finish

A. Exposed surfaces shall receive a smooth, aggregated, fine texture finish unless noted otherwise, or required to match adjacent surface textures.

2.11 Metal Studs

A. Cold formed galvanized steel.

1. Screw type with knurled flanges
2. Sizes as indicated. Minimum 20 gauge for cement board applications, minimum 25 gauge elsewhere.
3. Provide top and bottom tracks, bridging, bracing as required and recommended by manufacturer.

PART 3 EXECUTION

3.01 Installation of Steel Framing, General

A. Install steel framing as shown and to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.

B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer. Coordinate with Section 06100.

C. Isolate non-load bearing steel framing from building structure to prevent transfer of loading imposed by structural movement.

1. Where partition and wall framing abuts overhead structure.
2. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.

D. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

E. Install gypsum board ceiling suspension system per ASTM C636, CISCA, manufacturer’s recommendations and associated ICBO evaluation reports.

3.02 Installation of Gypsum Board

A. Comply with ASTM C840, unless otherwise recommended by gypsum board manufacturer.

B. Examine substrates and conditions; notify of detrimental conditions. Do not proceed until unsatisfactory conditions are corrected.

C. Do not exceed 1/8" in 8'-0" variation from plumb or level in line or surface; except at joints between units, do not exceed 1/16" variation between planes of abutting edges or ends. Shim as required to comply with specified tolerances.

D. Provide additional framing and blocking as required to support gypsum board at openings and cutouts, and to support built-in anchorage and attachment devices for other work.

E. Form control joints in gypsum board construction where indicated below. Allow 1/2" continuous opening between edges of adjacent drywall boards to allow for insertion of control joint trim accessory.

F. Finish exposed surfaces with joints, corners and exposed edges reinforced and trimmed, with all joints, fastener heads, trim accessories, flanges and surface defects filled with joint compound for a smooth flush surface.

G. Provide metal casing bead “J” trim around openings and terminations. Provide corner bead at all outside corners.

H. Partition/Walls: For heights of 8'-1" or less, apply gypsum board vertically or horizontally at contractor's option. For heights greater than 8'-1" or for areas less than 4' wide, apply vertically. Use floor-to-ceiling length boards for vertical applications and locate edge joints over supports, but offset at least one stud on opposite faces of partition/walls. Use maximum practical length boards for horizontal applications and locate end joints over supports and stagger in alternate courses of board.

I. Ceilings: Apply gypsum board with long dimension at right angles to supports with end butt joints located over supports. Use maximum practical length boards to minimize end butt joints. Stagger end joints in alternate courses of boards and locate as far away from center of ceiling as possible.

J. Multiple layers: follow requirements of rated assemblies.

3.04 Control Joints

A. Gypsum panel surfaces shall be isolated with control joints where:

1. Partition, furring, or column fireproofing abuts a structural element (excepts floor) or dissimilar wall or ceiling.
2. Ceiling abuts a structural element, dissimilar wall or partition, or other vertical penetration.
3. Construction changes within plane of partition or ceiling.
4. Partition or furring run exceeds 30 ft.
5. Ceiling dimensions exceed 50 ft. in either direction with perimeter relief, 30 ft. without relief.
6. Exterior soffits exceed 30 ft. in either direction.
7. Wings of "L", "U" and "T"-shaped ceiling areas are joined.
8. Expansion or control joints occur in base exterior wall.
9. Junctions between suspended gypsum board ceilings and gypsum board ceilings mounted directly to building framing.
10. Elsewhere as noted.

B. Ceiling height door frames may be used as control joints. Less-than-ceiling height frames shall have control joints extending to ceiling from both corners unless otherwise approved by A/E.

3.05 Gypsum Board Finishing

A. Do not install joint treatment compounds unless conditions comply with minimum temperature and ventilation requirements recommended by manufacturer. Finish exposed gypsum board surfaces with joints, corners, and exposed edges reinforced or trimmed as specified, and with joints, fasteners, accessory flanges, and surface defects filled with joint compound according to manufacturer's recommendations for a smooth, flush surface. Gypsum board finishing work will not be considered acceptable if corners or edges do not form true, level, or plumb lines, or if joints, fastener heads, flanges of accessories, or defects are visible after application.

3.06 Gypsum Board Primer

A. Apply full coverage coat of gypsum board primer to all painted walls and ceilings according to manufacturer's instructions. For both smooth surface finished and textured walls and ceilings, gypsum board primer shall be applied to equalize porosity and surface texture differences between finished joint compound and gypsum board face paper. Apply primer evenly, free of runs, sags and other blemishes.

B. This contractor shall be responsible for providing additional sanding as required after gypsum board primer has dried. This additional sanding is required to eliminate any surface texture differences that may have been caused by over sanding joint compound areas and raising nap on gypsum board paper facings. This contractor shall be solely responsible to provide a uniform texture surface on all gypsum surfaces ready for application of paint primer by painting contractor.

3.07 Texture Application

A. Apply texture according to manufacturer's instructions and according to approved sample. Apply material to blend uniformly without starved spots or detectable application pattern.

B. Protect surrounding surfaces from splattering or overspray.

3.08 Protection

A. Comply with proper procedures for protection of completed gypsum board work from damage or deterioration until acceptance of work.

093001 Ceramic Wall Tiling

PART 1 GENERAL

1.01 Summary

A. Provide ceramic wall tile as shown and as specified. Comply with applicable provisions of General Requirements.

1.02 Related Sections

A. Ceramic Floor Tiling -093002
B. Joint Sealants - 079200

1.03 Submittals

A. Submit product data and installation instructions. Include certifications and other data to show compliance with these specifications.

B. Submit full size sample of each type, class, and color of tile and trim. Samples will be reviewed for color, pattern and texture only; compliance with all other requirements is contractor's responsibility.

C. Submit color samples of grout.

1.04 Quality Assurance

A. Provide tile certified by Tile Council of America (TCA) to meet or exceed ANSI A137.1, "Standard Grade". Comply with TCA specifications for installation of ceramic tile system.

B. Provide materials obtained from one source and same production run for each type and color of materials.

C. Build mockups to verify selections, demonstrate aesthetics and set quality for materials and execution.

D. Conduct pre-installation conference with all related trades at project site prior to commencement of their work on site to coordinate jointing of substrates and other requirements.

1.05 Delivery and Storage

A. Deliver materials and store on site in original containers with seals and labels intact until used.

B. Store tile and cementitious materials elevated, under cover and dry. Keep liquids from freezing.

1.06 Extra Materials

A. Supply an extra 3% of total quantity of each tile and trim from same production run as installed tile. Place in clean marked cartons for owner's use.

PART 2 PRODUCTS

2.01 Ceramic Wall Tile

A. Tile shall match wall tile in existing toilet rooms.

B. Tile shall be ¼” thick porcelain tile with a glazed finish laid to match existing wall tile. Provide tile with an impervious body with less than 0.5% water absorption and a waffle type backing. Furnish trim in size and color to match tile, and as follows:

1. Inside corners - square.
2. Outside corners - bullnose.
3. Jambs-bullnose where tile projects from jamb.

2.02 Setting Materials

A. Wall setting latex/polymer modified Portland cement mortar: Comply with ANSI A108.5, TCA method W202-07.

2.03 Grouting Materials

A. Commercial, unsanded, latex/polymer modified Portland cement grout, wet or dry-cure formulation as appropriate, color to match existing. Comply with ANSI A118.7.

2.04 Sealants

A. For control joints in walls, use a urethane sealant per Section 079200.

2.05 Protective Materials

A. Grout Release: Proprietary liquid coating formulated to protect face of tile against grout staining, as recommended by tile manufacturer.

B. Neutral cleaner such as American Olean General Purpose Cleaner, Hillyard Super Shine-All or equal, subject to tile manufacturer's approval.

C. Heavy duty non-staining breathable construction paper with compatible masking tape.

PART 3 EXECUTION

3.01 Examination of Surfaces

A. Inspect substrates for condition and maximum variations shown below:

Walls	
Dry-Set Mortar	1/8" in 8'

B. Report unacceptable surfaces. Surfaces to be tiled shall be free from coatings, curing membranes, oil, grease, wax, and dust. Do not proceed until unsatisfactory conditions are corrected.

3.02 Layout

A. Determine location of movement joints. Lay out tile work to minimize cuts less than one-half tile in size. Locate cuts to be least conspicuous. Extend tile wainscots to next full tile beyond dimensions shown.

B. Align wall joints to give straight uniform grout lines, plumb and level. Make joints between tile sheets same width as joints within sheets so extent of each sheet is not apparent in finished work.

3.03 Tile Installation, General

A. Use products in strict accordance with manufacturer recommendations. Proportion mixes according to applicable ANSI 108-series standards.

B. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disruption of pattern or joint alignments.

C. Smooth exposed cut edges; clean cut edges before installing tiles. Fit tile carefully against trim and around pipes, electric boxes, and other built-in fixtures so that escutcheons, plates, and collars will completely overlap cut edges.

D. When using glazed tile sheets, minimize tearing sheets apart by drilling pipe holes as much as possible.

3.04 Setting Methods

A. Provide setting beds as shown or, when not indicated, use applicable TCA installation specifications for setting and grouting materials specified.

3.05 Grouting

A. Apply grout release if/as recommended by tile manufacturer to prevent grout stains on tile face.

B. Grout according to manufacturer's recommendations.

C. Follow manufacturer’s recommendations for grout curing.

3.06 Cleaning

A. Clean tile surfaces thoroughly after grouting. Remove grout film and any grout release agents, observing tile manufacturer's recommendations for chemical cleaners. Rinse tile work thoroughly with clean water before and after using chemical cleaners. Polish surface of tile work with soft cloth.

3.07 Protection

A. Protect tile work with heavy duty construction paper or other material to prevent damage. Prohibit construction traffic from using newly tiled areas.

B. Upon Substantial Completion, tile work shall be complete and free from defects. Repair damaged work to match adjacent surfaces.

093002 Ceramic Floor Tiling

PART 1 GENERAL

1.01 Summary

A. Provide ceramic floor tile as indicated and as specified. Comply with applicable provisions of General Requirements.

1.02 Related Sections

A. Ceramic wall tile - 093001.

B. Joint sealants - 079200

1.03 Submittals

A. Submit product data and installation instructions according to General Requirements. Include certifications and other data to show compliance with these specifications.

B. Submit full size sample of each type, class, and color of tile and trim according to Division 1. Samples will be reviewed for color, pattern and texture only; compliance with all other requirements is contractor's responsibility.

C. Submit color samples of grout for selection.

1.04 Quality Assurance

A. Provide tile certified by Tile Council of America (TCA) to meet or exceed ANSI A137.1 “Standard Grade". Comply with TCA specifications for installation of ceramic tile system.

B. Provide materials obtained from one source and same production run for each type and color of materials.

C. Build mockups to verify selections, demonstrate aesthetics and set quality standards for materials and execution.

D. Conduct pre-installation conference with all related trades at project site prior to commencement of their work on site to coordinate jointing layouts and other substrate requirements.

1.05 Delivery and Storage

A. Deliver materials and store on site in original containers with seals and labels intact until used.

B. Store tile and cementitious materials elevated, under cover and dry. Keep liquids from freezing.

1.06 Extra Materials

A. Supply an extra 3% of total quantity of each tile and trim from same production run as installed tile. Place in clean marked cartons for owner's use.

PART 2 PRODUCTS

2.01 General

A. Provide materials complying with ANSI A108.02, ANSI standards referenced by TCA installation methods specified, and other requirements specified.

2.02 Tile

A. Unglazed, non-textured, unpolished, color-body porcelain ceramic tile, complying with ANSI A137.1 standard grade requirements.

1. Coefficient of friction: minimum 0.6 wet/0.7 dry (ASTM C1028)
2. Moisture absorption: < 0.5% (ASTM C373)
3. Breaking strength: > 400 lbs.
4. Surface hardiness / durability rating: 8.5 MOH
5. Thickness: ¼”
6. Sizes: 6”x 6” and 12” x 12” to match what was considered existing conditions.
7. Colors: Match to existing or as selected by owner.

B. Acceptable products:

1. Basis of Design: DAL-TILE; colors as selected by owner.

C. Trim shapes as required for complete installation of tile, of same material, size, color and finish as floor tile. Use base cove throughout, square on radius top as required by conditions.

D. Factory blend tiles exhibiting color variations to provide same range in colors in each package.

2.03 Setting/Bonding Materials

A. TCA Method: “F111-07 Cement Mortar, Cleavage Membrane” Meet ANSI A108.18 for tile set on cured mortar bed with latex/polymer modified Portland cement bond coat.

B. Cleavage membrane: Asphalt felt. ASTM D226, Type 1 (No. 15); or polyethylene sheeting, ASTM D4397, 10.0 mils thick.

C. Reinforcing wire fabric: A galvanized weld wire fabric, 2 by 2 inches by 0.062 inch diameter; comply with ASTM A185 and ASTMA82 except for minimum wire size.

D. Mortar bed:

1. Portland cement: ASTM C150, type 1.
2. Hydrated lime: ASTM C206 or C207, type S
3. Sand: ASTM C144
4. Water: Clean, drinkable

E. Bond coat: Latex/polymer modified Portland cement mortar, as recommended by manufacturer for porcelain tile.

2.04 Grouting Materials

A. Latex/polymer modified Portland Cement Grout, ANSI A118.7

B. Color as selected by owner.

2.05 Elastomeric Joint Sealant

A. Use sealants per Section 079200.

B. Provide primers, backer rods and other sealant accessories recommended by the sealant manufacturer.

C. Provide colors to match colors of grout in adjacent tile.

2.06 Miscellaneous Materials

A. Expansion joints: angle on L-shape, height to match tile and setting bed thickness, designed specifically for tile flooring applications; stainless steel ASTM A666, 300 series exposed edge material.

B. Grout release: Proprietary liquid coating, specifically formulated and recommended by manufacturer for providing temporary protection of tile face against grout staining during grouting.

C. Tile cleaner: Neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for the installed products by their manufacturers.

D. Grout sealer: High-quality penetrating / impregnating silicon-free sealer recommended by grout manufacturer to prevent moisture penetration and minimize staining of cementitious grout material, that does not change appearance or color grout.

PART 3 EXECUTION

3.01 Examination of Surfaces

A. Inspect substrates for condition and maximum variations shown below:

1. Maximum ¼” in 10’ from the required plane.
2. Slope provided in subfloor.
3. Steel trowel finish.

B. Report unacceptable surfaces. Surfaces to be tiled shall be free from coatings, curing membranes, oil, grease, wax, and dust. Do not proceed until unsatisfactory conditions are corrected.

3.02 Layout

A. Joint width: 3/16”

B. Determine location of movement joints according to TCA recommendations, subject to approval by architect/engineer. Lay out tile work to minimize cuts less than one-half tile in size. Locate cuts in floors to be least conspicuous.

C. Floor joints shall form straight uniform grout lines, parallel with walls.

D. Provide metal edge strips at both edges of joints.

3.03 Tile Installation, General

A. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tile at project site before installing.

B. Use products in strict accordance with manufacturer recommendations. Proportion mixes according to applicable ANSI 108-series standards.

C. Pre-seal tile surfaces with a grout-release agent to prevent staining by grout and to ease grout cleanup, according to tile manufacturer's recommendations. Test small area first. Take care not to coat edges of tile.

D. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disruption of pattern or joint alignments.

E. Smooth exposed cut edges; clean cut edges before installing tiles. Fit tile carefully against trim and around pipes, electric boxes, and other built-in fixtures so that escutcheons, plates, and collars will completely overlap cut edges. Extend tile under metal door thresholds and frames.

3.04 Setting Methods

A. Install setting beds and related materials according to applicable TCA installation method specifications for setting and grouting materials specified.

B. Follow TCA recommendations for bonding large format tile to ensure proper coverage of bonding surface and full support of edges and corners. Periodically remove and check a tile to assure proper coverage is being attained.

3.05 Grouting

A. Grout according to manufacturer's recommendations.

B. Dampen grout joints daily with clean water by clean sponge or mop for first 7 days to facilitate grout core and color lock.

3.06 Expansion Joint Installation

A. Prepare substrate according to TCA Handbook.

B. Align expansion joints on floors and/or walls where indicated.

C. Press joints into setting material and trowel over perforated flanges.

D. Set tile over flange making sure top of joint is flush with tile.

E. Install joint sealants according to section 079200 and manufacturer's instructions.

3.07 Cleaning

A. Clean tile surfaces thoroughly after grouting. Remove grout film and grout release agent, observing tile manufacturer's recommendations for chemical cleaners and methods. Rinse tile work thoroughly with clean water before and after using chemical cleaners. Polish surface of tile work with soft cloth.

3.08 Post Cure Sealers

A. Apply grout sealer after curing period as recommended by manufacturer.

B. Do not seal tile surfaces.

3.09 Protection

A. Protect tile work with non-staining breathable, heavy duty construction paper to prevent damage immediately after tile has been properly installed and grouted. Do not use plastic or non-absorbent coverings. Maintain protection until floor is opened for intended use.

B. Prohibit construction traffic from using newly tiled areas.

C. Upon Substantial Completion, tile work shall be complete and free from defects. Repair damaged work to match adjacent surfaces.

099100 Painting

PART 1 GENERAL

1.01 Summary

A. Provide painting as shown and as specified. Comply with applicable provisions of General Requirements and Standard Specifications.

1.02 Work Included

A. Work includes painting and finishing items and surfaces of new construction; existing surfaces disturbed or exposed to accomplish the work; existing surfaces adjacent to new construction as needed to provide uniform appearance (texture, color, sheen); and other surfaces throughout the project as designated on Drawings, in Schedules, and in Specifications.

B. Paint all surfaces exposed to view whether or not colors are designated in "schedules", except where natural finish is obviously intended or specifically noted. Where items or surfaces are not specifically mentioned, finish to match adjacent similar materials or areas.

C. Work includes field painting of bare and covered pipes and ducts (including color coding and labeling when scheduled), hangers, exposed ferrous metal work, and primed and prefinished metal surfaces of equipment installed under mechanical and electrical work in finished areas only, except as otherwise specified.

D. Examine work of other trades and become thoroughly familiar with provisions regarding painting of their work. Paint or finish all exposed surfaces and equipment left unfinished by other provisions of these specifications.

1.03 Work Not Included

A. Shop Priming: Unless otherwise specified, shop primer coats are included under various sections for structural steel, miscellaneous metal, architectural woodwork, steel doors and frames, and shop-fabricated or factory-built mechanical and electrical equipment, accessories, and similar items.

B. Prefinished Items: Unless otherwise indicated, do not paint factory-finished or prefinished items, such as (but not limited to) metal toilet enclosures, acoustic materials, architectural woodwork and casework, light fixtures, and non-public utility area mechanical and electrical equipment.

C. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces in concealed inaccessible areas such as foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts, and elevator shafts. Exception: field paint steel lintels in exterior walls and framing in exterior eaves before enclosing.

D. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials do not require finish painting, except as otherwise indicated.

E. Operating Parts: Do not paint moving parts of operating units, sliding and bearing surfaces, and mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, and motor and fan shafts, unless otherwise indicated.

F. Labels: Do not paint over code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.04 Definitions

A. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

B. SSPC - Steel Structures Painting Council.
ASTM - American Society for Testing & Materials.

1.05 Submittals

A. Product Data: Submit manufacturer's product data, including label analysis and application instructions for each material specified.

B. Color Charts: Furnish color charts of proposed products for selection/verification.

C. Samples: Upon request, submit samples for review of color, gloss and texture. Compliance with all other requirements is the exclusive responsibility of contractor. Provide a listing of material and intended application for each sample.

1. On 12" x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit each sample as requested until required sheen, color and texture is achieved.
2. On actual wood surfaces, provide two 4" x 8" samples of each natural and stained wood finish as required. Label and identify each as to location and application.
3. On concrete masonry, provide two 4" square samples of masonry for each type of finish and color, defining filler, prime and finish coats.

D. Submit samples and certifications to the engineer. Do not apply paint systems until approved for use on the project.

1.06 Delivery, Storage and Protection

A. Deliver materials in original, unopened packages and containers bearing labels as follows:

Name or title of material.
Fed. Spec. number, if applicable.
Manufacturer's stock number.
Manufacturer's name.
Contents by volume, for major pigment and vehicle constituents.
Thinning instructions.
Application instructions.

PART 2 PRODUCTS

2.01 Paint and Coatings

A. Subject to compliance with the specified requirements, provide products by one of the following, or equal:

Pratt and Lambert Paints (P & L).
Sherwin-Williams Paints.
Glidden Paints.
Benjamin Moore Paints.
PPG Industries, Inc. (Pittsburg Paints).

B. Contractor shall submit a specific list of products it wishes to use if manufactured by a company other than that noted in Painting Schedules.

C. Refer to Drawings and Painting Schedules for finishes and coating systems to be applied to various surfaces throughout project.

D. Contractor shall bear responsibility for compatibility of shop primers and field-applied finish coatings and for compatibility of primer recoat-window time with timing of field finishes. When shop primer and finish coats are products of different manufacturers, manufacturer of finish coats shall certify in writing to the compatibility of products, or shall recommend a suitable barrier or intermediate tie coat to be applied prior to finish coats. Otherwise, provide recommended undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and within recommended limits.

E. Provide best quality grade of coatings as regularly manufactured by approved paint manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

PART 3 EXECUTION

3.01 Substrate Examination

A. Examine substrates and surfaces and conditions under which work is to be performed. Notify in writing of any conditions detrimental to performance of this work. Do not proceed with this work until unsatisfactory conditions have been corrected; starting of painting work will be construed as acceptance of surface and conditions within any particular area.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.02 Surface Preparation

A. Perform preparation procedures for each substrate in strict accordance with paint manufacturer's instructions and as specified.

B. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove mounted accessories if necessary for complete painting of items or adjacent surfaces. Following completion of painting of each space or area, reinstall removed items using workmen skilled in trades involved.

C. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

D. Prepare cementitious surfaces of concrete, concrete block, cement plaster, and mineral-fiber-reinforced cement board to be painted by removing all efflorescence, chalk, dust, dirt, grease, oils and by roughening as required to remove glaze.

E. Clean wood surfaces to be painted of all dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other approved sealer, before application of priming coat. After priming, fill holes and imperfections in

finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried. Wipe off adhering dust.

F. Clean non-galvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of SSPC, unless blast cleaning is indicated elsewhere.

G. Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

3.03 Material Preparation

A. Prepare painting materials according to manufacturer's directions. Mix materials before application to produce uniform density. Stir as required during application of materials. Do not stir surface film into material; remove film and, if necessary, strain material before using.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

3.04 Application

A. Apply paint according to manufacturer's directions. Use applicators and techniques best suited for type of material being applied.

