



Request for Bid
For Materials Lab Main Distribution Panel (MDP) replacement
Issued by:

IOWA DEPARTMENT OF TRANSPORTATION
Purchasing Section
Proposal No. **15324**

Letting Date: November 18, 2015

Must be submitted no later than 1:00 PM Central Time
Bid Responses received after this date will be rejected

***For information about this notice, and during this procurement,
interested persons shall contact only:***

Jody McNaughton
800 Lincoln Way
Ames, Iowa 50010
Phone: 515-239- 1298
Fax: 515-239-1538
E-Mail: jody.mcnaughton @dot.iowa.gov

**Issued addenda and all other correspondence
will be posted to Iowa DOT's website:**
<http://www.iowadot.gov/purchasing>

Procurement Timetable

The following dates are set forth for informational and planning purposes. The Iowa DOT reserves the right to revise the dates as needed. All times listed are Central Time.

Event/Dates	Section Reference	Date/Time
Issue RFB	cover	October 19, 2015
Number of Copies of Bid Responses Required	4.1.3	1
<input checked="" type="checkbox"/> Bidders Conference (Pre-Bid) <i>Box will be checked when attendance is mandatory</i> Location:	2.28	October 26, 2015 11:00 a.m. 800 Lincoln Way, Ames, IA 50010
DOT Response from Bidder's Conference Questions	2.28	October 29, 2015
Bidder Questions, Requests for Clarification, & Changes <i>(no later than)</i>	2.2/2.5	November 4, 2015
DOT Response to Questions Issued <i>(no later than)</i>	2.2/2.5	November 12, 2015
Bid Opening/Proposal Due	2.8/2.9	November 18, 2015
Presentations & Demonstrations "Short list" <i>(by invitation only)</i>	2.22/ 5.3	N/A
Announce Successful Bidder Intent to Award* <i>see note below</i>	2.22	November 20, 2015
Completion of Contract Negotiations & Execution of the Contract	2.22	December 7, 2015
Contract Begin Date	6.2	December 14, 2015
Contract End Date	6.2	May 30, 2016

*Intent to Award - See Section 2.22

It is intended that Bid Responses will be evaluated and a notice of "intent to award" will be issued within thirty (30) days of the bid opening date. Bid Responses prices, terms and conditions must be held firm for a 180-day period from the date of the notice of "intent to award" the contract.



Bid Response

		Date Bids Due: November 18,2015	Time of Bid Opening: 1:00 P.M.	Bid Opening Location: 800 Lincoln Way, Ames, IA	
Proposal Number: 15324	Description: Materials Lab Main Distribution Panel (MDP) replacement				
Contract to Begin: December 14,2015	Date of Completion: June 15, 2015	Proposal Guaranty Amount 15,000.00	Performance Bond (Y/N) Y	Liquidated Damages:	
Purchasing Agent: Jody McNaughton	E-mail Address: Jody.mcnaughton@msn.com	Phone: 515-239-1298	Fax: 515-239-1538		
Company Name:			Federal Tax ID:		
Street Address:		City:	State:	Zip Code:	
Supplier Contact (type or print)	E-mail Address:	Phone:	Fax:		
Supplier agrees to sell items/services at the same prices, terms and conditions to any other state agency. Regent or Political Subdivision upon request. Please check Yes or No. <input type="checkbox"/> Yes <input type="checkbox"/> No			Are you an Iowa Targeted Small Business? <input type="checkbox"/> Yes <input type="checkbox"/> No		

GENERAL INFORMATION

This bid package includes the Bid Proposal, Schedule of Prices, Standard Terms and Conditions, Supplemental Terms, Specifications, mailing label and other information needed to prepare a bid response. Please use the furnished mailing label, & indicate on the packet, proposal number & letting date” on the outside of the return envelope. Bidders may personally deliver, mail, or select a carrier that ensures timely delivery. **Faxed or emailed bids will not be accepted.**

If required, each bid must be accompanied by a proposal guarantee in an accepted form in the sum indicated above. Refer to the Standard Terms and Conditions for the accepted forms required for this specific bid opportunity. Bids not including a proposal guarantee when required, will not be considered for award.

PROPOSAL STATEMENT

The entire contents of this Bid Proposal, addendums to the proposal, specifications, plans, Supplemental Terms and Conditions, Standard Terms and Conditions, and Schedule of Prices shall become part of the contract.

Upon award, the successful Bidder promises to enter into a contract within fifteen (15) days after award or forfeit the proposal guarantee furnished herewith.

Bidder promises to furnish all materials, equipment and/or services specified, in the manner and the time prescribed, at prices hereinafter set out.