B. Apply additional coats when undercoats, stains or other conditions show through final coat of paint; paint film shall be of uniform finish, color and appearance.

C. Paint surfaces behind movable equipment and furniture to match exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

D. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

E. Finish exterior doors on tops, bottoms and side edges the same as exterior faces, unless otherwise shown.

F. Sand lightly between each succeeding enamel or varnish coat.

G. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise specified.

3.05 Protection

A. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damages by cleaning, repairing or replacing, and repainting.

B. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.06 Clean-Up

A. During progress of work, dispose of discarded paint materials, rubbish, cans and rags. Upon completion of painting work, clean all paint-spattered surfaces by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

PART 4 SCHEDULES

4.01 Painting Schedules, General

A. Provide the following coating systems for the various substrates indicated. Named products are specified to establish a standard of type and quality. See article "Paint & Coatings" for acceptable manufacturers. Provide coating systems for surfaces not listed here as recommended by manufacturer for substrates and exposure, subject to engineer approval.

B. Contractor shall include in its bid the painting of different colors for adjacent surfaces such as doors, frames and walls. Colors shall be as noted on drawings and schedules, or as otherwise directed by engineer.

4.02 Exterior Painting Schedule

Ferrous Metal - Primed and Prefinished, including miscellaneous metal fabrications, steel doors and frames, exposed structural lintels:

Touch up bare metal with Sherwin Williams Pro-Cryl Universal Acrylic Primer.
2 coats Sherwin Williams Pro Industrial Zero VOC
(For lintels: interior color to match adjacent wall; exterior color to match door frame).

4.03 Interior Painting Schedule

Block Masonry, where indicated on drawings:

1 coat P & L Pro-Hide Gold Interior/ Exterior Acrylic Surface Conditioner
2 coats P & L Red Seal Interior Oil Paint (alkyd-enamel, satin).

Gypsum Board, ceilings and walls:

2 coats P & L Accolade Interior Paint + Primer Acrylic Waterborne - Eggshell.

Ferrous Metal - Adjacent or Near to Painted Surfaces, including factory-primed and baked-enamel-prefinished fire extinguisher cabinets, grilles, louvers, ductwork, conduit, piping, electrical panel covers, baseboard radiation, convector cabinets, access covers, equipment enclosures, raceways and similar appurtenances:

Paint to match adjacent or near surfaces, except as designated below.

Ferrous Metal - Primed and Prefinished, including steel doors, steel frames, miscellaneous steel fabrications, tube columns, steel tube trusses:

Touch up primer.
1 coat P & L Vitralite Undercoating (tinted).
1 coat P & L Vitralite Enamel (alkyd, eggshell).

Insulation Coverings:

1 coat P & L Red Seal Interior Flat Wall Primer/ Paint.
Finish coats to match adjacent or near surfaces.

Hardwood - Stained, including unfinished hardwood trim:

1 coat P & L Tonetic Wood Stain.
1 coat P & L Sanding Sealer.
2 coats P & L 38 Clear Finish (alkyd-natural/stain, satin).

Plywood - Painted, including exposed deck above ceilings, shelving and equipment backing:

2 coats P & L Red Seal Oil Satin Primer/ Paint.

Wood - Painted

2 coats P & L Accolade Primer/ Paint in satin.

DIVISION 10 – SPECIALTIES

101400 Interior Signs

PART 1 GENERAL

1.01 Summary

A. Provide interior sign work as shown and as specified. Comply with applicable provisions of Division 1.

B. Supply and install, complete in place, all signage as indicated on the drawings and specified herein.

1. Provide handicap accessible signage at entry to new toilet rooms.
2. Provide handicap accessible signage on both sides of all power assisted doors.
3. Provide Family Assisted/ Handicap signage at entry to new toilet rooms.

C. Submit proposed sign configurations to ENGINEER for selection and approval.

D. Provide temporary signage as directed by owner for temporary changes in MEN and WOMEN toilet rooms and for way-finding at entrances to accommodate phasing of the work; if needed.

1.02 Submittals

A. Shop Drawings: Submit shop drawings, product data sheets, and schedules. Indicate type of sign, materials, dimensions, colors, graphics, and method of attachment.

B. Color Charts: Submit chart of color combinations for selection by engineer.

C. Samples: Showing color, materials, graphics, sizes, and mounting hardware.

1.03 Regulatory Requirements

A. Signs shall comply with the Americans with Disabilities Act (ADA) of 1990.

B. Signs shall comply with state, local, and ANSI handicapped accessibility requirements.

C. Use personnel thoroughly skilled and familiar with the manufacturer's recommended installation method.

1.04 Delivery, Storage and Handling

A. Ship sign materials including attachment devices carefully packaged to prevent surface damage. Include shop drawings to ensure correct installation and arrangement of all materials.

B. Remove all damaged and unsuitable materials from the jobsite immediately.

C. Store adhesives at ambient room temperature.

PART 2 PRODUCTS

2.01 Manufacturers

A. Signage shall be Adapt as manufactured by Takeform Architectural Graphics, Vista Signage Systems, 2/90 Sign Systems, asi Sign Systems or approved equal.

2.02 Signs

A. Architectural Signage System

1. The signage system shall utilize decorative laminate face with frame and applied graphics including all tactile requirements in adherence to ADA specifications.

B. Materials

1. Sign face shall be made of .035 standard-grade, high pressure surface laminate.
2. The sign core/backer shall be thermo set composite polyester based resin, color impregnated of .25 thickness.
3. Tactile lettering shall be precision machined 1/32” thick, matte polycarbonate and subsurface colored for scratch resistance.

C. Typography

1. Type style: Helvetica medium of height indicated on drawing details. Copy shall be a true, clean, accurate reproduction of helvetica medium. Upper and lower case or all caps as indicated in Sign Type drawings. Letter spacing to be normal and interline spacing shall be set by manufacturer.
2. Arrows, symbols and logo art: to be provided in style, sizes, colors and spacing as shown in drawings.
3. Braille: Grade II perfectly round, clear Braille beads.

D. Colors and Finishes

1. Typography to match existing.
2. Message Background to be selected by A/E: Family restroom
3. Finishes are to meet current Federal ADA and any state requirements.

E. Construction

1. Signage system shall utilize a plastic sphere for Grade II Braille inserted directly into a scratch-resistant, high pressure laminate sign face. Braille dots are to be pressure fit in low tolerance milled holes. Braille dots shall be half hemispherical domed and protruding a minimum .025” in compliance with California State code.
2. Sign face shall be permanently bonded to a composite core and precision machined together to a 90-degree angle. Edges shall be smooth, void chips, burrs, sharp edges, marks and polished to a satin luster.
3. All plaque signs shall have radiused corners of .25”.

2.03 Attachment Devices

A. Provide vandal resistant concealed fasteners for all signs using manufacturer's standard designed for surface indicated.

PART 3 EXECUTION

3.01 Inspection

A. Examine all sub-surfaces to receive the work. Report in writing to general contractor with copy to A/E any detrimental conditions. Failure to observe this injunction constitutes a waiver to any subsequent claims to the contract and hold signage contractor responsible for any corrections A/E may require. Commencement of the work will be construed as acceptance of all subsurfaces.

B. Coordinate required surface corrections with contractor responsible for installation.

C. Installer shall examine signs with general contractor for defects, damage and compliance with specifications. Installation shall not proceed until unsatisfactory conditions are corrected.

3.02 Installation

A. Install all items according to approved shop drawings and manufacturer's written instructions.

B. General: Installation locations shall be according to ADA specifications. Locate signs where indicated on contract drawings, using mounting methods in compliance with manufacturer’s instructions.

1. Signs shall be level, plumb, and at heights indicated, with sign surfaces free from defects.
2. Interior Wall Signs: Unless otherwise indicated, signs shall be installed on walls adjacent to latch side of door. Where not possible, signs shall be installed on nearest adjacent wall. Locate to allow approach within 3 inches (75mm) of sign without encountering protruding objects or standing within swing of door.

C. Units shall be installed rigid, straight, plumb, and level.

D. Provide a secure, vandal-resistant, permanent installation.

3.03 Delivery, Storage, Protection

A. Package to prevent damage or deterioration during shipment, handling, storage and installation. Products should remain in original packaging until removal is necessary.

3.04 Adjust and Clean

A. Clean all signage. Use cleaning agent recommended by manufacturer.

B. Clean premises of all litter, dirt, and debris created by work of this section.

3.05 Warranty

A. Provide manufacturer's five year warranty against defect in materials or workmanship including but not limited to delamination, color change, adhesive loosening, or fading.

102800 Toilet and Bath Accessories

PART 1 GENERAL

1.01 Summary

A. Provide toilet and bath accessories as shown and as specified. Comply with applicable provisions of General Requirements.

B. Provide all of the following accessories for each new toilet room/stall. For accessories specified herein which are not specifically shown on the drawings, coordinate the location with the ENGINEER.

1.02 Related Sections

Plumbing fixtures - Division 22.

1.03 Submittals

A. Submit shop drawings, product data, installation instructions, and maintenance recommendations for each toilet accessory. Provide setting drawings, templates, location of recesses and reinforcement, and instructions for installation of anchorage devices.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

A. Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise approved.

B. Stamped names or labels will not be permitted on exposed faces of units.

C. Products identified in this Section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality, type, and function. Unless otherwise indicated, products of the following manufacturers or equal may be substituted for those listed, provided the substitution is equal in quality, type, and function and meets the specified requirements:

Accessory Specialties.
American Specialties.
Bobrick Washroom Equipment.
Bradley/Washroom Accessories Div.
General Accessory Mfg.
McKinney/Parker.
Tubular Specialties.

2.02 Mirrors (MR1)

A. 1/4" thick, No. 1 (mirror glazing) quality, and clean polished plate/float mirror glass electrolytic ally copper plated, guaranteed against silver spoilage for 15 years. Sizes as noted.

B. Backing shall be resilient, non-absorbent filler material, with not less than 22 ga. galvanized steel backing plate attached to frame with concealed screws, one-piece construction, full height and width of mirror frame. Corrugated cardboard or other moisture absorbent filler material is not acceptable.

C. Construct metal backing with hanger slots for concealed "tamper-proof" mounting. Provide manufacturer's standard hanger to engage with backing for concealed installation.

D. Use one piece roll formed frames, not less than 22 ga., satin finish, type 304 stainless steel, with square corners heli-arc welded and ground smooth.

2.03 Paper Towel Dispenser and Waste Disposal (PTD1)

A. Recessed combination touch less roll-paper-towel dispenser and waste receptacle; with removable/convertible dispenser and receptacle; ADA compliant; 4” recess.

B. All-welded heavy gauge satin-finish stainless steel construction; cabinet with tumbler lock; one-piece 22 gauge beveled flange; 20 gauge one-piece door with full length piano hinge and tumbler lock.

C. Dispenser of high-impact resin materials; to accept standard core non-perforated rolls up to 8” wide and 8” diameter; dispensing 12” length of towel per roll.

D. 18 gallon receptacle of 22 gauge satin-finished stainless steel with hemmed top edges; secured with tumbler lock.

E. Bobrick B-39617.

2.04 Paper Towel Receptacle (PTR)

A. 22 gauge satin finish, type 304 stainless steel for recess into a 4" wall, of one-piece frame construction, 18 gallon receptacle capacity and tumbler lock.

B. Bobrick B-3644

2.05 Foam Soap Dispenser - Sink Mounted (SD1)

A. Touch-free counter-mount foam soap dispenser, with curved chrome spout to compliment lavatory faucet; sanitary-sealed cartridge refill system; 1500 dispenses per refill; low voltage power supply; 3 year warranty.

B. Coordinate location with lavatory supplier to ensure adequate clearance for proper installation.

C. Basis of design: Bobrick B-826 touch free counter mount dispenser.

2.06 Sanitary Napkin Disposal (SND)

A. Partition-mounted feminine napkin disposal unit; fabricated of 22 ga., satin finish, type 304 stainless steel.

B. Provide surface-mounted disposal unit with locking door.

C. Bobrick B-254

2.07 Grab Bars (GB-1, GB-2, GB-3)

A. Satin finish, type 304 stainless steel, 1-1/4" dia. x 18 ga. wall thickness, length as shown on Drawings, inserted into stainless steel flange and continuously heli-arc welded. When mounted, space between bar and wall shall be 1-1/2".

B. Provide grab bars with concealed mountings; Bobrick, Tubular Specialties, Saferail, or approved equal.

2.08 Toilet Paper Holder (TPS/TPD)

A. Surface mounted single roll holders with controlled delivery and theft resistant spindle.

1. Bobrick B273 with 283-604 spindle.

B. At handicap accessible water closets and Family Assisted Toilet Rooms, surface mounted double roll holders without controlled delivery and theft resistant spindle.

1. Bobrick B2740 with 283-604 spindles.

C. Where double roll holders are indicated provide surface mounted double roll dispenser equivalent to specified single roll toilet paper holders.

D. Satin finish stainless steel.

2.09 Electric Hand Dryer (EHD)

A. Heavy duty, rib reinforced cast iron cover with enamel finish. Color to be selected by A/E. Provide no touch operation with electronic sensor to automatically turn on and off dryer when drying hands. Nozzle to be fixed downward. Units shall be rated at 2300 watts, 110/120 volt, and 20 amp. 10-15 second dry time; surface mounted.

B. Air Force J 974 or equal.

2.10 Robe Hub (RH)

A. See section 102113.

B. Provide same or similar style at locations other than toilet partitions as indicated.

2.11 Sharps Receptacle (SR)

A. Uline Wall surface mounted cabinet #S-15309 with tumbler lock containing receptacle #S15308 for safe secured one-way disposal of used hypodermic needles.

2.12 Baby Changing Station (BCS)

A. Horizontal, wall-mounted, fold-open polyethylene with concealed stainless steel hinges, contoured bed, instruction graphics, 250 pound capacity, ADA compliant. Blank-out liner dispenser.

B. Bobrick/Koala KB200-00, cream color.

2.13 Inserts and Anchorages

A. Furnish inserts and anchoring devices for installation of toilet accessories.

PART 3 EXECUTION

3.01 Inspection

A. Examine conditions under which toilet and bath accessories are to be installed. Notify of detrimental conditions. Do not proceed until unsatisfactory conditions have been corrected.

B. Conduct pre-installation meeting with owner to confirm locations noted and resolve potential interferences.

3.02 Installation

A. Use concealed fastenings wherever possible, and as designated. Provide anchors, bolts and other necessary fasteners, and attach accessories securely to walls and partitions in locations as shown and according to manufacturer's instructions.

B. Install concealed mounting devices and fasteners fabricated of same material as accessories or of galvanized steel.

C. Install exposed mounting devices and fasteners finished to match accessories.

D. Provide theft-resistant fasteners for all accessory mountings.

DIVISION 12 – FURNISHINGS

124813 Recessed Floor Grates

PART 1 GENERAL

1.01 Summary

A. Remove and relocate recessed floor grate as shown and as specified. Comply with applicable provisions of Div. 1.

1.02 Design Criteria
A. Grid and framing sections, when installed, shall be designed to support a minimum 200 lbs. per square foot uniform load.

1.03 Submittals
A. Submit shop drawings and/or sample of new aluminum angle.

PART 2 PRODUCTS

2.01 General
A. Relocate recessed heavy-duty foot grilles in sizes and quantities as indicated on drawings, as manufactured by J.L. Industries, Construction Specialties, Inc./Pedigrid, Reese, Pawling, or equal.

2.02 Grid
A. Use existing grid and inserts.

2.03 Framing
A. New framing members shall have angle or ledge frame. Members shall be fabricated of 6063-T52 aluminum alloy, neatly coped at corners and assembled with #14 stainless steel screws to provide for rigid frame connections. Surfaces in contact with masonry shall receive one shop coat of zinc chromate primer. All other aluminum surfaces shall have a mill finish.

PART 3 EXECUTION

3.01 Installation
A. Install according to approved shop drawings and manufacturer's recommendations. Recess frame to receive adjacent flooring materials. Screed a recessed cement base inside frame using edge of frame as a guide and slope to floor drain.

B. In order to ensure proper performance of the entire assembly, it is absolutely necessary that framing members be installed in a level and accurate plane. Contractor shall follow manufacturer's installation instructions provided with each shipment.

127550 Interior Benches

PART 1 GENERAL

1.01 Summary
A. Remove, salvage and relocate interior benches in lobby as shown and as specified. Comply with applicable provisions of Division 1.

PART 2 PRODUCTS

2.02 Manufacturer and Product
A. Existing backless benches on steel pedestals with mounting plates anchored to base slab below ceramic floor tile.

PART 3 EXECUTION

3.01 Installation

A. Re-install as originally installed, with base plate fasteners fully concealed below floor tile.

DIVISON 22 - PLUMBING

224000 – Plumbing Specialties

PART 1 GENERAL

1.01 Related Documents

A. Drawings and general provisions of the Contract, including Standard Specification, apply to this section.

1.02 Summary

A. This section includes the following conventional plumbing fixtures and related components:

1. Flush-o-meters.
2. Water closets.
3. Lavatories

1.03 Submittals

A. Shop Drawings: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

B. Operation and Maintenance Data: For plumbing fixtures to include in operation and maintenance manuals.

C. Warranty: Special warranty specified in this Section.

1.04 Quality Assurance

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.

1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act" ; for plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

E. NSF Standard: Comply with NSF 61, "Drinking Water System Components—Health Effects," for fixture materials that will be in contact with potable water.

F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

1.05 Warranty

A. Warranty Period for Commercial Applications of Electronic Controls: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 Flush-o-meters

A. Flush-o-meters, Urinal: (for replacement of existing)

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Sloan Valve Company (Model 195-1.0 ES-SM).
   b. Zurn Plumbing Products Group.
2. Description: Flush-o-meter for urinal-type fixture. Include brass body with corrosion-resistant tubing, and polished chrome-plated finish on exposed parts.
   a. Internal Design: Diaphragm or piston operation.
   b. Style: Concealed.
   c. Inlet Size: NPS 3/4.
   d. Trip Mechanism: Hard-wired, electric-sensor actuator.
   e. Consumption: 1.0 gal./flush.
   f. Tailpiece Size: NPS 3/4 and standard length to top of bowl.
   g. Operations: Infrared Sensor with indicator light with push button override.

B. Flush-o-meters, Water Closet: (for replacement of existing)

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Sloan Valve Company (Model 152 ES-SM).
   b. Zurn Plumbing Products Group.

2. Description: Flush-o-meter for water-closet-type fixture. Include brass body with corrosion-resistant internal components, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.
   a. Internal Design: Diaphragm or piston operation.
   b. Style: Concealed.
   c. Inlet Size: NPS 1.
   d. Trip Mechanism: Hard-wired, electric-sensor actuator w/ manual pushbutton.
   e. Consumption: 3.5 gal./flush.
   f. Tailpiece Size: NPS 1-1/2 and standard length to top of bowl.
   g. Operations: Infrared Sensor with indicator light with push button override.

2.02 Water Closets for new Family Assisted Rest Rooms

A. Water Closets

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kohler, American Standard, Crane, Sloan
2. Description: As scheduled on Drawing P-001.
3. Basis of Design: As scheduled on Drawing P-001.

B. Seats

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kohler, American Standard, Crane, Bemis, Beneke
2. Description: As scheduled on Drawing P-001.
3. Basis of Design: As scheduled on Drawing P-001.

C. Flush-o-meter

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kohler, American Standard, Delany, Sloan
2. Description: As scheduled on Drawing P-001.
3. Basis of Design: As scheduled on Drawing P-001.

2.03 Lavatories for new Family Assisted Rest Rooms

A. Lavatory

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Kohler, American Standard, Crane
2. Description: As scheduled on Drawing P-001.

3. Basis of Design: As scheduled on Drawing P-001.

B. Faucet

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Moen Commercial, Kohler, Chicago Faucet
2. Description: Maximum 2 gpm flow/ .25 gallons per cycle (based on inlet pressure of 60 psi), battery powered sensor activated, 4" deck plate. As scheduled on Drawing P-001.
3. Basis of Design: As scheduled on Drawing P-001.

C. Other components

1. Drain: Chicago Faucet Co. #337-CP perforated strainer and 1-1/4" offset tailpiece or equivalent by: Engineered Brass Co., Kohler, Watts, Wade, Jr. Smith, or Josam.
2. Trap: 1-1/4" X 1-1/2" 17 ga. cast brass trap and tubular wall bend, with C.O. plug. Acceptable manufacturers: Kohler, McGuire, Dearborn, Engineered Brass Co.
3. Supplies and stops: Chicago Faucet No. 1006CP or equivalent by T&S Brass, McGuire.
4. Carriers and supports: Smith floor mounted concealed arm adjustable, or equivalent by Josam, Smith, Wade, Watts Drainage American Standard, Kohler, Crane. Mount fixture at ADA height.
5. Mixing valve: As scheduled on Drawing P-001 under lavatory faucet description.

PART 3 EXECUTION

3.01 Examination

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Installation

A Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions. Set level and plumb. Secure in place to counters, floors and walls providing solid bearing and secure mounting. Bolt fixture carriers to floor and wall. Secure rough-in fixture piping to prevent movement of exposed piping.

B. Install each fixture with trap easily removable for servicing and cleaning. Install fixture stops in readily accessible location for servicing.

C. Install flush-o-meter valves for accessible water closets and urinals with push button mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

D. Install barrier free fixtures in compliance with IBC 1108 and 3408, Comm 52, 69 and Federal ADA Accessibility Guidelines. Install barrier free lavatory traps parallel and adjacent to wall and supplies and stops elevated to 27" above floor to avoid contact by wheelchair users.

E. Provide a stop valve for each fixture, heavy duty type with brass stems and screwed or sweat inlet connections. Compression type inlets are not acceptable.

F. Cover pipe penetration with escutcheons. Exposed traps, stops, piping and escutcheons to be chrome plated brass, same items in concealed locations may be of rough brass finish.

G. Set floor mounted water closets, counter mounted lavs and sinks, lav and sink faucets and drains with full setting bed of flexible non-staining plumber's putty. Cover exposed water closet bolts with bolt covers.

H. Seal openings between walls, floors and fixtures with mildew-resistant silicone sealant same color as fixture.

3.02 Connections

A. Drawings indicate general arrangement of piping, fittings, and specialties. Contractor shall verify pipe sizes and connections prior to ordering flush-o-meter valves.

B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to NFPA standards.

D. Connect wiring according to NFPA standards.

3.03 Field Quality Control

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

E. Install fresh batteries in sensor-operated mechanisms.

3.04 Adjusting

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Operate and adjust controls. Replace damaged and malfunctioning units and controls.

C. Adjust water pressure at flush-o-meter valves to produce proper flow and stream.

3.05 Cleaning

A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.

B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.06 Protection

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by owner.

DIVISION 26 - ELECTRICAL

260500 Common Work Results for Electrical

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.

3. Sleeve seals.
4. Common electrical installation requirements.

1.03 Definitions

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.04 Submittals

A. No Submittal Required.

1.05 Coordination

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right-of-way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wire ways, cable trays, and bus ways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

D. Coordinate sleeve selection and application with selection and application of fire stopping specified in Division 07.

PART 2 - PRODUCTS

2.01 Sleeves for Raceways and Cable

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water stop, unless otherwise indicated.

2.02 Sleeve Seals

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel] of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.03 Grout

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.01 Common Requirements For Electrical Installation

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right-of-Way: Give to piping systems installed at a required slope.

3.02 Sleeve Installation For Electrical Penetrations

A. Electrical penetrations occur when raceways, cables, wire ways, cable trays, or bus ways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fire stop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with fire stop materials.

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.03 Sleeve-Seal Installation

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.04 Fire stopping

A. Apply fire stopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

3.05 Field Quality Control

A. Inspect installed sleeve and sleeve-seal installations and associated firestopping for damage and faulty work. Replace sleeve and sleeve-seals that are damaged or faulty.

260519 - Low-Voltage Electrical Power Conductors and Cables

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.03 Submittals

A. No Submittal Required.

1.04 Quality Assurance

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 Conductors and Cables

A. Copper Conductors: Comply with NEMA WC 70.

B. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

C. All conductors shall be rated 600 volts.

D. Branch circuit wire sizes not shown on the drawings shall be #12 AWG minimum.

E. Control circuit wire sizes not shown on the drawings shall be #14 AWG minimum.

2.02 Connectors and Splices

A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

1. Split Bolt Connectors: Not acceptable.
2. Solderless Pressure Connectors: High copper alloy terminal. May be used only for cable termination to equipment pads or terminals. Not approved for splicing.
3. Spring Wire Connectors: Solderless spring type pressure connector with insulating covers for copper wire splices and taps. Use for conductor sizes 10 AWG and smaller.
4. All wire connectors used in underground or exterior pull boxes shall be gel filled twist connectors or a connector designed for damp and wet locations.
5. Mechanical Connectors: Bolted type tin-plated; high conductivity copper alloy; spacer between conductors; beveled cable entrances.

6. Compression (crimp) Connectors: Long barrel; seamless, tin-plated electrolytic copper tubing; internally beveled barrel ends. Connector shall be clearly marked with the wire size and type and proper number and location of crimps.

PART 3 - EXECUTION

3.01 Conductor Material Applications

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.02 Conductor Insulation and Wiring Methods

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

E. Feeders Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.

F. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

3.03 Installation of Conductors and Cables

A. Wire and cable routing is shown diagrammatically on the drawings and is approximate unless dimensioned. Route wire and cable as required to meet project conditions.

B. All power, control and instrument wiring shall be installed in conduit unless specifically indicated otherwise.

C. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

D. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

E. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

F. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

G. Support cables according to Division 26.

H. Identify and color-code conductors and cables according to Division 26.

3.04 Connections

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

D. All conductors terminated with crimp type devices must be stranded.

E. Stranded conductors may only be terminated with UL or ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device.

3.05 Fire stopping

A. Apply fire stopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

260526 - Grounding And Bonding For Electrical Systems

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes methods and materials for grounding systems and equipment.

1.03 Submittals

A. None required.

1.04 Quality Assurance

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.01 Conductors

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

2.02 Connectors

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

PART 3 - EXECUTION

3.01 Applications

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.02 Equipment Grounding

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.

3.03 Installation

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

C. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

260529 - Hangers And Supports For Electrical Systems

PART 1 - GENERAL

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

1.02 Summary
A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.03 Definitions
A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

D. MFMA-4: Metal Framing Manufacturers Association.

E. MSS: Manufacturers Standardization Society of the Pipe, Valve, and Fitting Industry.

1.04 Performance Requirements
A. Provide supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

1.05 Submittals
A. No Submittal Required.

1.06 Quality Assurance
A. Comply with NFPA 70.

1.07 Coordination
A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.01 Support, Anchorage, And Attachment Components
A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
2. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used. Plastic type expansion anchors are unacceptable.
2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A325.
5. Toggle Bolts: All-steel springhead type.
6. Hanger Rods: Threaded steel.

2.02 Fabricated Metal Equipment Support Assemblies

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.01 Application

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps.

D. All supports installed outside, exposed to the weather, or inside in wet or damp areas shall utilize corrosion resistant supports, fittings, hardware, conduit clamps and all accessories.

3.02 Support Installation

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. All electrical fixtures, devices, and equipment shall be securely mounted to building structure and shall not depend upon ceiling or wall surfaces for their support. They shall be incapable of being rotated or displaced.

E. Do not fasten supports to piping, ductwork, mechanical equipment, cable tray, conduit, or any other surface not a part of the building structure or other structural surface.

F. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panel boards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

G. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

H. Do not drill or weld structural steel members unless approved by engineer.

3.03 Installation Of Fabricated Metal Supports

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.04 Painting

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

260533 - Raceway and Boxes for Electrical Systems

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.03 Definitions

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.04 Submittals

A. No Submittal Required.

1.05 Quality Assurance

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.06 Coordination

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.01 Metal Conduit and Tubing

A. Rigid Steel Conduit: ANSI C80.1.

B. IMC: ANSI C80.6.

C. EMT: ANSI C80.3.

D. FMC: Zinc-coated steel.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Fittings for EMT: Steel or die-cast, compression type.

G. Expansion Fittings: Type XJ with copper bonding jumpers.

2.02 Nonmetallic Conduit and Tubing

A. ENT: NEMA TC 13.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

C. LFNC: UL 1660.

D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

E. Fittings for LFNC: UL 514B.

2.03 Surface Raceways

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer’s standard finish.

B. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

2.04 Boxes, Enclosures, And Cabinets

A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

D. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

E. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

F. Cabinets:

1. NEMA 250, Type 1 unless stated otherwise on drawings, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panel boards.
4. Metal barriers to separate wiring of different systems and voltage.

PART 3 - EXECUTION

3.01 Raceway Application

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: Rigid steel conduit.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
4. Damp or Wet Locations: EMT.
5. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 3R, powder coated steel in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. Rigid Nonmetallic Conduit: Use PVC fittings, unless otherwise indicated.

3.02 Installation

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26.

E. Install temporary closures to prevent foreign matter from entering raceways.

F. Unused openings in boxes and fittings shall be plugged with suitable devices rated for the proper environment.

G. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

H. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

I. Conceal conduit and EMT within finished walls, and ceilings, unless otherwise indicated.

J. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.

1. Run parallel or banked raceways together on common supports.
2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

K. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

L. Conduit shall not be routed under floor slab unless specifically noted on drawings.

M. All conduit installed outside exposed to the weather and in wet locations shall utilize sealing locknuts and bushings.

N. Provide polished stainless steel escutcheon plates to provide smooth cleanable surfaces at wall penetrations. Affix plate securely to surface and caulk around plate.

O. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

P. Join raceways with fittings designed and approved for that purpose and make joints tight.

Q. Terminations:

1. When raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

S. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

T. Expansion fittings shall be installed across expansion joints in structures and concrete construction where such joints are shown on the architectural and structural drawings.

U. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

V. Locate and install boxes to allow access to them. Where installation is inaccessible, coordinate locations and provide 18 inch by 24 inch access doors.

W. No back to back outlet boxes shall be installed.

X. Electrical box locations shown on drawings are approximate unless dimensioned. Verify location of floor boxes and outlets in offices and work areas prior to rough-in.

Y. No outlet shall be located where it will be obstructed by other equipment, piping, lockers, benches, counters, etc.

Z. It shall be the contractor’s responsibility to study drawings pertaining to other trades, to discuss location of outlets with workmen installing other piping and equipment and to fit all electrical outlets to job conditions.

AA. The proper location of each outlet is considered a part of this contract and no additional compensation will be paid to the contractor for moving outlets which were improperly located.

BB. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

CC. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

DD. Set metal floor boxes level and flush with finished floor surface.

EE. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.03 Fire stopping

A. Apply fire stopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Fire stopping materials and installation requirements are specified in Division 07.

3.04 Protection

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

260543 – Underground Ducts and Raceways for Electrical Systems

PART 1 GENERAL

1.01 Summary

A. Section Includes:

1. Direct-buried conduit, ducts, and duct accessories.
2. Handholes and boxes.

1.02 Action Submittals

A. Product Data: For each type of product.

1. Include ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
2. Include accessories for manholes, handholes, boxes.

B. Shop Drawings:

1. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:
   a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
   b. Include duct entry provisions, including locations and duct sizes.
   c. Include cover design.

1.03 Field Conditions

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by owner or others unless permitted under the following conditions, and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify owner no fewer than two days in advance of proposed interruption of electrical service.

2. Do not proceed with interruption of electrical service without owner's written permission.

B. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.

PART 2 PRODUCTS

2.01 Metal Conduit And Fittings

A. GRC: Comply with ANSI C80.1 and UL 6.

B. Manufacturers: Subject to compliance with requirements, provide products that may be incorporated into the Work by manufacturers that comply with performance requirements listed in this section, in Wisconsin Department of Transportation standard specifications, and shown on drawings and schedules.

C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.02 Rigid Nonmetallic Duct

A. Underground Plastic Utilities Duct: Type EPC-40 complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as the duct.

B. Manufacturers: Subject to compliance with requirements, provide products that may be incorporated into the Work by manufacturers that comply with performance requirements listed in this section, in Wisconsin Department of Transportation standard specifications, and shown on drawings and schedules.

C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

D. Solvents and Adhesives: As recommended by conduit manufacturer.

2.03 Flexible Nonmetallic Ducts

A. HDPE Duct: Type EPEC-40 HDPE, complying with NEMA TC 7 and UL 651A.

B. Manufacturers: Subject to compliance with requirements, provide products that may be incorporated into the Work by manufacturers that comply with performance requirements listed in this section, in Wisconsin Department of Transportation standard specifications, and shown on drawings and schedules.

C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.04 Polymer Concrete Handholes And Boxes With Polymer Concrete Cover

A. General Requirements for Handholes and Boxes: Comply with SCTE 77. Comply with tier requirements indicated on drawings.

1. Color: Gray
2. Configuration: Units shall be designed for flush burial and have closed bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "WISDOT ITS."
6. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
7. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

B. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

C. Manufacturers: Subject to compliance with requirements, provide products that may be incorporated into the Work by manufacturers that comply with performance requirements listed in this section, in Wisconsin Department of Transportation standard specifications, and shown on drawings and schedules.

2.05 Source Quality Control

A. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
2. Testing machine pressure gages shall have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 EXECUTION

3.01 Preparation

A. Coordinate layout and installation of ducts, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify owner if there is a conflict between areas of excavation and existing structures to remain.

B. Coordinate elevations of ducts into handholes and boxes with final locations and profiles of ducts, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct runs drain to handholes.

C. Site Clearing

1. Protect and maintain benchmarks and survey control points from disturbance during construction.
2. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.
3. Mark location of utilities. Protect and maintain in safe and operable condition the utilities to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities and the owner.
4. Protect existing site improvements to remain from damage during construction.
5. Restore damaged improvements to their original condition, as acceptable to owner.

D. Existing Utilities

1. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
2. Arrange with utility companies to shut off utilities.
3. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
    a. Notify owner not less than two days in advance of proposed utility interruptions.
    b. Do not proceed with utility interruptions without owner's written permission.

E. Disposal of Surplus and Waste Materials

1. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off owner's property.

3.02 Underground Duct Application

A. Ducts for Communications Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank unless otherwise indicated.

B. Bored Underground Duct: Type EPEC-40-HDPE unless otherwise indicated.

C. Underground Ducts Crossing Paved Paths, Walks, Driveways, and Roadways: RNC, NEMA Type EPC-40-PVC, HDPE.

3.03 Underground Enclosure Application

A. Handholes and Boxes for 600 V and Less:

1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 22 structural load rating.
2. Cover design load shall not exceed the design load of the handhole or box.

3.04 Earthwork

A. Restore surface features at areas disturbed by excavation and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

B. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary top soiling, fertilizing, liming, seeding, sodding, sprigging, and mulching.

C. Cut and patch existing pavement in the path of underground ducts and utility structures unless otherwise noted on drawings.

D. Cutting and Patching General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
2. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties
3. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
4. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
    a. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
    b. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
    c. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

d. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
e. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
f. Proceed with patching after construction operations requiring cutting are complete.

3.05 Duct Installation

A. Install ducts according to NEMA TCB 2.

B. Slope: Pitch ducts a minimum slope of 1:300 down toward handholes and away from buildings and equipment. Slope ducts from a high point in runs between two handholes, to drain in both directions.

C. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends, both horizontally and vertically, at other locations unless otherwise indicated.

D. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions.

E. Duct Entrances to Polymer Concrete Handholes: Use end bells, spaced proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell without reducing duct line slope and without forming a trap in the line.
2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit around disturbed earth adjacent handhole. Install an expansion fitting near the center of all straight line direct-buried duct banks with calculated expansion of more than 3/4 inch.
3. Grout end bells into structure walls from both sides to provide watertight entrances.

F. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet outside the building wall, without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.

G. Pulling Cord: Install 100-lbftest nylon cord in empty ducts.

H. Direct-Buried Duct Banks:

1. Excavate trench bottom to provide firm and uniform support for duct.
2. Width: Excavate trench 3 inches wider than duct on each side.
3. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.

3.06 Installation Of Handholes And Boxes Other Than Precast Concrete

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and traffic ways, set cover flush with finished grade. Set covers of other handholes 1 inch above finished grade.

D. Install handholes and boxes with bottom below frost line.

E. Field cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.07 Grounding

A. Ground underground ducts and utility structures.

3.08 Field Quality Control

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 6-inch- long mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
3. Test handhole grounding to ensure electrical continuity of grounding and bonding connections.

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.09 Cleaning

A. Clean internal surfaces of handholes and duct according to manufacturer’s recommendations.

260923 - Lighting Control Devices

PART 1 - GENERAL

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

1.02 Summary
A. This Section includes the following lighting control devices:

1. Outdoor and indoor photoelectric switches.
2. Indoor occupancy sensors.
3. Lighting contactors.

1.03 Definitions
A. LED: Light-emitting diode.

B. PIR: Passive infrared.

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

B. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.05 Quality Assurance
A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked.

1.06 Coordination
A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.01 Outdoor Photoelectric Switches
A. Description: Solid state, with SPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.

1. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lx), with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of photocell to prevent fixed light sources from causing turn-off.
2. Time Delay: 15-second minimum, to prevent false operation.
3. Mounting: Fixed base for conduit mounting and capable of being wall mounted.
4. Shall fail in ON position.

2.02 Indoor Photoelectric Switches

A. Ceiling-Mounted Photoelectric Switch: Solid-state, light-level sensor unit, with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photo resistors are not acceptable.

1. Lens or angled entrance to photocell to prevent false shutoff.
2. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20-A ballast load at 120V ac.
4. Light-Level Monitoring Range: 10 to 200 fc (108 to 2152 lx), with a digital foot-candle adjustment for turn-on and turn-off levels throughout that range.
5. Time Delay: Adjustable up to minimum 20 minutes to prevent cycling, with dead band adjustment.
6. Indicator: LED(s) to indicate the beginning of on-off cycles.
7. Shall fail in ON position.

2.03 Indoor Occupancy Sensors

A. General Description: Ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20-A ballast load at 120V ac.
4. Mounting:
    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed.
5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
6. Bypass Switch: Override the on function in case of sensor failure.

B. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.

1. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm).
2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
3. Detection Coverage (Corridor): Detect occupancy within 90 feet (27.4 m) when mounted on a 10-foot- (3-m-) high ceiling.

C. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.

1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. (56 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
3. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet (27.4 m) when mounted on a 10-foot- (3-m-) high ceiling in a corridor not wider than 14 feet (4.3 m).

2.04 Lighting Contactors

A. Description: Electrically operated and mechanically held, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Control-Coil Voltage: Match control power source.

PART 3 - EXECUTION

3.01 Sensor Installation

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

B. All lighting control units shall be installed in an appropriate enclosure for the type of environment encountered. No exposed wiring shall be permitted inside of the building or pedestal mounted enclosure in which this equipment is installed.

C. Photoelectric switches shall be oriented to the north or east with only eye visible from the exterior of the enclosure.

3.02 Wiring Installation

A. Wiring Method: Comply with Division 26.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and non-power limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.03 Identification

A. Identify components and power and control wiring according to Division 26.

1. Identify controlled circuits in lighting contactors.

B. Label time switches and contactors with a unique designation.

3.04 Field Quality Control

A. Perform the following field tests and inspections:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device, including operation of photo eyes at sunset or sunrise, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

C. Remove and replace lighting control devices where test results indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at contractor’s expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.05 Training

A. Spend at least two hours training two owner-specified personnel in operation and maintenance of lighting control devices using O&M manuals.

262416 - Panel boards

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. Section Includes:

1. Distribution panel boards.
2. Lighting and appliance branch-circuit panel boards.

1.03 Definitions

1.04 Submittals

A. Product Data: For each type of panel board, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panel board and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panel boards and overcurrent protective devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
6. Component list.
7. Cable terminal sizes.
8. Breaker layout drawing with dimensions indicated and nameplate designation.

1.05 Quality Assurance

A. Source Limitations: Obtain panel boards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.06 Delivery, Storage, And Handling

A. Remove loose packing and flammable materials from inside panel boards; install temporary electric heating (250 W per panel board) to prevent condensation.

B. Handle and prepare panel boards for installation according to NEMA PB 1.

1.07 Project Conditions

A. Environmental Limitations:

1. Do not deliver or install panel boards until spaces are enclosed and weather tight, wet work in spaces is complete and dry, work above panel boards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
    a. Ambient Temperature: Not exceeding 23 deg F (minus 5 deg C) to plus 104 deg F (plus 40 deg C).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.

1.08 Coordination

A. Coordinate layout and installation of panel boards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.09 Extra Materials

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Six spares for each type of panel board cabinet lock.

PART 2 - PRODUCTS

2.01 General Requirements For Panel boards

A. Enclosures: Surface-mounted cabinets.

1. Rated for environmental conditions at installed location. Provide the following minimum requirements, unless noted otherwise on the drawings.
   a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Finishes:
   a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
   b. Back Boxes: Same finish as panels and trim.
4. Directory Card: Inside panel board door, mounted in metal frame with transparent protective cover.

B. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

C. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Main and Neutral Lugs: Mechanical type.
3. Ground Lugs and Bus-Configured Terminators: Compression type.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

D. Service Equipment Label: NRTL labeled for use as service equipment for panel boards.

E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

F. Panel board Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

G. Panel board Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.02 Distribution Panel boards

A. Panel boards: NEMA PB 1, power and feeder distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

C. Mains: Thermal-Magnetic circuit breaker or lugs only, as shown on drawings.

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Thermal-Magnetic Bolt-on circuit breakers.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Thermal-Magnetic Bolt-on circuit breakers.

2.03 Lighting And Appliance Branch-Circuit Panel boards

A. Panel boards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or lugs only, as shown on drawings.

C. Branch Overcurrent Protective Devices: Thermal-Magnetic Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Hinged; secured with flush latch with tumbler lock; keyed alike.

2.04 Disconnecting And Overcurrent Protective Devices

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating and interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Compression or Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding high-intensity discharge (HID) lighting circuits.
    d. Multiple units enclosed in a single housing or factory assembled to operate as a single unit.
    e. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

2.05 Accessory Components And Features

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

PART 3 - EXECUTION

3.01 Examination

A. Receive, inspect, handle, and store panel boards according to NECA 407.

B. Examine panel boards before installation. Reject panel boards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panel boards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Installation

A. Install panel boards and accessories according to NECA 407.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panel boards.

C. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.

D. Mount panel board cabinet plumb and rigid without distortion of box. Mount recessed panel boards with fronts uniformly flush with wall finish and mating with back box.

E. Install overcurrent protective devices and controllers not already factory installed.

F. Install filler plates in unused spaces.

G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

H. Comply with NECA 1.

3.03 Identification

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26.

B. Create a directory to indicate installed circuit loads; incorporate owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panel board Nameplates: Label each panel board with a nameplate complying with requirements for identification specified in Division 26.

D. Device Nameplates: Label each branch circuit device in distribution panel boards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.04 Field Quality Control

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panel board bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:
    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panel board. Remove front panels so joints and connections are accessible to portable scanner.
    b. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

C. Panel boards will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports, including a certified report that identifies panel boards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.05 Adjusting

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

3.06 Protection

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

262726 - Wiring Devices

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:

1. Receptacles.
2. Snap switches and wall-box dimmers.
3. Wall plates.

1.03 Definitions

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.04 Submittals

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

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.05 Quality Assurance

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.06 Coordination

PART 2 - PRODUCTS

2.01 Straight Blade Receptacles

A. Convenience Receptacles, Heavy-Duty grade, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

2.02 GFCI Receptacles

A. General Description: Straight blade, Heavy-duty grade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, configuration5-20R, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

2.03 Snap Switches

A. Comply with NEMA WD 1 and UL 20.

B. Switches, Heavy-duty grade, 120/277 V, 20 A:

C. Key-Operated Switches, 120/277 V, 20 A:

1. Description: Single pole, with factory-supplied key in lieu of switch handle. Provide two spare keys for every switch.

2.04 Communications Outlets

A. Telephone Outlet:

1. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e. Comply with UL 1863.

2.05 Wall Plates

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant thermoplastic with lockable cover.

2.06 Finishes

A. Color:

1. Wiring Devices Connected to Normal Power System: Match existing, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.01 Installation

A. Coordination with Other Trades:

1. Take steps to ensure those devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

B. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA70, Article 300, without pigtails.
4. Existing Conductors:
   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pig tailing existing conductors is permitted provided the outlet box is large enough.

C. Device Installation:

1. Install devices and assemblies level, plumb, and square with building lines.
2. Connection to receptacles and switches shall utilize screw terminals. Plug-in connections are not acceptable.
3. Remove wall plates and protect devices and assemblies during painting.

4. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
5. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
6. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
7. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
8. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
9. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
10. Tighten unused terminal screws on the device.
11. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
12. Receptacles shall have a bonding conductor from grounding terminal to the ground system. Self-grounding receptacles using mounting screws as bonding means are not acceptable.
13. GFCI receptacles shall be installed in a non-feed through configuration, with a GFCI receptacle in each location indicated on drawings, unless otherwise indicated.

D. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

E. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.

3.02 Identification

A. Comply with Division 26.

3.03 Field Quality Control

A. Perform tests and inspections.

1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
2. Test GFCI operation with both local and remote fault simulations according to manufacturer’s written instructions.

B. Remove malfunctioning units, replace with new units, and retest as specified above.

265100 - Lighting

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:

1. Interior lighting fixtures, lamps, and ballasts.
2. Lighting fixture supports.

1.03 Definitions

A. BF: Ballast factor.
B. CRI: Color-rendering index.
C. CU: Coefficient of utilization.
D. FMG: Factory Mutual Group
E. LER: Luminaire efficacy rating.
F. Luminaire: Complete lighting fixture, including ballast housing if provided.
G. RCR: Room cavity ratio.

1.04 Submittals

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Ballast.
3. Energy-efficiency data.
4. Life, output, and energy-efficiency data for lamps.
5. Photometric data, in IESNA format, based on laboratory tests of each lighting fixture type, outfitted with lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this project.
    a. Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.

B. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

C. Warranties: Special warranties specified in this Section.

1.05 Quality Assurance

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

D. All lamps shall be new and delivered to the job in sealed cartons protected from dirt and dust during storage on the project. Lamps shall be taken directly from the cartons and installed in the fixture with special care so that they do not become dusty and are not soiled in the operation.

1.06 Coordination

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.07 Extra Materials

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: Furnish one of each type.
2. Plastic Diffusers and Lenses: Furnish at least two of each type.
3. Ballasts: Furnish one of each type of ballasts installed.

PART 2 - PRODUCTS

2.01 Lighting Fixtures And Components, General Requirements

A. Provide fixtures as indicated on drawings.

B. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

D. Metal Parts: Free of burrs and sharp corners and edges.

E. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

G. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: 90 percent.

H. Plastic Diffusers, Covers, and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
   a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless different thickness is indicated.
   b. UV stabilized.
2. Glass: Annealed crystal glass, unless otherwise indicated.

2.02 Ballasts for Linear Fluorescent Lamps

A. Electronic Ballasts: Comply with ANSI C82.11; rapid programmed-start type, unless otherwise indicated, and designed for type and quantity of lamps served. Ballasts shall be designed for full light output unless dimmer or bi-level control is indicated.

1. Sound Rating: A.
2. Total Harmonic Distortion Rating: Less than 10 percent.
3. Transient Voltage Protection: IEEE C62.41, Category A or better.
4. Operating Frequency: 42 kHz or higher.
5. Lamp Current Crest Factor: 1.7 or less.
6. BF: See plans.
7. Power Factor: 0.95 or higher.
8. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C 82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.
9. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.

B. Single Ballasts for Multiple Lighting Fixtures: Factory-wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

2.03 Fluorescent Lamps

A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

B. T8 rapid-start low-mercury lamps, rated 32 W maximum, nominal length of 48 inches (1220 mm), CRI 80 (minimum), color temperature 4100 K, and average rated life 20,000 hours, unless otherwise indicated. See plans for further details.

C. T8 rapid-start low-mercury lamps, rated 17 W maximum, nominal length of 24 inches (610 mm), CRI 80 (minimum), color temperature 4100 K, and average rated life of 20,000 hours, unless otherwise indicated. See plans for further details.

2.0 Lighting Fixture Support Components

A. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gauge (2.68 mm).

PART 3 - EXECUTION

3.01 Installation

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

1. The contractor shall install fixture supports as required to support all lighting fixtures adequately, providing extra steel work for the support of the fixtures if required. Any components necessary for mounting fixtures shall be provided by the contractor.

B. Adjust amiable lighting fixtures to provide required light intensities.

C. Connect wiring according to Division 26.

D. Bond fixtures and metal accessories to branch circuit equipment grounding conductor.

E. All fixtures shall be checked and cleaned if necessary prior to installing lamps in fixtures.

F. Contractor shall re-lamp any fixtures that have failed until substantial completion of the project at no additional cost to the owner.

DIVISION 27 – LOW VOLTAGE CABLING

SECTION 271000 – STRUCTURED CABLING SYSTEM

PART 1 GENERAL

1.01 Related Documents

A. T-series drawings.

B. Section 272000 “Data Communications Active Equipment”.

C. Section 282000 “Video Surveillance System”.

1.02 Summary

A. This Section covers items that are common to all components of a Structured Cabling System (Equipment Room Fittings, Communications Horizontal Cabling, Communications Backbone Cabling, etc.).

B. Where cabling specified in this section is to be used by equipment specified in other sections, the contractor installing the structured cabling shall coordinate with the other contractor(s) for the connection of that equipment.

1.03 Abbreviations and Acronyms

A. The following Abbreviations and Acronyms apply to this document. Some or all may apply to the project.

8P8C	Eight-Position, Eight-Conductor (Modular Jack type)
ACR-N*	Attenuation-to-Crosstalk Ratio (Near End)
ACR-F*	Attenuation-to-Crosstalk Ratio (Far End; prev. Equal Level Far End Crosstalk (ELFEXT))
APC	Angled Physical Contact (fiber optic connector end-face)
AXT	Alien Crosstalk
HC	Horizontal Cross-connect
IC	Intermediate Cross-connect
IDC	Insulation displacement connector
MC	Main Cross-connect
N	Newton (a unit of force)
NEXT*	Near End Cross Talk
PC	Physical Contact (fiber optic connector end-face)
RJ45	(RJ45S) Registered Jack (8P8C), keyed
RU	(Equipment) Rack Unit; 1.75-inches vertical spacing
RL	Return Loss
SFF	Small Form Factor (Fiber Optic Connector)
UPC	Ultra-Physical Contact (fiber optic connector end-face)
VCSEL	Vertical-Cavity Surface Emitting LASER
WAP (AP)	Wireless Access Point (Access Point)

* Power-sum versions of these tests indicated by prefix “PS-“.

1.04 Definitions

A. The following definitions apply to this document and its companion sections for clarification and direction. Some or all may apply to the project.

Channel	The end-to-end transmission path connecting interfaces of any two pieces of application-specific equipment. Equipment cords and work area cords are included in the channel.
Cross-Connect (X-C),	A facility enabling the termination of cable elements and their interconnection or cross-connection.
Cross-Connection	A connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end.
Horizontal Cross-Connect (H-C)	[A group of connectors (e.g., patch panels, punch-down blocks) that allow (HC) horizontal, backbone, and equipment cabling to be cross-connected with patch cords or jumpers.
Main Cross-Connect (MX-C)	The cross-connect normally located in the (main) equipment room for cross- connection and interconnection of entrance cables, first-level backbone cables, and equipment cables.
Modular Patch Panel	A connecting hardware system that facilitates cable termination and cabling administration using patch cords or equipment cords.
Permanent Link	The permanently installed portion of horizontal cabling (excludes cordage).
Rack Unit	A unit of measure of vertical space in an equipment rack, cabinet or enclosure. One rack unit is equal to 1.75 inches (in).
Service Loop	A surplus of cable, typically located at or near the point of termination, to facilitate potential future changes.
Telecommunications Outlet	An assembly of components consisting of one or more connectors and a faceplate or housing.
Unshielded Twisted Pair (UTP) Cable	Twisted-pair cable without a metallic shield around pairs nor overall shield.

1.05 Codes And Standards References

A. All applicable codes and standards shall be as identified in the project code analysis. Where codes or standards are not specifically included in the project code analysis, the current version of the applicable codes and standards – as of the date of project bid – shall be used.

B. NFPA 70 – National Electric Code.

C. Telecommunications Industry Association (TIA) Standards, current versions in place at the time the project bids are due.

D. 568: Telecommunications Cabling Standards.

E. 569: Telecommunications Pathways and Spaces.

F. 606: Administration Standard for Commercial Telecommunications Infrastructure.

G. 607: Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises.

H. Building Industry Consulting Services International (BiCSi) Telecommunications Distribution Methods Manual (TDMM).

1.06 Contractor Qualifications

A. Contractor shall have necessary certifications to provide for Guarantees as specified herein.

B. Contractor shall be an active participant in Installers Program operated by manufacturer of cabling or connectivity products used.

C. Contractor shall be participant in this program at time of Bidding and remain so throughout project.

D. Contractor shall have on the project team at a minimum one (1) Certified Installer trained by the manufacturer(s) of the cabling, hardware and accessories installed under this project.

E. At least one member of each test team shall be factory trained/certified in use of the test equipment. The project foreman shall have been factory trained in the use of the test equipment.

1.07 Quality Assurance

A. The manufacturer(s) of cabling and connectivity components shall be a company specializing in and having a minimum of five years documented experience in producing products similar to those specified in this and related sections.

1.08 Identification

A. At a minimum, all cables shall be labeled with the far-end destination of the cable.

B. Where cables are too numerous or too small to individually label (e.g. within an enclosure), a diagram must be included to indicate the appropriate far-end destination of each cable.

1.09 Submittals

A. Product Data: For each type of product indicated in the following sections:

B. Shop Drawings.

1. Samples of system labeling planned for the project including label dimensions, material and lettering examples.

C. Samples: For workstation outlets, jacks, jack assemblies in specified finish, one for each size and outlet configuration, and faceplates for color selection and evaluation of technical features.

D. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector including contractor certification(s) in Installers Program(s) operated by Manufacturer of Cabling, Hardware and/or Accessories to be used.

E. Project Documentation – See Part 3 for requirements.

1.10 Coordination

A. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

B. Coordinate layout and installation of communications equipment with owner's telecommunications staff.

C. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

1.11 Warranty

A. Special Warranty for Communications Structured Cabling: Manufacturer's standard form in which manufacturer of Cabling and Termination Hardware agrees to repair or replace components that fail in materials, workmanship or performance within specified warranty period.

B. Warranty period for:

1. Copper Backbone Cabling and Termination Hardware: 2-year component warranty.
2. Fiber Optic Backbone Cabling and Termination Hardware: 20-year component and performance warranty.
3. Horizontal Permanent Link: 20-year component and performance warranty.
4. Coaxial Cabling and Termination Hardware: 5-year component warranty.

C. Special Warranty covering Structured Cabling Horizontal Permanent Link shall be direct from manufacturer(s) of cabling and connecting components to owner, facilitated by the structured cabling system contractor.

PART 2 PRODUCTS

2.01 GENERAL

A. Comply with NECA 1.

B. Wiring Methods:

1. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where specified unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
   a. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

3. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

C. General Requirements for Cabling:

1. Comply with TIA-568.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Terminate conductors; no cable shall contain un-terminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
4. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps shall not be used for heating.

2.02 Horizontal Cabling

A. General:

1. Cabling and connectivity components proposed shall be by the same manufacturer or from manufacturers between which exist a documented partnership supporting an extended warranty and performance guarantees. Partnership shall have been in effect for minimum 1-year prior to bidding.
2. Bridged taps and splices shall not be installed in the horizontal cabling.

B. Unshielded Twisted Pair (UTP) Cabling:

1. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector (TO) and the horizontal cross-connect (HC) located in the communications equipment room serving that outlet location. This cabling and its connecting hardware are called the "permanent link," a term that is used in the testing protocols.
2. The maximum allowable horizontal cable length for the permanent link is 295 feet. This maximum allowable length does not include an allowance for the length of connecting cord to the workstation equipment nor does it include an allowance for the length of connecting cord in the horizontal cross-connect.
3. General Performance: Horizontal cabling system shall comply with transmission standards in ANSI/TIA-568 and standards referenced therein for the cable type(s) specified, when tested according to test procedures of these standards.
4. UTP Cabling shall:
   a. Be listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70.
   b. Meet NFPA 70 Listing Requirements for Communications Plenum Rated cable type CMP.
5. Description: 100-Ohm, 4-pair UTP, covered with a thermoplastic jacket.
   a. Performance: ANSI/TIA Category 6.
   b. Conductor Wire Gauge: 24 AWG.
   c. Jacket Color: Per site standards.
   d. Comply with ICEA S-90-661 for mechanical properties.

6. Description (Outside Plant): 100-Ohm, 4-pair UTP, covered with a UV resistant polyethylene (PE) jacket.
    a. Performance: ANSI/TIA Category 6.
    b. Conductor Wire Gauge: 24 AWG.
    c. Jacket Color: BLACK.
    d. Construction: filled with a water-resistant flooding compound.
    e. Comply with ICEA S-90-661 for mechanical properties.

C. Coaxial Cabling:

1. Not applicable to this project.

D. Fiber Optic Cabling:

1. Not applicable to this project.

2.03 Horizontal Termination Hardware

A. Termination Blocks: Not applicable to this project.

B. Surge Protection Devices:

1. Data speeds up to 10GbE
2. Rated for Cat5e, Cat6, and Cat6A
3. Comply with IEEE Std. 802.3af and 802.3at for POE
4. Protection Modes: L-G (All), L-L (All)
5. Clamping Voltage Common mode 75V
6. Clamping Voltage Differential mode 7.22V
7. Surge Current Rating: 20kA/Pair
8. Power Handling: 144 Watts
9. External grounding screw
10. RJ-45 connections

C. Patch Panels:

1. Modular Patch Panels:
    a. Connector Type: Modular Jack; 8P8C (“RJ-45”); non-keyed.
    b. Cable Interface: IDC-type connectors shared by multiple jacks for permanent termination of installed cables.
        1) IDC shall be 110-type or similar.
        2) On rack-mounted panels, this interface shall be on the rear of the panel.
    c. Panels which incorporate individual jacks inserted into the panel shall be provided in increments of no less than 12-jacks.
    d. All remaining empty slots on the panel must be filled with blank inserts.

2. Horizontal Cabling Patch Panel: Used for all horizontal cabling within the facility.
    a. Category 6 rated
    b. Flat
    c. 48-port

D. Consolidation Point: Not applicable to this project.

E. Multi-user Telecommunications Outlet Assembly (MUTOA): Not applicable to this project.

F. Telecommunications Outlets

1. General: Telecommunications Outlet consists of a faceplate into which connectors of the required type and quantity are snapped into position. Faceplates of varying configurations are included for specific purposes. Refer to project drawings for layouts of each faceplate type.
2. Faceplates and Housings
    a. Standard Duty:
        1) For use in all office areas.
        2) Form: Single gang.
        3) Material: High-impact plastic.
        4) Connector Ports: Two (2).
        5) Configuration/Mounting: Flush mount.
    b. Surface Housing:
        1) For use in locations where direct-attachment to end device (e.g. wireless access points, video surveillance cameras) is not available.
        2) Form: As required to match modular jacks.
        3) Material: Plastic.
        4) Connector Ports: Up to two (2).
        5) Configuration/Mounting: surface mount.
3. Modular Jacks:
    a. Connector – Twisted Pair Copper:
        1) Type: 100 Ohm, balanced connector; four-pair (eight conductor), eight-position modular (8P8C) Jack.
        2) Performance: ANSI/TIA Category 6.
        3) Shielded: No.
        4) Pin/Pair Assignment: T568B.
        5) Color: Per C.o.S. standards.
4. Field-Terminable Plug:
    a. Type: 100 Ohm, balanced connector; four-pair (eight conductor), eight-position modular (8P8C) plug.
    b. Performance: ANSI/TIA Category 6.
    c. Shielded: No.
    d. Pin/Pair Assignment: T568B.
    e. Color: Per C.o.S. standards.

5. Outlet Labeling:
    a. Standard Duty, Display, Modular Furniture and Surface Housing: Recessed opening for machine-printed paper inserts; Snap-in, clear-label covers.
    b. Decorative: discreet adhesive labels in low-contrasting color.
    c. Wall-Mounted Telephone, Hard Duty and Floor Boxes: Labels shall be machine printed, using adhesive-tape label. Label shall be protected with a clear laminate.

2.04 Equipment Room Fittings

A. Racks, Cabinets and Enclosures:

1. Equipment Racks: Install in existing cabinet
2. Equipment Cabinets: Not applicable to this project.
3. Equipment Enclosures: Not applicable to this project.

2.05 Connecting Cords And Cables

A. Copper Wire: Not applicable to this project.

B. Copper Patch Cords: Provide outdoor rated Category 6 patch cords for connection exterior cameras.

C. Coaxial Cords: Not applicable to this project.

D. Fiber Optic Cords: Not applicable to this project.

PART 3 EXECUTION

3.01 General

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Group connecting hardware for cables into separate logical fields.
2. Cables may not be spliced.
3. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
4. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
5. Cable bundles shall consist of not more than 50 cables.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
7. Coil and secure 4 feet of each horizontal cable at the last support (e.g. J-Hook) before the cable enter a fishable wall, conduit, surface raceway or box.

8. At all communications equipment rooms provide ~10-feet of slack in each horizontal cable under 250-feet in length to allow for changes in the telecommunication room layout without re-cabling. Preferred approach is to secure on the cable runway.

C. Unenclosed Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
4. Cable shall not be laid directly on the ceiling grid.
5. Cables shall not be attached to ceiling grid wires, other cabling, plumbing or steam piping, ductwork, ceiling supports or conduit.

D. Installation of Cable Routed Exposed Under Raised Floors:

1. Not applicable to this project.

E. Systems Furniture Cable Installation:

1. Not applicable to this project.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569 for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation (minimum) between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: 5 inches.
   b. Electrical Equipment Rating between 2 and 5 kVA: 12 inches.
   c. Electrical Equipment Rating More Than 5 kVA: 24 inches.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: 2-1/2 inches.
   b. Electrical Equipment Rating between 2 and 5 kVA: 6 inches.
   c. Electrical Equipment Rating More Than 5 kVA: 12 inches.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: 3 inches.
    c. Electrical Equipment Rating More Than 5 kVA: 6 inches.
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: 5 inches.

3.02 Backbone Cabling And Termination Hardware

A. General:

1. Coordinate backbone cabling with Termination Block locations location at Telecommunications Equipment Room(s).

B. Innerduct:

1. Where not installed in a continuous length, splice innerduct segments using couplings designed for that purpose.
2. Identify all exposed innerduct is to be labeled at 35-foot (minimum) intervals with tags indicating ownership, the cable type (e.g. "Fiber Optic Cable") and the cables it contains.
3. Innerduct shall not exceed maximum vertical rise specification unless intermediate tension relief is used.
4. Innerduct shall extend past end of conduit in pull boxes by not less than four inches and not more than six inches. After installation of innerduct, allow innerduct to ‘relax’ for a period of 48 hours to assure innerduct does not retract back into the conduit.

3.03 Horizontal Cabling And Termination Hardware

A. General:

1. Install all cables in continuous lengths from endpoint to endpoint. No splices shall be allowed unless noted otherwise.
2. Cable shall be suitable for the installation environment through which it passes. General Purpose or Riser-rated installed in a Plenum area shall be in conduit.
3. Furnish all required installation tools to facilitate cable pulling without damage to the cable jacket. Such equipment is to include, but not limited to, sheaves, winches, cable reels, cable reel jacks, duct entrance tunnels, pulling tension gauge and similar devices. All equipment shall be of substantial construction to allow steady progress once pulling has begun. Makeshift devices, which may move or wear in a manner to pose a hazard to the cable, shall not be used.

4. Pull all cable by hand unless installation conditions require mechanical assistance. Where mechanical assistance is used, care shall be taken to ensure that the maximum tensile load for the cable as defined by the manufacturer is not exceeded. This may be in the form of continuous monitoring of pulling tension, use of a “break-away” or other approved method.
5. Complete all work using qualified personnel utilizing state-of-the-art equipment and techniques. During pulling operation an adequate number of workers shall be present to allow cable observation at all points of duct entry and exit, as well as to feed cable and operate pulling machinery.
6. Pull cable according to cable manufacturer’s recommendations and ANSI/IEEE C2 standards. Manufacturer’s recommendations shall be a part of the cable submittal. Recommended pulling tensions and pulling bending radius shall not be exceeded. Any cable bent or kinked to radius less than recommended dimension shall not be installed. If any installed cable is kinked to a radius less than recommended dimension, it shall be replaced by the contractor with no additional cost to the project.
7. All wiring shall be run “free-air”, in conduit, in a secured metal raceway or in modular furniture as designated on the plan drawings. All cable shall be free of tension at both ends.
8. Avoid abrasion and other damage to cables during installation.
9. Pulling Lubricant may be used to ease pulling tensions. Lubricant shall be of a type that is non-injurious to the cable jacket and other materials used. Lubricant shall not harden or become adhesive with age.
10. All cable shall be free of tension at both ends. In cases where the cable must bear some stress, Kellems grips may be used to spread the strain over a longer length of cable.
11. Protection of cable from foreign materials:
    a. Provide adequate physical protection during construction to prevent foreign material application or contact with any cable type.
        1) Foreign material is defined as any material that would negatively impact the validity of the manufacturer’s performance warranty. This includes, but is not limited, to overspray of paint (accidental or otherwise), drywall compound, or any other surface chemical, liquid or compound that could not encounter the cable, cable jacket or cable termination components.
        2) Overspray of paint on any cable, cable jacket or cable termination component will not be accepted.
        3) Use of any cleaning agents to remove overspray shall be per the cable manufacturer’s written consent.
    b. It shall be the contractor’s responsibility to replace any component in its entirety affected by a foreign material. This replacement shall be at no additional cost to the project.
    c. Should the manufacturer and/or warrantor of the structured cabling system desire to physically inspect the installed condition and certify the validity of the structured cabling system (via a signed and dated statement by an authorized representative of the structured cabling manufacturer), the

owner may, at their sole discretion, agree to accept said warranty in lieu of having the affected cables replaced.

1) In the case of plenum cabling, in addition to the statement from the manufacturer, the contractor shall also present to the owner a letter from the local Authority Having Jurisdiction stating that they consider the plenum rating of the cable to be intact and acceptable.

12. Manufacturer's minimum bend radius specifications shall be observed in all instances.
13. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
14. All openings shall be sleeved and firestopped per prevailing code and building construction ratings upon completion of cable installation.

B. Unshielded Twisted Pair Cabling:

1. Route Horizontal Cabling on each Floor to the Telecommunications Room (TR) on that floor or to the designated TR if on another floor.
2. Unless noted on plans, the maximum station cable drop length for specified UTP cable shall not exceed standards. This length is measured from the termination panel in the wiring closet to the outlet and must include any slack required for the installation and termination.
3. The contractor is responsible for installing station cabling in a fashion as to avoid unnecessarily long runs. Any area that cannot be reached within the above constraints should be identified and reported to the engineer prior to installation.
4. Changes to the plan shall be approved by the engineer.
5. Where installed free-air, installation shall consider the following:
   a. Cable shall run at right angles and be kept clear of other trades work.
   b. Space supports at a maximum 4-foot interval unless limited by building construction. If cable "sag" at mid-span exceeds 6-inches, another support shall be used.
   c. Do not place cable directly on the ceiling grid or attach cable in any manner to the ceiling grid wires.
   d. Do not attach cables to existing cabling, plumbing or steam piping, ductwork, ceiling supports or electrical or communications conduit.
6. Cable ties to secure and anchor the station cabling shall not be allowed.
7. Place a coil of 4 feet in each cable shall in the ceiling at the last support (e.g. J-Hook) before the cables enter a fishable wall, conduit, surface raceway or box. At any location where cables are installed into movable partition walls or modular furniture via a service pole, approximately 15-feet of slack shall be left in each station cable under 250-feet in length to allow for change in the office layout without re-cabling. These "service loops" shall be secured at the last cable support before the cable leaves the ceiling. Minimum coil diameter shall be 8-inches.
8. At all Telecommunication Rooms (TR), provide approximately 10-feet of slack in each station cable to allow for changes in the telecommunication room layout without re-cabling.

a. This slack shall not be required where a horizontal cable length in excess of 295-feet would result.
b. Secure cable slack to the cable runway above the equipment racks.
c. Cable bend radius (minimum) shall be 200% of the cable recommended minimum bend radius.

9. Minimum separation distances between communications wires and cables, and any electric light, power, Class 1, non-powered fire alarm, or medium power network-powered broadband communications circuit shall comply with NEC Article 800.
10. Within the equipment room in which Data Cabling is to be terminated, use only Hook and Loop (e.g. “Velcro”) ties from room entry to the point of termination. This is to facilitate the addition of future cables.

C. Surge Protection Devices:

1. Install according to manufacturers installation instructions.

D. Modular Patch Panels :

1. Install Data Patch Panel(s) in a fashion as to allow future station cabling to be terminated on the panel without disruption to existing connections.
2. Size Data Patch panels to accommodate a minimum of 20% growth in the quantity of stations relative to the initial installation.
3. At Telecommunications Outlet and Data Patch Panel, ensure that the twists in each cable pair are preserved to within 0.5-inch of the termination for Data cables. The cable jacket shall be removed only to the extent required to make the termination.

E. Telecommunications Outlets:

1. Locate Telecommunications Outlets as identified on the Project Drawings.
2. Outlets shall be flush mounted on wall-mounted boxes, in floor-mounted boxes, on Surface Raceway and in modular furniture.
3. Mount level.
4. Unless noted otherwise on drawings, default mounting height (from finished floor to center line of outlet) in new installation shall be as indicated on the drawings.

3.04 Connecting Cords And Cables

A. Copper Wire: Not applicable to this project.

B. Copper Cords: Not applicable to this project.

C. Coaxial Cords: Not applicable to this project.

D. Fiber Optic Cords: Not applicable to this project.

E. Digital Audio-Visual Cords: Not applicable to this project.

3.05 Field Quality Control And Testing

A. Inspections:

1. Visually confirm performance (e.g. “Category”) marking of cables, outlet/connectors, and patch panels.
2. Visually inspect copper and optical fiber cable jacket materials for NRTL certification markings.
3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
4. Inspect cabling terminations for compliance with TIA-568 (including un-twisted conductor length, color-coding for pin assignments, cable bend radius.

B. Testing:

1. Test instruments shall meet or exceed applicable requirements in TIA-568.
2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex.
3. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
4. Calibrate test unit(s) or have test unit(s) calibrated to factory compliance prior to beginning any cabling test.
    a. UTP Performance Tests – Backbone Cable:
        1) Test for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors.
    b. UTP Performance Tests:
        1) Test from Horizontal Cross-connect to Telecommunications Outlet.
        2) Confirm all pairs to be free of shorts and opens.
        3) Verify pair validity, polarity, and conductor position on the terminating blocks (Wire Map).
        4) Perform Permanent Link performance tests according to TIA-568 to Category of cabling specified above.
        5) Perform Modular Plug Terminate Link testing for cables terminated with Field Terminable Plugs.

C. Post- Inspection and Testing:

1. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
2. End-to-end cabling will be considered defective if it does not pass tests and inspections.
3. Prepare test and inspection reports.

3.06 Documentation

A. Document data for each measurement.

B. Copper UTP Cable Test Results:

1. Submit test results for each Horizontal Link in electronic form in the native format of the test instrument
2. Submit summary of results that includes a graphical display of all test parameters. Submit is Adobe Acrobat .pdf format.

C. Record Drawings:

1. Modify construction documents to denote as-built information to include:
   a. Cable routes
   b. Outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons and drawing conventions used shall be consistent throughout all documentation provided.
   c. Identify drawings as "As-built" and include:
      1) Contractor name and/or logo.
      2) Drawing date.
2. Provide in Hard Copy (Paper) and in Electronic form.
3. Electronic drawings shall use font, color, layer, and model/paper-space conventions used in the original drawings.

SECTION 272000 – DATA COMMUNICATIONS ACTIVE EQUIPMENT

PART 1 GENERAL

1.01 Summary

A. This specification section is intended to establish the minimum acceptable data communications products and requirements for the installation of those products that provide digital data communications for the project.

B. One or more related specification sections may refer to this section.

1.02 Related Documents

A. Division 27 specification sections 271000.

B. Division 28 specification sections 282000

C. Division 27 and 28 specification sections that include a requirement for active data network equipment.

1.03 Abbreviations and Acronyms

A. The following Abbreviations and Acronyms apply to this document. Some or all may apply to the project.

IP	Internet Protocol
KVM	Keyboard, Video, Mouse
LAN	Local Area Network
MAN	Metropolitan Area Network
PAN	Personal Area Network
PoE	Power over Ethernet
SSID	Service Set Identifier
TCP	Transmission Control Protocol
VLAN	Virtual Local Area Network (LAN)
VoIP	Voice over Internet Protocol (IP)
WAN	Wide Area Network
WAP (AP)	Wireless Access Point (Access Point)
WLAN	Wireless Local Area Network (LAN)

1.04 Definitions

A. The following definitions apply to this document and its companion sections for clarification and direction. Some or all may apply to the project.

Access Layer	The point at which local end users are allowed into the network. In the LAN environment, this connection point is typically a switched Ethernet port that is assigned to a virtual LAN (VLAN)
Ad Hoc Network	A peer-to-peer network characterized by communication between nodes without the need for an infrastructure.
Antenna	A conductive structure specifically designed to couple or radiate electromagnetic energy. In radio frequency (RF) systems, the antenna may be used to both transmit and receive electromagnetic energy
Distribution Layer	A collection of switches between the core and access layer. Distribution switches may be a switch and external router combination or a multilayer switch.
Ethernet	A networking technology originally based on a logical bus structure and carrier sense multiple access with collision detection (CSMA/CD). Ethernet standards are formulated by the IEEE 802.3 committee and apply to Open Systems Interconnection (OSI) Reference Model Layers 1 and 2.
Media Converter	A device that transfers a signal from one transmission medium type to another (e.g., from copper to optical fiber).

OSI model	A seven-layer network architecture developed by the International Organization for Standardization (ISO) that has served as a foundation for the development of many standards for network systems communications. The seven layers are physical, data link, network, transport, session, presentation, and application.
SSID	A character string used for identification of a service set. Service sets must have identical SSIDs to establish radio contact.

1.05 Codes And Standards References

A. Refer to Division 27 specification section 271000.

1.06 Contractor Qualifications

A. Refer to Division 27 specification section 271000.

1.07 Quality Assurance

A. Refer to Division 27 specification section 271000.

1.08 Identification

A. Refer to Division 27 specification section 271000.

1.09 Submittals

A. Product Data: For each type of product indicated in this section.

B. Shop Drawings: For all systems within this section that consist of multiple, interconnected devices. Indicate all head-end and field devices and their power requirements. Include a one-line diagram detailing their interconnections.

1.10 Coordination

A. Refer to Division 27 specification section 271000.

1.11 Warranty

A. Manufacturer's standard warranty for workmanship, minimum of one year from date of system substantial completion.

PART 2 PRODUCTS

2.01 General

A. Where basis-of-design products are indicated, these products have been shown to meet the design intent of the product requirements. Other products shall be considered provided they are of equal or superior quality and functionality than the basis-of-design products indicated.

2.02 Modems, Gateways And Routers

A. Not applicable to this project.

2.03 Ethernet Switches

A. General: The Ethernet switch shall be a Layer 2 managed switch compliant to IEEE 802.3.

B. The following features shall be available on the Ethernet Switch:

1. 24-Port 10/100/1000Base-T Gigabit RJ-45 with IEEE 802.3af/802.3at PoE Injector
2. RJ45 ports shall be 10/100/1000 BASE-TX and support auto-negotiation and auto-crossover.
3. (4) 100/1000Base-X mini-GBIC/SFP slots, shared with Port-21 to Port-24
4. Power over Ethernet Plus (PoE+), capable of providing 30W per port.
5. PoE Power Budget 370 Watts
6. Layer 2 routing capability.
7. Stackable with use of external backplane cables.
8. Rack-mountable with included 19" EIA hardware.
9. Input voltage range: 100 to 240 VAC.
10. Operating range:
    a. temperature: 32°F to +113°F.
    b. humidity: 10% to 90% (non-condensing).

C. Configuration: Switch may be Configure via:

1. Web interface (with built-in help files).
2. SNMP-V1/V2/V3 based network management software.
3. Command Line Interface (CLI).

D. Basis of Design:

1. i3 International S243
2. Approved Equal

2.04 Poe/Ethernet Extenders

A. General: Long range ethernet adapter kit that transmits data and PoE via a single twisted pair.
1. IEE 802.3af and IEEE 803.3at compliant
2. UL listed in United States and Canada
3. CE approved
4. 10/100 BaseT, half/full duplex, auto negotiation
5. Operating temp:
    a. Outdoor Installation -40°F to 140°F
    b. Relative Humidity 85% +/- 5%

6. Distance:
    a. Cat5e (or better) up to 500m
7. Basis of design
    a. Altronix PACE1PRM Receiver
    b. Altronix PACE1PTM Transceiver

PART 3 EXECUTION

3.01 General

A. Install equipment according to manufacturer's instructions.

B. Install equipment as indicated on drawings.

3.02 Modems, Gateways And Routers

A. Not applicable to this project.

3.03 Ethernet Switches

A. Install and configure Ethernet switches to operate properly for the system(s) applications required.

B. Fully document all configuration parameters.

C. Turn usernames and passwords over to owner.

3.04 Poe/Ethernet Extenders

A. Install as per manufacturers guidelines

1. Exterior device shall be enclosed in an enclosure rated for the environment in which it is installed.

B. Install for each Category 6 network cable over 300 feet in length.

3.05 IP-Based Intercom System

A. Programming: Fully brief owner and tenant on available programming options. Record owner's / tenant's decisions and set up initial system program.

B. Operational Test: Test originating station-to-station and all-call messages at each intercommunication station. Verify proper routing and volume levels and that system is free of noise and distortion. Test each available message path from each station on system.

C. Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

DIVISION 28 – VIDEO SURVEILLANCE

SECTION 282000 - VIDEO SURVEILLANCE SYSTEM

PART 1 GENERAL

1.01 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

B. Division 27 sections 271000 and 272000.

1.02 Description

A. This Section includes Video Surveillance System (VSS) equipment consisting of the necessary infrastructure (raceways, boxes and wiring) to support new video surveillance cameras indicated on the drawings as well as cameras, lenses, mounts and installation thereof.

B. The Video Surveillance System described herein shall pertain only those cameras designated for the rest area on the drawings.

1.03 General Conditions

A. Documentation to be submitted by Contractor upon completion of system installation:

1. Upon completion of installation, the Contractor shall prepare Record (or "as-built") drawings of the system. Drawings shall be AutoCAD (2010 or more recent). Drawings shall include:
    a. Floor and Site plan(s) indicating exact device locations, panel terminations, cable routes, and wire numbers as tagged and color-coded on the cable tag.
    b. Point-to-point wiring diagrams of each type of device
2. Documentation of software configuration, changes or additions.
3. Operation and maintenance manuals: Two (2) sets.
    a. All approved Submittals
    b. Manufacturers Operation and maintenance documents for each component.

1.04 Definitions

A. AGC: Automated gain control

B. IP: Internet protocol.

C. LAN: Local area network.

D. NVR: Network Video Recorder

E. PC: Personal computer.

F. POE: Power over Ethernet

G. PTZ: Pan-tilt-zoom.

H. RAID: Redundant array of independent disks.

I. TCP: Transmission control protocol - connects hosts on the Internet.

J. UPS: Uninterruptible power supply.

K. VMS: Video Management System

L. VSS: Video Surveillance System

M. WAN: Wide area network.

1.05 Submittals

A. Proposal Delta: It is the duty of the contractor to provide a working system. Any omissions or errors or differences between this document and the contractor's submitted proposal shall be clearly outlined in a separate document labeled "[COMPANY NAME] Proposal Deltas".

B. Qualification Statements
   1. Manufacturer
      a. Submit confirmation and details of manufacturer's warranty, extended warranty, and replacement policies.
      b. Submit preceeding 3 years financial statements for the equipment manufacturer.
      c. Submit list of available manufacturers provided, fee based professional services available to the contractor or the owner including but not limited to: training, installation, commissioning, remote diagnostics and integration with 3rd party software and hardware systems.
   2. Contractor
      a. General:
         1) This scope of work must be followed by the winning bidder, sub-contractor and Lessor.
         2) All requirements must be adhered to, including notification of project award, discussion of the project prior to start and providing a project schedule.
      b. Documentation:
         1) Submit confirmation that contractor is licensed to install video surveillance and security equipment as required by the authority having jurisdiction.
         2) Submit history of contractor certification(s) for items in this section.
         3) Submit references with contact information where contractor has installed items in this section.

4) Submit confirmation that installer who will install this equipment or who will supervise installation of this equipment has received manufacturer training and is certified by the manufacturer on this equipment and that the training the installer received is current.

C. Product Data: Submit manufacturer technical specifications, typical installation drawings, system overview drawings and sample images of items included in this section.

D. Shop Drawings: For video surveillance system and accessories. Include plans, elevations, sections, details, and attachments to other work.
1. Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location and size of each field connection.
2. Include scaled drawings for master station that detail built-in equipment.
3. Wiring Diagrams: For power, signal, and control wiring.
   a. Identify terminals to facilitate installation, operation, and maintenance.
   b. Single-line diagram showing interconnection of components.
   c. Cabling diagram showing cable routing.

E. Equipment List: Complete bill-of-materials indicating all products being furnished and installed under the project.

F. Field quality-control reports.

G. Configuration and testing plan.

H. Operation and maintenance data.

I. Warranty: Sample of project warranty and service agreement.

1.06 Quality Assurance

A. All equipment, systems, and materials furnished and installed under this section shall be installed in accordance with the applicable standards of:

1. National codes: NEC and NFPA
2. Approvals and Listings: UL
3. TIA Telecommunications wiring standards
4. Local Authorities Having Jurisdiction

B. Contractor Certification:

1. The Contractor shall be a factory-authorized and trained dealer/integrator of the system and shall be factory-trained and certified to maintain/repair the system after system acceptance.
   a. This certification must be in place at time of Bidding and remain so throughout project.

2. Contractor performing video surveillance system installation shall have on the project team at a minimum one (1) Certified Installer trained by the manufacturer(s) of the system installed under this project.

C. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Interior, Controlled Environment: System components, except central-station control unit, installed in air-conditioned interior environments shall be rated for continuous operation in ambient temperatures of 36 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
2. Interior, Uncontrolled Environment: System components installed in non-air-conditioned interior environments shall be rated for continuous operation in ambient temperatures of 0 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 3R enclosures.
3. Exterior Environment: Unless stated otherwise in specifications, system components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph and snow cover up to 24 inches thick. Use NEMA 250, Type 3R enclosures.
4. Hazardous Environment: System components located in areas where fire or explosion hazards may exist because of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers shall be rated, listed, and installed according to NFPA 70.
5. Corrosive Environment: System components subject to corrosive fumes, vapors, and wind-driven salt spray in coastal zones. Use NEMA 250, Type 4X enclosures.
6. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

1.07 Guarantee Of Work

A. All components, parts, and assemblies supplied by the Manufacturers shall be warranted against defects in material for a period of at least two (2) years (parts and labor), commencing upon date of acceptance by Owner.

1. Warranty service shall be provided by a factory-trained service representative.
2. Warranty shall include all parts, labor and necessary travel.

B. At the end of the warranty period, Contractor shall provide detailed documentation of corrective maintenance performed from date of acceptance. Documentation shall include:

1. Description of symptoms, diagnoses and subsequent actions taken.
2. Recommended changes in routine preventive maintenance procedures shall also be included.

C. Contractor shall provide a preventive maintenance outline for all equipment included in this project.

1.08 Service/Maintenance

A. During the warranty period the manufacturer shall be responsible for maintenance and repair of the system at no charge to the owner.
   1. Includes:
      a. Labor to troubleshoot and diagnose system problems,
      b. Labor to replace workmanship defects failed devices and/or software problems.
      c. Materials
      d. Travel time and expenses.
   2. Provide 24-hours daily, 7-days per week including holidays.
   3. Repair service shall be provided within 4 hours of notification.

B. The manufacturer shall provide a cost budget for up to five (5) years for the maintenance and upgrades to the system. The budget must clearly define all contractor and manufacturer costs expected. The agreement shall be renewable monthly, quarterly, or yearly.

C. All repairs shall be made by a qualified service representative (fully trained in the servicing of the video surveillance systems).

D. All test adjustments or replacements shall be made in the presence of owner's technician, or other person designated by the owner.

E. Upon completion of each call a report will be provided to clearly indicate any replacements or adjustments and any evidence of tampering.

1.09 Extra Materials

A. Extra materials shall be housed in an environment and condition recommended by the manufacturer and shall be clearly labeled with "SPARE: DO NOT REMOVE", manufacturer part number, and date of delivery to the owner.

B. All packaging for spares must be kept in good condition and used as appropriate for any Returns to Manufacturer (RMA).

PART 2 PRODUCTS

2.01 Video Surveillance System

A. The Video Surveillance System shall include new Video Management System and new video surveillance cameras within the scope of the project.

B. Systems which meet the specifications below shall be considered. The contractor shall furnish a point-by-point comparison of the proposed system against the specifications below. Each point shall be identified as 'does not meet', 'meets' or 'exceeds'.

2.02 System Requirements

A. Per Division 27 specifications for Horizontal Cabling.

B. Per manufacturer's recommendations for all field device wiring and cabling.

C. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.

D. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

2.03 Signal Transmission Components

A. System shall be connected to Owner's network. Connection to network requires coordination with Owner for IP addressing scheme, port configuration as necessary and physical connection location(s).

B. Refer to Division 27 section 272000 for signal transmission components.

2.04 Video Management System

A. Network Video Recording: Manufacturers: NVR and VMS System shall be based on ExacqVision Professional VMS or approved equal. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ExacqVision Professional VMS (Basis of design)
2. Approved Equal

B. Description:

1. System shall provide high-quality delivery and processing of IP-based video, audio, and control data using standard Ethernet-based networks.
2. System shall be pre-loaded with VMS server software.
3. System shall include 16 IP Camera inputs.
4. System shall have seamless integration of all video surveillance and control functions.
5. The VMS shall have a client/server-based architecture that can be configured as a standalone VMS with the client software running with equal functionality on the server hardware and/or the client running on any network-connected TCP/IP workstation.
6. User Interfaces – The VMS shall support installed client and web client interfaces
7. Graphical user interface software shall manage all IP-based video matrix switching and camera control functions, two-way audio communication, alarm monitoring and control, and recording and archive/retrieval management. IP system shall also be capable of integrating into larger system environments.
8. Include three years of software upgrades.

9. System design shall include all necessary compression software for high-performance, dual-stream, H.264/MJPEG video. Unit shall provide connections for all video cameras, bidirectional audio, discreet sensor inputs, and control system outputs.
10. All camera signals shall be compressed, encoded, and delivered onto the network for processing and control by the IP video management software.
11. Camera system units shall be ruggedly built and designed for extreme adverse environments, complying with NEMA Type environmental standards.
12. System shall place video, audio and data network stream that can be managed from multiple workstations on the user's LAN or WAN.
13. All system interconnect cables, servers, network storage and network intermediate devices shall be provided for full performance of specified system.
14. System shall allow for open architecture supporting IP cameras and encoders and access control systems from multiple manufacturers.
15. System client software to allow remote access to live and recorded video, including access from mobile devices.

C. NVR (Network Video Recorder)

1. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   Exacqvision LC Series Una (Basis of Design)
   Approved equal
2. The PoE NVR shall be an appliance to power and to acquire, record, store and display video signals from 16 IP network video cameras.
3. Power:
   POE+ (per IEEE 802.3at)
   25 Watts per port
   Maximum: 240 Watts total for 16 ports
4. Network Interface Card: 1000 Base-T
5. RAM: Minimum 4 GBUSB 2.0 Ports: Minimum 8
6. Video and audio recording over TCP/IP network.
7. Video recording of H.264 and MJPEG streams.
8. Video recording storage rate of 100 Mbps.
9. Duplex operation: Simultaneous recording and playback.
10. Continuous and alarm-based recording.
11. Bookmarking-A bookmarking feature shall allow the tagging, naming, and retention of video clips.
12. The VMS shall provide the capability to organize related bookmarks into cases.
13. Full-featured search capabilities: Search based on camera, time, or date.
14. Automatic data replenishment to ensure recording even if network is down.
15. Digital certification by watermarking.
16. Capacity: Storage capacity shall be sized to accommodate 7 days of storage. All calculations for storage capacity must be approved by owner.

17. Full integration with LAN, Intranet, or Internet through standard Web browser or video management software.
18. Integrated Web server FTP server functionality.

2.05 IP Cameras

A. Indoor Fixed Camera: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AXIS M3046-V (Basis of design)
2. Hanwha-Techwin XND-8020F
3. Approved equal

B. Description:

1. Image sensor: 1/3" RGB CMOS progressive scan.
2. Lens: Fixed 2.4 mm
3. Minimum illumination: .3 lux at 50 IRE F2.2.
4. Shutter time: 1/32500 s to 1/5 s.
5. Video Compression: H.264, MPEG-4, MJPEG.
6. Resolution (pixels): up to 2688X1520.
7. Frame rate: 25/30 frames per second (fps).
8. Video Streaming: Multiple, in H.264 and MJPEG formats.
9. Pan/Tilt/Zoom (PTZ): Digital.
10. Image settings:
    a. Compression
    b. Color
    c. Brightness
    d. Sharpness
    e. Contrast
    f. White balance
    g. Exposure control
    h. Exposure zones
    i. Backlight compensation
    j. Fine tuning of behavior at low light
    k. WDR – dynamic contrast
    l. Text and image overlay
    m. Mirroring of images,
    n. Privacy mask
    o. Rotation 0,90,180,270, including Corridor Format
11. Audio: None.
12. PoE power. Compliant with IEEE 802.3af/802.3at, power consumption of 3.2 W.
13. IR illumination: None.
14. Storage: MicroSD onboard.

15. Operating temp. 32 deg. F to 104 deg. F, with 15 – 85% RH, non-condensing.
16. Casing: Polycarbonate transparent cover dehumidifying membrane. IP42 rated, IK08 impact-resistant.

C. Panoramic Cameras: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Axis P3707-PE (360) (Basis of design)
2. Axis Q3709-PVE (180) (Basis of design)
3. Or approved equal.

D. Description

1. Image sensor:
   a. 360-degree: 4 x 1/2.8 CMOS, RGB progressive scan.
   b. 180-degree: 3 x 1/3.2" CMOS, progressive scan.
2. Lens:
   a. 360-degree: Varifocal, 2.8-6 mm.
   b. 180-degree: 3 x Fixed, 5 mm.
3. Minimum illumination:
   a. 360-degree: 0.3 lux in color mode and 0.06 lux in night mode.
   b. 180-degree: 2 lux in color mode and 0.4 lux in night mode.
4. Shutter time:
   a. 360-degree: 1/22500s to 2 s.
   b. 180-degree: 1/23250 s to 2/5 s
5. Video Compression: H.264, MJPEG.
6. Resolution (pixels):
   a. 360-degree:
      4 x 1920x1080
   b. 180-degree:
      1) 3 x (3480 x 2880) (4K/UHD)
7. Frame rate:
   a. 360-degree: up to 25/30 frames per second (FPS) in 720p.
   b. 180-degree: 3 x 4K/UHD @ 25/30 fps.
8. Video Streaming: Multiple, in H.264 and MJPEG formats.
9. Pan/Tilt/Zoom (PTZ): Digital, with preset positions.
10. Image settings:
    a. Compression
    b. Color
    c. Brightness
    d. Sharpness
    e. Contrast
    f. White balance
    g. Exposure control
    h. Exposure zones

i. Backlight compensation
j. Fine tuning of behavior at low light
k. WDR – dynamic contrast
l. Text and image overlay
m. Mirroring of images,
n. Privacy mask

11. Audio:
    a. 360-degree: None.
    b. 180-degree: None.
12. PoE power:
    a. 360-degree: Compliant with IEEE 802.3af, maximum power consumption of 8W.
    b. 180-degree: Compliant with IEEE 802.3at, maximum power consumption of 24 W.
13. IR illumination: None.
14. Storage: SD/SDHC/SDXC clot supporting up to 64GB.
15. Operating temp.: -22 deg. F to 122 deg. F, with 10 – 100% RH, non-condensing.
16. Casing: Polycarbonate transparent cover with aluminum inner camera module with encapsulated electronics, IP66 and NEMA-4X rated.

E. Exterior Fixed Camera: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AXIS M3367-VE (Basis of design)
2. Hanwha-Techwin XNV-8080R
3. Approved equal

F. Description:

1. Image sensor: 1/3.2" RGB CMOS, progressive scan.
2. Lens: Varifocal (3-9mm), with remote control, focus and zoom.
3. Minimum illumination: 0.2 lux in color mode and 0.04 lux in B/W mode.
4. Shutter time: 1/28000 s to 2 s.
5. Video Compression: H.264, MJPEG.
6. Resolution (pixels): 2592x1944 to 160X90.
7. Frame rate: up to 30 frames per second (fps).
8. Video Streaming: Multiple, in H.264 and MJPEG formats.
9. Pan/Tilt/Zoom (PTZ): Digital PTZ
10. Image settings:
    a. Compression
    b. Color
    c. Brightness
    d. Sharpness
    e. Contrast
    f. White balance

g. Exposure control
h. Exposure zones
i. Backlight compensation
j. Fine tuning of behavior at low light
k. WDR – dynamic contrast
l. Text and image overlay
m. Mirroring of images,
n. Privacy mask
o. Rotation 0,90,180,270 including Corridor Format

11. Audio: Two Way.
12. PoE+ power. Compliant with IEEE 802.3af/802.3at, power consumption of 12.1 W max.
13. IR illumination: None.
14. Storage: SD card onboard.
15. Operating temp. -40 deg. F to 131 deg. F, with 10 – 100% RH, condensing.
16. Casing: Polycarbonate transparent cover with aluminum inner camera module with encapsulated electronics. IP66, IK10 and NEMA-4X rated.

G. Accessories: As required to meet conditions of camera mounting location and desired field of view, products that may be required include, but are not limited to, the following:

1. Pendant adapter kit with weather shield.
2. Wall bracket.
3. Corner bracket.
4. Sun shield.

2.06 Power Supplies

A. Not Applicable; all camera power is derived via PoE (Power over Ethernet) provided by Ethernet switch.

2.07 Uninterruptible Power Supply

A. The Uninterruptible Power Supply (UPS) be a rack-mounted unit with a battery runtime of 10 minutes, capable of backing up the entire load of the Video Surveillance System plus a spare capacity of 20%, including but not limited to:

1. Video management System
2. Network switch(es)

Basis of Design product: APC Smart-UPS 3000VA.

1. Description:
   a. Adjustable voltage sensitivity.
   b. Audible alarms.
   c. Battery failure notification.
   d. User hot-swappable batteries.

e. Sequenced shutdown and reboot.
f. Network manageable.
g. USB connectivity to VMS server.
h. Monitoring and alerting software.
i. Multiple 15A and 20A output receptacles.

2. UPS input voltage shall be 120VAC.
3. UPS input current shall be 30A.

2.08 Monitors

A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bosch UML 223-90 (Basis of design)
2. Approved equal

B. Description: The monitor shall provide a high-resolution picture, high quality; thin film transfer LED panel; rear panel controls; built-in speaker; connections for video including DVI-D, HDMI separate, composite, Y-C connectors for S-VHS input; automatic color switching system for PAL/NTSC. The color monitor shall meet or exceed the following specifications.

1. The monitor shall provide a thin film transfer LCD flat panel.
2. The monitor shall provide an on-screen display for setup and adjustment of the monitor viewing parameters.
3. The monitor shall meet NTSC/PAL standards.
4. The monitor shall provide DVI input.
5. Shall provide 500 TV lines of resolution in composite video mode.
6. The monitor shall provide digital resolution of 1920x1080 pixels.
7. The monitor shall operate in a range of 90 to 260 VAC, 60/50 Hz or 12 VDC and shall consume a maximum of 30 watts.
8. The monitor shall provide an automatic color switching system between NTSC/PAL formats.
9. The monitor shall accept 1.0 V p-p composite video and provide 75 ohms of input/output impedance.
10. The monitor shall provide a base for placing the unit on a flat surface.
11. The monitor shall provide tint, color, brightness, contrast, volume, and power on/off controls on the front panel.
12. The monitor shall provide 16.7 million colors, a contrast ratio of 1000:1
13. The monitor shall have an operating temperature range of 32° to 122°F (0° to 50° C) and an operating humidity range of 20% to 85% relative, non-condensing.

PART 3 EXECUTION

3.01 General

A. Maintain the integrity and operational status of existing video surveillance system, including head-end (server) equipment, storage devices and cameras.

B. Coordinate all system outages (partial or otherwise) with owner a minimum of two working days prior to outage.

C. Furnish, install and configure all necessary components to expand the existing VMS as indicated on the drawings and as defined in this specification.

D. In meetings with Engineer and Owner, present planning documents and review, adjust, and prepare final setup documents. Use final documents to configure and program system software.

3.02 Protection

A. Maintain strict security during the installation of equipment and software.

B. Keep confidential all details of the installation, configuration and programming of the video surveillance system. Comply with all local and federal regulations regarding the distribution of sensitive security information.

3.03 Examination

A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.

B. Examine roughing-in for LAN and IP network before device installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.04 Installation

A. Install all equipment and materials in accordance with the current recommendations of the manufacturer.

B. The work shall also be in accordance with:

1. Installation criteria defined in these specifications and in the construction documents.
2. Approved submittals.
3. Applicable requirements of the referenced standards.

3.05 Cabling And Wiring

A. All wiring shall be in conduit or otherwise concealed and protected against harm.

B. Comply with TIA-569C, "Commercial Building Standard for Telecommunications Pathways and Spaces."

C. Comply with NECA 1, "Good Workmanship in Electrical Contracting."

D. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters. Conceal raceway and wiring except in unfinished spaces.

E. Install cables using techniques, practices, and methods that are consistent with rating of components and that ensure manufacturer recommended performance of completed and linked signal paths, end to end.

F. Install cables without damaging conductors, shield, or jacket.

G. Where installed indoors, boxes and enclosures containing security system components or cabling, and which are easily accessible to employees or to the public, shall be provided with a lock. Boxes above ceiling level in occupied areas of the building shall not be considered to be accessible. Junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public shall be covered with a suitable cover plate and secured with tamperproof screws.

H. Cable application requirements are minimum requirements and shall be exceeded if recommended or required by manufacturer of system hardware.

I. For communication wiring, comply with Division 27 specifications Structured Cabling and Horizontal Cabling.

3.06 System Hardware Installation

A. Install cameras level and plumb.

B. Install cameras with 84-inch-minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.

C. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.

D. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system-component enclosures and mounted in self-protected, inconspicuous positions.

3.07 Grounding

A. Comply with IEEE 1100, "Power and Grounding Sensitive Electronic Equipment."

B. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

C. Bond shields and drain conductors to ground at only one point in each circuit.

D. Signal Ground:

1. Terminal: Locate in each equipment room and wiring closet; isolate from power system and equipment grounding.
2. Bus: Mount on wall of main equipment room with standoff insulators.
3. Backbone Cable: Extend from signal ground bus to signal ground terminal in each equipment room and wiring closet.

3.08 Identification

A. Label all hardware and cable.

B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the device as shown.
2. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.

3.09 Configuration

A. Configure the VMS and each new camera in the server. Coordinate camera naming with the Owner.

B. Assign any new software licenses to owner.

3.10 Testing

A. Operational Testing: The contractor shall perform thorough operational testing and verify that all system components are fully operational.

B. Acceptance Test Plan Form: An acceptance test plan form shall be prepared/provided by the contractor prior to the acceptance walk through.

C. This form shall include separate sections for each device/panel/unit as well as a column indicating the manufacturer’s performance allowance/margin, a column indicating the result of the testing performed by the contractor (pass/fail), and an empty column for recording finding during the walk-through.

3.11 Commissioning

A. The Contractor shall certify completion in writing and schedule the commissioning walk-through. The contractor shall provide all the tools and personal needed to conduct an efficient commissioning process.

3.12 Field Quality Control

A. Tests and Inspections:

1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. At a minimum prepare video surveillance system equipment for acceptance and operational testing as follows:

a. Prepare equipment list described in "Submittals" Article.
b. Verify operation of auto-iris lenses.
c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
e. Set and name all preset positions; consult Owner's personnel.
f. Set sensitivity of motion detection; consult Owner’s personnel.
g. Set event recording; consult Owner for parameters and schedule.
h. Set sensitivity of motion detection.
i. Connect and verify responses to alarms.
j. Verify operation of control-station equipment.

3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

B. New video surveillance system equipment shall be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.13 Training

A. Conduct group and/or individual training sessions, as required by the owner, for the proper operation and maintenance of all systems installed.

1. The purpose of the training is to fully prepare the staff for complete operational responsibility of the newly installed equipment.

B. All training shall be conducted by a manufacturer authorized trainer with expertise in each listed component.

C. At minimum, the training shall cover:

1. System Overview including Overall System Design, Features and Capabilities
2. System Operation and Maintenance
3. Component Labeling
4. Test Documentation (methods & interpretation of results)
5. Facility Tour (locations that demonstrate typical configurations)

D. Training shall:

1. Include a total of at least four (4) hours of instruction.
2. Be performed at the site
3. Be presented at time(s) arranged with the owner.
4. Include training materials for up to (6) students.

E. The Session(s) may be videotaped (by the Owner and the tenant) for use as future refresher materials for Owner and tenant technical staff.

3.14 Adjusting

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:

1. Check cable connections.
2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
3. Adjust all preset positions; consult Owner's personnel.
4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
5. Provide a written report of adjustments and recommendations.

3.15 Cleaning

A. Clean installed items using methods and materials recommended in writing by manufacturer.

B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

DIVISION 31 – EARTHWORK

312100 Structural Excavating, Backfilling and Compacting

PART 1 GENERAL

1.01 Summary
A. Provide excavating, backfilling, and compacting as necessary for construction indicated.

B. Protect existing improvements, utilities, trees and shrubs, and reference marks.

PART 2 PRODUCTS

2.01 Materials, General
A. Soil materials shall be free of organic matter, debris, frozen soils, ice, and other objectionable materials. Rock particles larger than 3” shall be removed.

B. Existing material excavated from site may be used if it meets requirements specified. If necessary, furnish additional approved material from suitable off-site sources.

2.02 'Granular Fill'
A. Select soils complying with ASTM D2487 soil classification groups GW (well-graded gravel), GP (poorly-graded gravel), SW (well-graded sand), or SP (poorly-graded sand). Aggregate shall pass a 1-1/2" sieve and not more than 35% shall be retained on a #10 sieve. Maximum 5% by weight shall pass a #200 sieve.

2.03 'Backfill'
A. Previously excavated soils, free of aggregate larger than 3", and suitable for intended purpose.

PART 3 EXECUTION

3.01 Stability of ExcavationsA. Maintain sides and slopes of excavation in a safe condition. Comply with applicable codes and ordinances.

3.02 Cold Weather Protection
A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 deg. F. by covering with dry insulating materials of sufficient depth to prevent frost penetration.

3.03 Subgrade
A. Inspect subgrade prior to placement of fill. Do not place fill on frozen subgrade.

3.04 Fill, General
A. Place fill or backfill in approximately horizontal layers; with maximum lift thickness as specified in Part 4 Schedules before compaction.

3.05 'Granular Fill' or 'Engineered Fill', 'Structural Fill'

A. Use 'Granular Fill' below concrete slabs, sidewalks and foundations to bring subgrade to designated elevation.

3.06 Backfill

A. Use 'Backfill' material to bring excavations to natural or designated grade outside of the building perimeter and beyond sidewalks unless 'Granular Fill' is indicated.

3.07 Compaction

A. Compact each layer of soil material to not less than the percentage of maximum density specified in Part 4 Schedules.

B. Provide compaction equipment required to obtain specified compaction. Small vibratory compactors are required wherever fill is placed adjacent to foundation walls, footings and piers. Pipe bedding and initial backfill shall be hand or mechanically tamped.

3.08 Field Testing

A. Provided whatever quality control measures, tests or procedures are necessary to perform, complete, maintain and verify the work to be in conformance with the specifications.

3.09 Disposal of Excess and Waste Materials

A. Remove excess excavated material, trash, debris, and waste materials and dispose of it off owner's property.

PART 4 SCHEDULES

4.01 Compaction Schedule

Material Type	Usage	Loose Lift Thickness (1)	Compaction (2)
Granular Fill	Below concrete slabs Below concrete sidewalks, paving Below footings	6"	95%
	Along foundation walls (inside building)	6"	95%
	Along foundation walls (outside building)	8"	92%

(1) Place manually compacted materials in maximum 4" layers.

(2) Percent of maximum density determined according to ASTM D1557 (Modified Proctor test).

ADDITIONAL SPECIAL PROVISION 4

Payment to First-Tier Subcontractors

Within 10 calendar days of receiving a progress payment for work completed by a subcontractor, pay the subcontractor for that work. The prime contractor may withhold payment to a subcontractor if, within 10 calendar days of receipt of that progress payment, the prime contractor provides written notification to the subcontractor and the department documenting "just cause" for withholding payment.

The prime contractor may also withhold routine retainage from payments due subcontractors.

Payment to Lower-Tier Subcontractors

Ensure that subcontracting agreements at all tiers provide prompt payment rights to lower-tier subcontractors that parallel those granted first-tier subcontractors in this provision.

Release of Routine Retainage

After granting substantial completion the department may reduce the routine retainage withheld from the prime contractor to 75 percent of the original total amount retained.

When the Department sends the semi-final estimate the department may reduce the routine retainage withheld from the prime contractor to 10 percent of the original total amount retained.

Within 30 calendar days of receiving the semi-final estimate from the department, submit written certification that subcontractors at all tiers are paid in full for acceptably completed work and that no routine retainage is being withheld. The department will pay the prime contractor in full and reduce the routine retainage withheld from the prime contractor to zero when the department approves the final estimate.

This special provision does not limit the right of the department, prime contractor, or subcontractors at any tier to withhold payment for work not acceptably completed or work subject to an unresolved contract dispute.

ADDITIONAL SPECIAL PROVISION 6
ASP 6 - Modifications to the standard specifications

Make the following revisions to the standard specifications:

104.10.1 General

Replace paragraph one with the following effective with the December 2017 letting:

(1) Subsection 104.10 specifies a 2-step process for contractors to follow in submitting a cost reduction incentive (CRI) for modifying the contract in order to reduce direct construction costs computed at contract bid prices. The initial submittal is referred to as a CRI concept and the second submittal is a CRI proposal. The contractor and the department will equally share all savings generated to the contract due to a CRI as specified in 104.10.4.2(1). The department encourages the contractor to submit CRI concepts.

104.10.4.2 Payment for the CRI Work

Replace paragraph one with the following effective with the December 2017 letting:

(1) The department will pay for completed CRI work as specified for progress payments under 109.6. The department will pay for CRI's under the Cost Reduction Incentive administrative item. When all CRI costs are determined, the department will execute a contract change order that does the following:

1. Adjusts the contract time, interim completion dates, or both.
2. Pays the contractor for the unpaid balance of the CRI work.
3. Pays the contractor 50 percent of the net savings resulting from the CRI, calculated as follows:

NS = CW - CRW - CC - DC

Where:

NS = Net Savings

CW = The cost of the work required by the original contract that is revised by the CRI. CW is computed at contract bid prices if applicable.[1]

CRW = The cost of the revised work, computed at contract bid prices if applicable.[1]

CC = The contractor's cost of developing the CRI proposal.

DC = The department's cost for investigating, evaluating, and implementing the CRI proposal.

[1] The department may adjust contract bid prices that, in the engineer's judgement, do not represent the fair value of the work deleted or proposed.

108.11 Liquidated Damages

Replace paragraphs two and three with the following effective with the December 2017 letting:

(2) This deducted sum is not a penalty but is a fixed, agreed, liquidated damage due the department from the contractor for the added cost of engineering and supervision resulting from the contractor's failure to complete the work within the contract time.

(3) Unless enhanced in the special provisions, the department will assess the following daily liquidated damages

LIQUIDATED DAMAGES

ORIGINAL CONTRACT AMOUNT		DAILY CHARGE	
FROM MORE THAN	TO AND INCLUDING	CALENDAR DAY	WORKING DAY
$0	$250,000	$850	$1700
$250,000	$500,000	$815	$1630
$500,000	$1,000,000	$1250	$2500
$1,000,000	$2,000,000	$1540	$3080
$2,000,000	___	$2070	$4140

203.3.2.2 Removal Operations

Replace the entire text with the following effective with the December 2017 letting:

203.3.2.2.1 General

(1) Except as specified below for closing culverts, remove the entire top slab of box culverts and the entire superstructure of other culverts and bridges designated for removal. Completely remove existing piles, cribs, or other timber construction within the limits of new embankments, or remove these structures to an elevation at least 2 feet below finished ground line. Remove sidewalls or substructure units in water to an elevation no higher than the elevation of the natural stream or lake bed, or, if grading the channel is required under the contract or the plans, to the proposed finished grade of the stream or lake bed. Remove sidewalls or substructure units not in water down to at least 2 feet below natural or finished ground line.

(2) If extending or incorporating existing culverts and bridges in the new work, remove only those parts of the existing structure as necessary to provide a proper connection to the new work. Saw, chip, or trim the connecting edges to the required lines and grades without weakening or damaging the remaining part of the structure. During concrete removal, do not damage reinforcing bars left in place as dowels or ties incorporated into the new work.

(3) Remove pipe culverts designated for salvage in a way that prevents damage to the culverts.

(4) Dismantle steel structures or parts of steel structures designated for salvage in a way that avoids damage to the members. If the contract specifies removing the structure in a way that leaves it in a condition suitable for re-erection, matchmark members with durable white paint before dismantling. Mark pins, bolts, nuts, loose plates, etc., similarly to indicate their proper location. Paint pins, bolts, pinholes, and machined surfaces with a department-approved rust preventative. Securely wire loose parts to adjacent members, or label and pack them in boxes.

(5) Remove timber structures or parts of timber structures designated for salvage in a way that prevents damage to the members.

(6) If the engineer approves, the contractor may temporarily use materials designated for salvage in falsework used to construct new work. Do not damage or reduce the value of those materials through temporary use.

203.3.2.2.2 Deck Removal

(1) Protect the work as specified in 107.14 during deck removal. Minimize debris falling onto water surfaces and wetlands as the contract specifies in 107.18 or in the special provisions. Also, minimize debris falling on the ground and roadway.

(2) Do not damage existing bar steel reinforcement, girders, or other components that will be incorporated in new work. Remove decks on prestressed concrete girders using a hydraulic shear or other engineer-approved equipment. Thoroughly clean, realign, and retie reinforcement as necessary.

(3) After deck removal is complete, notify the engineer to request a damage survey. Point out damage to the engineer. Allow one business day for the engineer to complete the damage survey. If damage is identified, the department will determine if repairs or girder restoration will be allowed.

(4) If the department allows girder restoration, have a professional engineer registered in the State of Wisconsin analyze the effect of the damage to the bridge, make recommendations, and prepare signed and sealed computations and structural details required to restore girders to their previous structural capacity. Submit the restoration proposal, including analysis and structural details, to the department and design engineer of record. The department will accept or reject the restoration proposal within 3 business days. Do not begin restoration work until the department allows in writing.

(5) The engineer will not extend contract time to assess or remediate contractor caused damage.

203.5.1 General

Replace paragraph two with the following effective with the December 2017 letting:

(2) Payment is full compensation for breaking down and removing; costs associated with contractor-caused damage; required salvaging, storing, and disposing of materials; and, unless the contract specifies granular backfill, for backfilling.

415.2.3 Expansion Joint Filler

Replace paragraph one with the following effective with the December 2017 letting:

(1) Furnish expansion joint filler conforming to AASHTO M153, AASHTO M213, or ASTM D8139 in lengths equal to the pavement lane width and of the thickness and height the plans show. Where dowel bars are required, use filler with factory-punched holes at the dowel bar locations and with a diameter not greater than 1/8 inch larger than the nominal dowel bar diameter.

415.3.20 Filling Joints

Replace paragraph two with the following effective with the December 2017 letting:

(2) Clean joints of laitance, curing compound, and other contaminants before filling. Saw construction joints at least 3/4 inches deep before filling. Sawing is not required for tooled joints in curb and gutter. Sandblast or waterblast exposed joint faces using multiple passes as required to clean joints surfaces of material that might prevent bonding. Blow clean and dry with oil-free compressed air immediately before filling.

415.5.1 General

Replace paragraph six with the following effective with the December 2017 letting:

(6) Payment for Concrete Pavement Joint Filling is full compensation for filling concrete pavement joints; filling adjacent curb and gutter joints; and for sawing.

440.3.4.2 Contractor Testing

Replace paragraph two with the following effective with the December 2017 letting:

(2) Coordinate with the engineer at least 24 hours before making profile runs for acceptance unless the engineer approves otherwise. The department may require testing to accommodate staged construction or if corrective action is required.

455.5.3 Tack Coat

Replace paragraph two with the following effective with the December 2017 letting:

(2) The department will adjust pay for Tack Coat, under the Nonconforming Tack Coat administrative item, for nonconforming material the engineer allows to remain in place at a maximum of 75 percent of the contract unit price.

460.2.7 HMA Mixture Design

Replace paragraph one with the following effective with the December 2017 letting:

(1) For each HMA mixture type used under the contract, develop and submit an asphaltic mixture design according to CMM 8-66 and conforming to the requirements of table 460-1 and table 460-2. The values listed are design limits; production values may exceed those limits. The department will review mixture designs and report the results of that review to the designer according to CMM 8-66.

TABLE 460-2 MIXTURE REQUIREMENTS

Mixture type	LT	MT	HT	SMA
ESALs x 10^6 (20 yr design life)	<2.0	2 - <8	>8	___
LA Wear (AASHTO T96)				
100 revolutions(max % loss)	13	13	13	13
500 revolutions(max % loss)	50	45	45	40
Soundness (AASHTO T104) (sodium sulfate, max % loss)	12	12	12	12
Freeze/Thaw (AASHTO T103) (specified counties, max % loss)	18	18	18	18
Fractured Faces (ASTM D5821) (one face/2 face, % by count)	65/___	75 / 60	98 / 90	100/90
Flat & Elongated (ASTM D4791) (max %, by weight)	5 (5:1 ratio)	5 (5:1 ratio)	5 (5:1 ratio)	20 (3:1 ratio)
Fine Aggregate Angularity (AASHTO T304, method A, min)	40	43	45	45
Sand Equivalency (AASHTO T176, min)	40	40	45	50
Gyratory Compaction				
Gyrations for N_{ini}	6	7	8	8
Gyrations for N_{des}	40	75	100	65
Gyrations for N_{max}	60	115	160	160
Air Voids, $\%V_a$ ($\%G_{mm}$ N_{des})	4.0 (96.0)	4.0 (96.0)	4.0 (96.0)	4.0 (96.0)
% G_{mm} N_{ini}	<= 91.5[1]	<= 89.0[1]	<= 89.0	___
% G_{mm} N_{max}	<= 98.0	<= 98.0	<= 98.0	___
Dust to Binder Ratio[2] (% passing 0.075/P_{be})	0.6 - 1.2	0.6 - 1.2	0.6 - 1.2	1.2 - 2.0
Voids filled with Binder (VFB or VFA, %)	68 - 80[4] [5]	65 - 75[3] [5]	65 - 75[3] [5]	70 - 80
Tensile Strength Ratio (TSR) (AASHTO T283)[6] [7]				
no antistripping additive	0.75 min	0.75 min	0.75 min	0.75 min
with antistripping additive	0.80 min	0.80 min	0.80 min	0.80 min
Draindown (AASHTO T305) (%)	___	___	___	0.30

[1] The percent maximum density at initial compaction is only a guideline.

[2] For a gradation that passes below the boundaries of the caution zone (ref. AASHTO M323), the dust to binder ratio limits are 0.6 - 1.6.

[3] For No. 5 (9.5mm) and No. 4 (12.5 mm) nominal maximum size mixtures, the specified VFB range is 70 - 76 percent.

[4] For No. 2 (25.0mm) nominal maximum size mixes, the specified VFB lower limit is 67 percent.

[5] For No. 1 (37.5mm) nominal maximum size mixes, the specified VFB lower limit is 67 percent.

[6] WisDOT eliminates freeze-thaw conditioning cycles from the TSR test procedure.

[7] Run TSR at asphalt content corresponding to 3.0% air void regressed design using distilled water for testing.

460.2.8.2.1.3.1 Contracts with 5000 Tons of Mixture or Greater

Replace paragraph six with the following:

(6) Conduct TSR tests during mixture production according to CMM 8-36.6.14. Test each full 50,000 ton production increment, or fraction of an increment, after the first 5000 tons of production. Perform required increment testing in the first week of production of that increment. If production TSR values are below the limit specified in CMM 8-36.6.14, notify the engineer. The engineer and contractor will jointly determine a corrective action.

502.2.7 Preformed Joint Filler

Replace paragraph one with the following effective with the December 2017 letting:

(1) Use preformed joint filler conforming to AASHTO M153, AASHTO M213, or ASTM D8139.

502.3.7.8 Floors

Replace paragraph fourteen with the following effective with the December 2017 letting:

(14) Unless specified otherwise, transversely tine finish the floors of structures with approach pavements designed for speeds of 40 mph or greater as specified in 415.3.8.3, except make the tining 1/8 inch in depth and do not perform tining within 12 inches of gutters. The contractor may apply a broom finish, described below, instead of the artificial turf drag finish required before tining. The contractor may perform tining manually, if it obtains a finish satisfactory to the engineer. Perform tining within 20 degrees of the centerline of bearing of the substructure units on bridge decks having skew angles of 20 degrees or greater.

505.2.6 Dowel Bars and Tie Bars

Replace the entire text with the following effective with the March 2018 letting:

505.2.6.1 General

(1) Furnish bars coated in a plant certified by the Concrete Reinforcing Steel Institute. For dowel bars and straight tie bars, there is no requirement for bend tests. Ensure that the bars are the specified diameter and length the plans show.

(2) The contractor need not coat or patch sawed ends, sheared ends, cut ends, ends left bare during the coating process, or ends with damaged coating.

(3) The contractor need not repair circumferential coating damage from shipping, handling, or installation, if the following conditions are met:

1. The damaged area is 1/4 inch square or smaller.
2. The total damaged area in any one-foot length does not exceed 2 percent of the circumferential area in that length.

(4) Repair areas of damaged circumferential coating larger than 1/4 inch square. Reject bars with total damage greater than 2 percent of the bar's circumferential area.

505.2.6.2 Dowel Bars

505.2.6.2.1 General

(1) Ensure that the bars are straight, round, smooth, and free from burrs or other deformations detrimental to the free movement of the bar in the concrete.

(2) Saw bars to the required length. For solid bars, the department will allow shearing if no damage occurs to the coating and shearing distortions do not exceed the following:

1. No distorted diameter is more than 0.04 inches greater than the true diameter.
2. No distortion extends more than 0.40 inches from the sheared end.

(3) Apply a surface treatment to loose dowels, or furnish manufacturer-treated bars in dowel bar baskets, capable of preventing bond between the epoxy-coated bars and the concrete. Apply field surface treatments when loading bars in the dowel bar magazine.

505.2.6.2.2 Solid Dowel Bars

(1) Furnish coated bars conforming to AASHTO M31 grade 40 or 60. Alternatively the contractor may furnish dowel bars conforming to AASHTO M227 grade 70-80. Coat with a thermosetting epoxy conforming to AASHTO M254, type B.

505.2.6.2.3 Tubular Dowel Bars

(1) Furnish welded steel tubular bars conforming to ASTM A513 fabricated from plain carbon steel with a minimum tensile yield strength of 60 ksi and sized as follows:

SOLID BAR SPECIFIED DIAMETER	MINIMUM REQUIRED OUTSIDE DIAMETER	MINIMUM BASE METAL WALL THICKNESS
1 1/4-inch	1 5/16 inches	0.120 inch
1 1/2-inch	1 5/8 inches	0.120 inch

(2) Cap bar ends to prevent intrusion of concrete or other materials. Ensure that tubing is galvanized on the exterior and interior according to ASTM A653 with a G40 zinc coating and apply 7-13 mils of epoxy to the galvanized exterior according to AASHTO M254, Type B.

505.2.6.2.4 High Performance Dowel Bars

(1) As an alternate the contractor may furnish high performance dowel bars from the department's APL.

505.2.6.3 Tie Bars

(1) Furnish coated bars conforming to AASHTO M31 grade 40 or 60. Coat tie bars as specified in 505.2.4 for coated high-strength steel reinforcement. Ensure that the tie bars are the shape the plans show.

(2) Repair, with compatible coating material, the bend location of field-straightened coated tie bars.

614.2.1 General

Add the following as paragraph ten effective with the December 2017 letting:

(10) Furnish guardrail reflectors from the department's APL.

614.3.2.1 Installing Posts

Add the following as paragraph five effective with the December 2017 letting:

(5) Provide post-mounted reflectors every 100 feet with one at the beginning and end of each run and a minimum of three reflectors per run.

614.5 Payment

Replace paragraph four with the following effective with the December 2017 letting:

(4) Payment for the Steel Thrie Beam, Steel Plate Beam Guard, Guardrail Stiffened, MGS Guardrail, Short Radius, and various transition bid items is full compensation for providing guardrail and transitions including post-mounted reflectors; for repairing damaged zinc coatings; and for excavating, backfilling, and disposing of surplus material.

641.2.9 Overhead Sign Supports

Replace paragraph three with the following effective with the December 2017 letting:

(3) Provide steel pole shafts, mast arms or trusses, and luminaire arms zinc coated according to ASTM A123. The contractor may provide either straight or tapered pole and arm shafts unless the plans specify otherwise. Provide bolts and other hardware conforming to 641.2.2.

642.2.2.1 General

Replace the entire text with the following effective with the December 2017 letting:

(1) Provide each field office with two rooms, separated by an interior door with a padlock. Ensure that each room has a separate exterior door and its own air conditioner. Locate the office where a quality internet connection can be achieved.

(2) Provide long distance telephone service via a land line for exclusive department use that has the following:

- Two programmable touch-tone phones, one of which is cordless. Ensure that phone operations will not interfere with other telecommunications equipment.
- Voice mail service or an answering machine.

(3) Provide high-speed internet service for exclusive department use via cable or DSL connection with a modem/router and capable of supporting cloud enabled file sharing, voice over internet protocol (VoIP), video conferencing, and web based applications. Ensure that system meets the following:

- Includes a wireless network for the field office.
- Can accommodate IPSec based VPN products.
- Has a bandwidth range as follows:

Field office with 1-5 staff:	A minimum connection speed of 5 Mbps download and 1 Mbps upload. If a cable or DSL option is not available the contractor may provide a personal hotspot using cell phone tethering or other device able to achieve the specified minimum speeds inside the field office.
Field office with 6 or more staff:	A minimum connection speed of 10 Mbps + 1/2 Mbps per user download and 5 Mbps upload.
Projects over 500 million dollars:	A minimum connection speed of 20 Mbps + 1/2 Mbps per user download and 10 Mbps upload. Coordinate network setup at the leased office with the WisDOT network team.

(4) Provide and maintain a Windows 7 and Windows 10 compliant multi-function device with copy, print, and scan capabilities that can accommodate both 8 1/2" x 11" and 11" x 17" paper. Replenish paper, toner cartridges, and other supplies before fully expended. Ensure that department staff can connect to the device either directly or through the field office wireless network.

(5) Equip with a drafting table with a drafter's stool. Except as specified in 642.2.2.4, provide 2 ergonomically correct office chairs in working condition with, at a minimum, the following:

1. Five-legged base with casters.
2. Seat adjustable from 15 to 22 inches from the floor with a seamless waterfall, rounded, front edge.
3. High backrest with no arms or adjustable arms.

643.3.1 General

Replace paragraph one with the following effective with the December 2017 letting:

(1) Provide and maintain traffic control devices located where the plans show or engineer directs to maintain a safe work zone throughout the contract duration. Relocate as required to accommodate changing work operations. When not in use, place devices away from traffic outside of paved and gravel shoulder surfaces. Where there is barrier on the shoulder, the contractor may place devices not in use on the shoulder as close as possible to the barrier and delineated with drums. Lay signs and supports flat on the grade with uprights oriented parallel to and downstream from traffic. Do not stack devices or equipment. Promptly remove temporary devices from within the project limits as follows:

- That will not be used within 14 consecutive calendar days.
- Within 5 business days of substantial completion unless the engineer allows otherwise.

645.2.2.2 Geotextile, Type SAS (Subgrade Aggregate Separation)

Replace paragraph one with the following effective with the December 2017 letting:

(1) Furnish fabric conforming to the following physical properties:

TEST	METHOD	VALUE[1]
Minimum grab tensile strength	ASTM D4632	170 lb
Minimum puncture strength	ASTM D6241	350 lb
Maximum apparent opening size	ASTM D4751	No. 70
Minimum permittivity	ASTM D4491	0.35 s^{-1}

[1] All numerical values represent minimum/maximum average roll values. Average test results from all rolls in a lot must conform to the tabulated values.

645.2.2.4 Geotextile, Type DF (Drainage Filtration)

Replace paragraph one with the following effective with the December 2017 letting:

(1) Furnish fabric conforming with the physical requirements of either schedule A, schedule B, or schedule C as the contract specifies.

SCHEDULE A TEST	METHOD	VALUE[1]
Minimum grab tensile strength	ASTM D4632	110 lb
Minimum puncture strength	ASTM D6241	200 lb
Minimum apparent breaking elongation	ASTM D4632	30%
Maximum apparent opening size	ASTM D4751	300 µm
Minimum permittivity	ASTM D4491	0.70 s^{-1}

SCHEDULE B TEST	METHOD	VALUE[1]
Minimum grab tensile strength	ASTM D4632	180 lb
Minimum puncture strength	ASTM D6241	350 lb
Minimum apparent breaking elongation	ASTM D4632	30%
Maximum apparent opening size	ASTM D4751	300 µm
Minimum permittivity	ASTM D4491	1.35 s^{-1}

SCHEDULE C TEST	METHOD	VALUE[1]
Minimum grab tensile strength	ASTM D4632	180 lb
Minimum puncture strength	ASTM D6241	350 lb
Minimum apparent breaking elongation	ASTM D4632	15%
Maximum apparent opening size	ASTM D4751	600 µm
Minimum permittivity	ASTM D4491	1.00 s^{-1}

[1] All numerical values represent minimum/maximum average roll values. Average test results from all rolls in a lot must conform to the tabulated values.

645.2.2.6 Geotextile, Type R (Riprap)

Replace paragraph one with the following effective with the December 2017 letting:

(1) Use fabric conforming to the following physical properties:

TEST	METHOD	VALUE[1]
Minimum grab tensile strength	ASTM D4632	205 lb
Minimum puncture strength	ASTM D6241	400 lb
Minimum apparent breaking elongation	ASTM D4632	15%
Maximum apparent opening size	ASTM D4751	No. 30
Minimum permittivity	ASTM D4491	0.12 s^{-1}

[1] All numerical values represent minimum/maximum average roll values. Average test results from all rolls in a lot must conform to the tabulated values.

645.2.2.7 Geotextile, Type HR (Heavy Riprap)

Replace paragraph one with the following effective with the December 2017 letting:

(1) Use fabric conforming to the following physical properties:

TEST	METHOD	VALUE[1]
Minimum grab tensile strength, lb	ASTM D4632	305 lb
Minimum puncture strength, lb	ASTM D6241	500 lb
Minimum apparent breaking elongation, %	ASTM D4632	15%
Maximum apparent opening size	ASTM D4751	No. 30
Minimum permittivity	ASTM D4491	0.40, s^{-1}

[1] All numerical values represent minimum/maximum average roll values. Average test results from all rolls in a lot must conform to the tabulated values.

645.2.2.8 Geotextile, Type C (Modified SAS)

Replace paragraph one with the following effective with the December 2017 letting:

(1) Use fabric conforming to the following physical properties:

TEST	METHOD	VALUE[1]
Grab tensile strength, lb	ASTM D4632	205 lb
Puncture strength, lb	ASTM D6241	350 lb
Maximum apparent opening size	ASTM D4751	No. 50
Minimum permittivity	ASTM D4491	0.12 s^{-1}

[1] All numerical values represent minimum/maximum average roll values. Average test results from all rolls in a lot must conform to the tabulated values.

646.3.1.1 General Marking

Replace paragraph one with the following effective with the December 2017 letting:

(1) Prepare the surface and apply marking as the manufacturer specifies. Provide manufacturer specifications as the engineer requests. Do not mark over a marking product with less adherence or over chipped or peeled marking. Do not remove polymer overlay materials in areas receiving pavement marking. Use only epoxy pavement marking where the contract requires marking placed on polymer overlays.

Replace paragraph five with the following effective with the December 2017 letting:

(5) After the marking can sustain exposure to traffic, re-apply clear protective surface treatment conforming to 502.2.11 where removed from structures during marking surface preparation. Seal exposed concrete including grooves for tape. Cover marking during resealing with a system that will not degrade the marking's retroreflectivity when removed. Uncover marking before opening to traffic.

701.3 Contractor Testing

Replace paragraph one with the following effective with the December 2017 letting:

(1) Perform contract required QC tests for samples randomly located according to CMM 8-30. Also perform other tests as necessary to control production and construction processes, and additional testing enumerated in the contractor's quality control plan or that the engineer directs. Use test methods as follows:

TABLE 701-2 TESTING STANDARDS

TEST	TEST STANDARD
Washed P 200 analysis	AASHTO T11[1]
Sieve analysis of fine and coarse aggregate	AASHTO T27[1]
Aggregate moisture	AASHTO T255[1]
Sampling freshly mixed concrete	AASHTO R60
Air content of fresh concrete	AASHTO T152[2]
Air void system of fresh concrete	AASHTO Provisional Standard TP118
Concrete slump	AASHTO T119[2]
Concrete temperature	ASTM C1064
Concrete compressive strength	AASHTO T22
Making and curing concrete cylinders	AASHTO T23
Standard moist curing for concrete cylinders	AASHTO M201

[1] As modified in CMM 8-60.

[2] As modified in CMM 8-70.

715.2.3.1 Pavements

Add the following as paragraph six effective with the December 2017 letting:

(6) For new lab-qualified mixes, test the air void system of the proposed concrete mix conforming to AASHTO provisional standard TP 118. Include the SAM number as a part of the mix design submittal.

715.3.1.1 General

Replace paragraph one with the following effective with the December 2017 letting:

(1) Provide slump, air content, concrete temperature and compressive strength test results as specified in 710.5. Provide a battery of QC tests, consisting of results for each specified property, using a single sample randomly located within each sublot. Cast three cylinders for strength evaluation. For pavement concrete, also test the air void system conforming to AASHTO provisional standard TP118 at least once per lot and enter the SAM number in the MRS for information only.

715.3.1.3 Department Verification Testing

Replace paragraph one with the following effective with the December 2017 letting:

(1) The department will perform verification testing as specified in 701.4.2 with additional testing as required to obtain at least 1 verification test per lot for air content, slump, temperature, and compressive strength.

Errata

Make the following corrections to the standard specifications:

106.3.3.1 General

Correct errata by changing "acceptance" to "approval".

(1) For manufactured products or assemblies, the department may base approval on a product certification or require both a product certification and production plant certification.

205.3.1 General

Correct errata by replacing paragraphs three and four with the following to reflect current practice to incorporate suitable materials.

(3) Replace unsuitable material with satisfactory material. Trim and finish the roadway. Maintain the work done under 205 in a finished condition until acceptance.

305.1 Description

Correct errata to clarify that the contractor may use more than one material under a single contract.

(1) This section describes constructing a dense graded base using one or more of the following aggregates at the contractor's option:

Crushed stone	Reclaimed asphalt
Crushed gravel	Reprocessed material
Crushed concrete	Blended material

521.2 Materials

Correct errata by deleting bullet three and including aluminum coated pipe in bullet one.

(1) Furnish corrugated steel pipe and steel apron end walls as follows:

- Corrugated steel culvert pipe, steel apron endwalls, aluminum coated corrugated steel culvert pipe, and other components conforming to AASHTO M36.
- Polymer coated corrugated steel culvert pipe and pipe arch fabricated from zinc coated sheet steel conforming to AASHTO M218. Before fabrication, coat the sheets on both sides with polymer protective coating grade 250/250 according to AASHTO M246. Fabricate the pipe according to AASHTO M245.

614.3.2.2 Installing Rail

Correct errata for splice location and allow punching or drilling holes and slots.

(1) Install rail with lap splices in the direction of traffic. Ensure that the number and dimensions of holes and bolts conforms to the plan details for new splices. Place the round head of bolts on the traffic side.

(2) Cut rails to length by shearing or sawing; do not use cutting torches. Drill or punch bolt holes and slots; ensure that they are burr free. After installation, cut anchor bolts that project more than one inch from the nut to 1/2 inch from the nut; deburr the threaded end of cut bolts.

618.1 Description

Correct errata by deleting designated detours from the scope of Maintenance and Repair of Haul Roads.

(1) This section describes maintaining, repairing, and restoring all public roads, streets, drainage facilities, and other components used for hauling by contractor, subcontractor, or supplier to support work for a department contract to its pre-haul condition. Public roads and streets shall be limited to those not a part of the State Trunk Highway System and from now on called haul roads.

643.3.5.2 Cellular Communication

Correct errata by changing State Traffic Operations Center to Traffic Management Center.

(2) A minimum of 14 days before deployment, demonstrate to the department that the cellular modem is capable of communications with the Traffic Management Center. If remote communications are interrupted or temporarily unavailable, the department will notify the contractor to change messages manually. Update messages within 2 hours of receiving notification.

646.3.1.2 Liquid Marking

Correct errata by changing "epoxy overlays" to "polymer overlays".

(5) Apply liquid marking and glass beads across the line at or exceeding the following:

LIQUID MARKING	PAVEMENT TYPE	THICKNESS (mils)	BEAD APPLICATION (pounds per gallon)
Paint	all	16	8-10
Epoxy	SMA, seal coats, and polymer overlays	25	25
Epoxy	all other	20	22.5

654.5 Payment

Correct errata to clarify that contractor-provided anchor rods and associated hardware are incidental.

(2) Payment for the Bases bid items is full compensation for providing concrete bases; for embedded conduit and electrical components; for anchor rods, nuts, and washers; for bar steel reinforcement; and for excavating, backfilling, and disposing of surplus materials.

ADDITIONAL SPECIAL PROVISION 7

A. Reporting 1st Tier and DBE Payments During Construction

1. Comply with reporting requirements specified in the department's Civil Rights Compliance, Contractor's User Manual, Sublets and Payments.
2. Report payments to all DBE firms within 10 calendar days of receipt of a progress payment by the department or a contractor for work performed, materials furnished, or materials stockpiled by a DBE firm. Report the payment as specified in A(1) for all work satisfactorily performed and for all materials furnished or stockpiled.
3. Report payments to all first tier subcontractor relationships within 10 calendar days of receipt of a progress payment by the department for work performed. Report the payment as specified in A(1) for all work satisfactorily performed.
4. All tiers shall report payments as necessary to comply with the DBE payment requirement as specified in A(2).
5. Require all first tier relationships, DBE firms and all other tier relationships necessary to comply with the DBE payment requirement in receipt of a progress payment by contractor to acknowledge receipt of payment as specified in A(1), (2), (3) and (4).
6. All agreements made by a contractor shall include the provisions in A(1), (2), (3), (4) and (5), and shall be binding on all first tier subcontractor relationships and all contractors and subcontractors utilizing DBE firms on the project.

B. Costs for conforming to this special provision are incidental to the contract.

NOTE: CRCS Prime Contractor payment is currently not automated and will need to be manually loaded into the Civil Rights Compliance System. Copies of prime contractor payments received (check or ACH) will have to be forwarded to paul.ndon@dot.wi.gov within 5 days of payment receipt to be logged manually.

***Additionally, for information on Subcontractor Sublet assignments, Subcontractor Payments and Payment Tracking, please refer to the CRCS Payment and Sublets manual at:

http://wisconsindot.gov/Documents/doing-bus/civil-rights/labornwage/crcs-payments-sublets-manual.pdf

ADDITIONAL SPECIAL PROVISION 9-S
Electronic Labor Data Submittal for
State Funded Only Projects

(1) Use the Workforce Utilization Report Microsoft Excel spread sheet, or other compatible spread sheet (i.e., Google Spread Sheet), to report required labor data. Details and the Excel spreadsheet are available online through the department's highway construction contract information (HCCI) site on the Labor, Wages, and EEO Information page at:

http://wisconsindot.gov/Pages/doing-bus/civil-rights/labornwage/default.aspx

(2) Ensure that all tiers of subcontractors, including all trucking firms, submit their labor data electronically via the Excel spread sheet to the prime contractor within 14 calendar days of the end of each quarter (quarters are defined as January-March, April-June, July-September, and October-December). The prime contractor shall coordinate collection of their subcontractors' spread sheets and forward them to the Regional Labor Compliance Specialist within 21 calendar days of the end of each quarter. Every company or contractor providing physical labor towards completing the project is a subcontractor under this special provision.

(3) Upon receipt of contract execution, promptly make all affected companies or contractors aware of the requirements under this special provision and arrange for them to receive an Excel spreadsheet as part of their subcontract documents.

(4) The department will reject all paper submittals of information required under this special provision. All costs for conforming to this special provision are incidental to the contract.

Non-discrimination Provisions

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. Compliance with Regulations: The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. Non-discrimination: The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. Information and Reports: The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the Federal Highway Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:

a. Withholding payments to the contractor under the contract until the contractor complies; and/or
b. Cancelling, terminating, or suspending a contract, in whole or in part.

6. Incorporation of Provisions: The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

Effective August 2015 letting

BUY AMERICA PROVISION

All steel and iron materials permanently incorporated in this project shall be domestic products and all manufacturing and coating processes for these materials from smelting forward in the manufacturing process must have occurred within the United States. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to the requirements of Buy America. The exemption of this requirement is the minimal use of foreign materials if the total cost of such material permanently incorporated in the product does not exceed one-tenth of one percent (1/10 of 1%) of the total contract cost or $2,500.00, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the subject products as they are delivered to the project. The contractor shall take actions and provide documentation conforming to CMM 2-28.5 to ensure compliance with this “Buy America” provision.

http://wisconsindot.gov/rdwy/cmm/cm-02-28.pdf

Upon completion of the project certify to the engineer, in writing using department form WS4567, that all steel, iron, and coating processes for steel or iron incorporated into the contract work conform to these "Buy America" provisions. Attach a list of exemptions and their associated costs to the certification form. Department form WS4567 is available at:

http://wisconsindot.gov/hcciDocs/contracting-info/ws4567.doc

March 2017

NOTICE TO BIDDERS
WAGE RATE DECISION

The wage rate decision of the Department of Labor which has been incorporated in these advertised specifications is incomplete in that the classifications may be omitted from the Department of Labor's decision.

Since the bidder is responsible, independently, for ascertaining area practice with respect to the necessity, or lack of necessity, for the use of these classifications in the prosecution of the work contemplated by this project, no inference may be drawn from the omission of these classifications concerning prevailing area practices relative to their use. Further, this omission will not, per se, be construed as establishing any governmental liability for increased labor cost if it is subsequently determined that such classifications are required.

There may be omissions and/or errors in the federal wage rates. The bidder is responsible for evaluating and determining the correct applicable rate.

If a project includes multiple types of construction (highway, bridge over navigable water, sanitary sewer and water main, building) and there is not a separate wage determination for this type of work included in the proposal, use the wage determination that is in the proposal.

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0002	201.0105 Clearing	8.000 STA	_____._____	_____._____
0004	201.0205 Grubbing	8.000 STA	_____._____	_____._____
0006	203.0100 Removing Small Pipe Culverts	1.000 EACH	_____._____	_____._____
0008	204.0100 Removing Pavement	4,579.000 SY	_____._____	_____._____
0010	204.0120 Removing Asphaltic Surface Milling	118.000 SY	_____._____	_____._____
0012	204.0150 Removing Curb & Gutter	1,370.000 LF	_____._____	_____._____
0014	204.0155 Removing Concrete Sidewalk	224.000 SY	_____._____	_____._____
0016	204.0190 Removing Surface Drains	1.000 EACH	_____._____	_____._____
0018	204.0195 Removing Concrete Bases	7.000 EACH	_____._____	_____._____
0020	204.0220 Removing Inlets	7.000 EACH	_____._____	_____._____
0022	204.0245 Removing Storm Sewer (size) 01. 12-Inch	83.000 LF	_____._____	_____._____
0024	204.9060.S Removing (item description) 01. Picnic Shelter	1.000 EACH	_____._____	_____._____
0026	204.9060.S Removing (item description) 02. Luminaires	40.000 EACH	_____._____	_____._____
0028	204.9060.S Removing (item description) 03. Lighting Unit	5.000 EACH	_____._____	_____._____
0030	204.9105.S Removing (item description) 04. Loop Detector Wire & Lead-In Cable STH 165 & E. Front. Rd (120th Ave)	LS	LUMP SUM	_____._____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0032	205.0100 Excavation Common	3,713.000 CY	_____.____	_____.____
0034	205.0400 Excavation Marsh	2,822.000 CY	_____.____	_____.____
0036	208.1100 Select Borrow	3,950.000 CY	_____.____	_____.____
0038	213.0100 Finishing Roadway (project) 01. 3738-08-70	1.000 EACH	_____.____	_____.____
0040	305.0120 Base Aggregate Dense 1 1/4-Inch	2,725.000 TON	_____.____	_____.____
0042	310.0110 Base Aggregate Open-Graded	217.000 TON	_____.____	_____.____
0044	320.0145 Concrete Base 8-Inch	343.000 SY	_____.____	_____.____
0046	415.0080 Concrete Pavement 8-Inch	3,898.000 SY	_____.____	_____.____
0048	415.0100 Concrete Pavement 10-Inch	1,067.000 SY	_____.____	_____.____
0050	415.5110.S Concrete Pavement Joint Layout	1.000 LS	_____.____	_____.____
0052	416.0512 Concrete Truck Apron 12-Inch	158.000 SY	_____.____	_____.____
0054	416.0610 Drilled Tie Bars	1,170.000 EACH	_____.____	_____.____
0056	416.0620 Drilled Dowel Bars	48.000 EACH	_____.____	_____.____
0058	416.1010 Concrete Surface Drains	6.000 CY	_____.____	_____.____
0060	416.1725 Concrete Pavement Replacement SHES	79.000 SY	_____.____	_____.____
0062	420.1000 Continuous Diamond Grinding Concrete Pavement	3,539.000 SY	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0064	465.0105 Asphaltic Surface	38.000 TON	_____.____	_____.____
0066	504.0900 Concrete Masonry Endwalls	16.000 CY	_____.____	_____.____
0068	520.8000 Concrete Collars for Pipe	1.000 EACH	_____.____	_____.____
0070	522.1018 Apron Endwalls for Culvert Pipe Reinforced Concrete 18-Inch	2.000 EACH	_____.____	_____.____
0072	522.2329 Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-III 29x45-Inch	144.000 LF	_____.____	_____.____
0074	522.2338 Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-III 38x60-Inch	156.000 LF	_____.____	_____.____
0076	522.2414 Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-IV 14x23-Inch	50.000 LF	_____.____	_____.____
0078	522.2614 Apron Endwalls for Culvert Pipe Reinforced Concrete Horizontal Elliptical 14x23-Inch	2.000 EACH	_____.____	_____.____
0080	601.0409 Concrete Curb & Gutter 30-Inch Type A	4,378.000 LF	_____.____	_____.____
0082	601.0551 Concrete Curb & Gutter 4-Inch Sloped 36-Inch Type A	527.000 LF	_____.____	_____.____
0084	602.0410 Concrete Sidewalk 5-Inch	1,050.000 SF	_____.____	_____.____
0086	602.0415 Concrete Sidewalk 6-Inch	352.000 SF	_____.____	_____.____
0088	602.0505 Curb Ramp Detectable Warning Field Yellow	16.000 SF	_____.____	_____.____
0090	606.0200 Riprap Medium	10.900 CY	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0092	608.3012 Storm Sewer Pipe Class III-A 12-Inch	13.000 LF	_____.____	_____.____
0094	608.3015 Storm Sewer Pipe Class III-A 15-Inch	24.000 LF	_____.____	_____.____
0096	608.3018 Storm Sewer Pipe Class III-A 18-Inch	82.000 LF	_____.____	_____.____
0098	611.0420 Reconstructing Manholes	1.000 EACH	_____.____	_____.____
0100	611.0612 Inlet Covers Type C	1.000 EACH	_____.____	_____.____
0102	611.0615 Inlet Covers Type F	1.000 EACH	_____.____	_____.____
0104	611.0624 Inlet Covers Type H	4.000 EACH	_____.____	_____.____
0106	611.2004 Manholes 4-FT Diameter	1.000 EACH	_____.____	_____.____
0108	611.3004 Inlets 4-FT Diameter	3.000 EACH	_____.____	_____.____
0110	611.3230 Inlets 2x3-FT	2.000 EACH	_____.____	_____.____
0112	611.8115 Adjusting Inlet Covers	8.000 EACH	_____.____	_____.____
0114	612.0104 Pipe Underdrain 4-Inch	620.000 LF	_____.____	_____.____
0116	618.0100 Maintenance And Repair of Haul Roads (project) 01. 3738-08-70	1.000 EACH	_____.____	_____.____
0118	619.1000 Mobilization	1.000 EACH	_____.____	_____.____
0120	624.0100 Water	26.000 MGAL	_____.____	_____.____
0122	625.0100 Topsoil	791.000 SY	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0124	625.0500 Salvaged Topsoil	11,034.000 SY	_____.____	_____.____
0126	627.0200 Mulching	10,818.000 SY	_____.____	_____.____
0128	628.1104 Erosion Bales	580.000 EACH	_____.____	_____.____
0130	628.1504 Silt Fence	2,009.000 LF	_____.____	_____.____
0132	628.1520 Silt Fence Maintenance	2,009.000 LF	_____.____	_____.____
0134	628.1905 Mobilizations Erosion Control	15.000 EACH	_____.____	_____.____
0136	628.1910 Mobilizations Emergency Erosion Control	6.000 EACH	_____.____	_____.____
0138	628.2008 Erosion Mat Urban Class I Type B	12,998.000 SY	_____.____	_____.____
0140	628.7015 Inlet Protection Type C	29.000 EACH	_____.____	_____.____
0142	628.7020 Inlet Protection Type D	9.000 EACH	_____.____	_____.____
0144	628.7504 Temporary Ditch Checks	120.000 LF	_____.____	_____.____
0146	628.7555 Culvert Pipe Checks	8.000 EACH	_____.____	_____.____
0148	628.7570 Rock Bags	135.000 EACH	_____.____	_____.____
0150	629.0210 Fertilizer Type B	6.900 CWT	_____.____	_____.____
0152	630.0160 Seeding Mixture No. 60	149.000 LB	_____.____	_____.____
0154	630.0200 Seeding Temporary	15.000 LB	_____.____	_____.____
0156	631.0300 Sod Water	19.000 MGAL	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0158	631.1000 Sod Lawn	803.000 SY	_____.____	_____.____
0160	634.0618 Posts Wood 4x6-Inch X 18-FT	60.000 EACH	_____.____	_____.____
0162	637.1220 Signs Type I Reflective SH	228.000 SF	_____.____	_____.____
0164	637.2210 Signs Type II Reflective H	537.144 SF	_____.____	_____.____
0166	637.2230 Signs Type II Reflective F	50.500 SF	_____.____	_____.____
0168	638.2102 Moving Signs Type II	9.000 EACH	_____.____	_____.____
0170	638.2601 Removing Signs Type I	5.000 EACH	_____.____	_____.____
0172	638.2602 Removing Signs Type II	27.000 EACH	_____.____	_____.____
0174	638.3000 Removing Small Sign Supports	35.000 EACH	_____.____	_____.____
0176	638.3100 Removing Structural Steel Sign Supports	2.000 EACH	_____.____	_____.____
0178	641.8100 Overhead Sign Support (structure) 01. S-30-0256	LS	LUMP SUM	_____.____
0180	642.5001 Field Office Type B	1.000 EACH	_____.____	_____.____
0182	643.0300 Traffic Control Drums	5,647.000 DAY	_____.____	_____.____
0184	643.0420 Traffic Control Barricades Type III	1,158.000 DAY	_____.____	_____.____
0186	643.0705 Traffic Control Warning Lights Type A	2,268.000 DAY	_____.____	_____.____
0188	643.0715 Traffic Control Warning Lights Type C	20.000 DAY	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0190	643.0800 Traffic Control Arrow Boards	4.000 DAY	_____.____	_____.____
0192	643.0900 Traffic Control Signs	1,556.000 DAY	_____.____	_____.____
0194	643.0910 Traffic Control Covering Signs Type I	1.000 EACH	_____.____	_____.____
0196	643.1050 Traffic Control Signs PCMS	10.000 DAY	_____.____	_____.____
0198	643.5000 Traffic Control	1.000 EACH	_____.____	_____.____
0200	645.0120 Geotextile Type HR	32.000 SY	_____.____	_____.____
0202	646.1020 Marking Line Epoxy 4-Inch	2,712.000 LF	_____.____	_____.____
0204	646.1545 Marking Line Grooved Wet Ref Contrast Epoxy 4-Inch	275.000 LF	_____.____	_____.____
0206	646.3020 Marking Line Epoxy 8-Inch	932.000 LF	_____.____	_____.____
0208	646.3040 Marking Line Grooved Wet Ref Epoxy 8-Inch	466.000 LF	_____.____	_____.____
0210	646.5020 Marking Arrow Epoxy	21.000 EACH	_____.____	_____.____
0212	646.5120 Marking Word Epoxy	7.000 EACH	_____.____	_____.____
0214	646.5220 Marking Symbol Epoxy	4.000 EACH	_____.____	_____.____
0216	646.6120 Marking Stop Line Epoxy 18-Inch	104.000 LF	_____.____	_____.____
0218	646.7120 Marking Diagonal Epoxy 12-Inch	661.000 LF	_____.____	_____.____
0220	646.8120 Marking Curb Epoxy	689.000 LF	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0222	646.8320 Marking Parking Stall Epoxy	4,643.000 LF	_____._____	_____._____
0224	646.9000 Marking Removal Line 4-Inch	1,406.000 LF	_____._____	_____._____
0226	646.9100 Marking Removal Line 8-Inch	932.000 LF	_____._____	_____._____
0228	650.4000 Construction Staking Storm Sewer	9.000 EACH	_____._____	_____._____
0230	650.4500 Construction Staking Subgrade	2,304.000 LF	_____._____	_____._____
0232	650.5500 Construction Staking Curb Gutter and Curb & Gutter	1,400.000 LF	_____._____	_____._____
0234	650.6000 Construction Staking Pipe Culverts	5.000 EACH	_____._____	_____._____
0236	650.7000 Construction Staking Concrete Pavement	2,154.000 LF	_____._____	_____._____
0238	650.8500 Construction Staking Electrical Installations (project) 01. 3738-08-70	 LS	 LUMP SUM	 _____._____
0240	650.9910 Construction Staking Supplemental Control (project) 01. 3738-08-70	 LS	 LUMP SUM	 _____._____
0242	650.9920 Construction Staking Slope Stakes	2,493.000 LF	_____._____	_____._____
0244	652.0210 Conduit Rigid Nonmetallic Schedule 40 1-Inch	220.000 LF	_____._____	_____._____
0246	652.0225 Conduit Rigid Nonmetallic Schedule 40 2-Inch	1,672.000 LF	_____._____	_____._____
0248	652.0615 Conduit Special 3-Inch	100.000 LF	_____._____	_____._____
0250	652.0800 Conduit Loop Detector	84.000 LF	_____._____	_____._____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0252	653.0115 Pull Boxes Steel 12x36-Inch	1.000 EACH	_____.____	_____.____
0254	653.0135 Pull Boxes Steel 24x36-Inch	1.000 EACH	_____.____	_____.____
0256	653.0140 Pull Boxes Steel 24x42-Inch	5.000 EACH	_____.____	_____.____
0258	653.0905 Removing Pull Boxes	4.000 EACH	_____.____	_____.____
0260	654.0105 Concrete Bases Type 5	8.000 EACH	_____.____	_____.____
0262	654.0111 Concrete Bases Type 11	3.000 EACH	_____.____	_____.____
0264	654.0220 Concrete Control Cabinet Bases Type 10	1.000 EACH	_____.____	_____.____
0266	655.0610 Electrical Wire Lighting 12 AWG	999.000 LF	_____.____	_____.____
0268	655.0615 Electrical Wire Lighting 10 AWG	1,000.000 LF	_____.____	_____.____
0270	655.0620 Electrical Wire Lighting 8 AWG	3,830.000 LF	_____.____	_____.____
0272	655.0630 Electrical Wire Lighting 4 AWG	2,640.000 LF	_____.____	_____.____
0274	655.0700 Loop Detector Lead In Cable	296.000 LF	_____.____	_____.____
0276	655.0800 Loop Detector Wire	852.000 LF	_____.____	_____.____
0278	657.0255 Transformer Bases Breakaway 11 1/2-Inch Bolt Circle	6.000 EACH	_____.____	_____.____
0280	657.0322 Poles Type 5-Aluminum	6.000 EACH	_____.____	_____.____
0282	657.0715 Luminaire Arms Truss Type 4 1/2-Inch Clamp 15-FT	6.000 EACH	_____.____	_____.____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price	Bid Amount
0284	659.1120 Luminaires Utility LED B	34.000 EACH	_____._____	_____._____
0286	690.0250 Sawing Concrete	3,698.000 LF	_____._____	_____._____
0288	715.0415 Incentive Strength Concrete Pavement	1,296.000 DOL	1.00000	1,296.00
0290	SPV.0060 Special 01. Automatic Flush Valves, Urinal	10.000 EACH	_____._____	_____._____
0292	SPV.0060 Special 02. Automatic Flush Valves, Water Closet	27.000 EACH	_____._____	_____._____
0294	SPV.0060 Special 03. Family Assisted Restrooms	2.000 EACH	_____._____	_____._____
0296	SPV.0060 Special 04. Vestibules	2.000 EACH	_____._____	_____._____
0298	SPV.0060 Special 21. Lighting Units Walkway LED	3.000 EACH	_____._____	_____._____
0300	SPV.0060 Special 22. Post Top Luminaires Utility Led	11.000 EACH	_____._____	_____._____
0302	SPV.0060 Special 25. Repair Picnic Table Type1	2.000 EACH	_____._____	_____._____
0304	SPV.0060 Special 26. Rest Area Picnic Shelters	1.000 EACH	_____._____	_____._____
0306	SPV.0060 Special 27. Grading Shaping Finishing Picnic Shelters	1.000 EACH	_____._____	_____._____
0308	SPV.0060 Special 29.Salvage & Reinstall Ramp Gate Assembly	1.000 EACH	_____._____	_____._____
0310	SPV.0085 Special 01. Concrete Pavement Corner Repair Partial Depth	10,901.000 LB	_____._____	_____._____
0312	SPV.0105 Special 01. Video Surveillance Indoor	 LS	LUMP SUM	_____._____

Proposal ID: 20180508010 Project(s): 1030-31-72, 3738-08-70

Federal ID(s): N/A, N/A

SECTION: 0001 Contract Items

Alt Set ID: Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units		Unit Price	Bid Amount
0314	SPV.0105 Special 02. Video Surveillance Outdoor	LS		LUMP SUM	_____.____
0316	SPV.0105 Special 03. Exterior Painting	LS		LUMP SUM	_____.____
0318	SPV.0105 Special 04. Repair Dam	LS		LUMP SUM	_____.____
0320	SPV.0105 Special 11. Lighting System Integrator	LS		LUMP SUM	_____.____
0322	SPV.0105 Special 12. Lighting System Survey	LS		LUMP SUM	_____.____
	Section: 0001			Total:	_____.____
				Total Bid:	_____.____

PLEASE ATTACH SCHEDULE OF ITEMS HERE