Bidder certifies that they have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a bid; that this bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; and that this bid has not been knowingly disclosed prior to the opening of bids to any other bidder or competitor.

Bidder certifies that all materials, equipment and/or services proposed meet or exceed the specifications and will be supplied in accordance with the entire contents of this Bid Proposal.

Upon award, the successful bidder promises to complete the contract within the contract period, or pay any liquidated damages, if stipulated, for each calendar day as set forth in the bid documents.

Signed _____ Date _____



Iowa Department of Transportation
Standard Terms and Conditions For
Bid Proposals/Contracts
-FORMAL-

Formal is the procurement process required by Iowa law when the estimated, aggregate amount of the purchase equals or exceeds \$50,000.

The entire contents of this bid proposal shall become a part of a contract or purchase order. In case of a discrepancy between the contents of the bid documents, the following items listed by descending order shall prevail:

- Addendums to the bid proposal
- Bid Proposal-
- Schedule of Prices
- Specifications
- Plans and Drawings
- Supplemental Terms and Conditions
- Standard Terms and Conditions

(Example - if a statement in the specifications contradicts a statement in the Standard Terms and Conditions, the statement in the specifications shall apply)

Preparation of Bid Response: All bid responses must address all aspects of the proposal including clearly answering all questions within the proposal. Bid responses must be typed or completed in ink and submitted on the forms supplied by the Iowa DOT.

Bid responses must be signed and received prior to the bid opening date and time as indicated on the Bid Response cover page or bid opportunity. The signed, submitted quotation or bidder's proposal shall become the official bid response to be considered for award.

No email, fax or web link bid responses will be accepted. Bid Responses must be signed, sealed and delivered in person or by a mail courier that ensures timely delivery.

A. Bid Proposal

1. **Bid Opening:** Bid openings are made public and conducted at the Iowa DOT, Ames complex unless otherwise specified. Proposals received after the time of the bid opening will be returned unopened and considered non-compliant.
2. **Communications:** Questions concerning this proposal should be directed to the purchasing agent listed on the bid proposal. Inquiries can be written, phoned, or faxed. In all cases, written communication will take precedence over verbal communication
3. **Proposal Guarantee:** If required, the bid response page will indicate the amount required to be included in the bid response. A Proposal Guarantee can be supplied in one of the following ways: **(1)** Certified check or credit union certified share draft, cashier's check, or bank draft, drawn on a solvent bank or credit union. Certified checks and certified share drafts shall be drawn and endorsed in the amount indicated. Checks or drafts shall be made payable either to the Iowa Department of Transportation (Iowa DOT) or to the bidder. If payable to the bidder, the check or draft shall be endorsed without qualifications to the Iowa DOT by the bidder or an authorized agent. **(2)** An insurance or surety company may be retained to provide a bond in fulfillment of the proposal guarantee requirement. A properly completed and signed copy of the Proposal Guarantee (*Form 131084*) must accompany the bid. **The Iowa DOT's Proposal Guarantee form must be used; no other forms or formats will be accepted.**
4. **Pricing and Discount:** Unit prices shown on the bid/response shall be quoted as the price per unit (e.g., gal., case, each, etc.) as stated in the bid proposal. If there is a discrepancy between the unit bid prices, extension, or total amount of bid, the unit prices shall prevail. Unless otherwise indicated, prices shall be firm for the duration of the contract or purchase. Discounts for early payment are allowed, but not considered in award of the contract.

5. **Acceptance/Rejection:** The Iowa DOT reserves the right to accept or reject any or all bids and to waive irregularities or technicalities, provided such waiver does not substantially change the offer or provide a competitive advantage to any supplier(s). The Iowa DOT also reserves the right to accept that bid which is deemed to be in the best interests of the state. Any unauthorized changes, additions, or conditional bids including any ties to another bid or proposal or any reservations about accepting an award or entering into a contract, may result in rejection of the bid. Bids must remain available for award for thirty (30) days from date of bid opening.
6. **Bid Results & Disclosure:** Bid tabulations will be posted on the Iowa DOT website at www.iowadot.gov/purchasing under the *Bid Award* link referencing the proposal number with an award recommendation indicated. At the conclusion of the selection process, the contents of all received bid responses will be placed in the public domain and be open to inspection by interested parties, according to state law. Trade secrets or proprietary information that are recognized as such and are protected by law may be withheld if clearly identified as such in the proposal.
7. **Quality:** All material shall be new and of first quality. Items which are used, demonstrators, refurbished, obsolete, seconds, or which have been discontinued are unacceptable without prior written approval by the Iowa DOT.
8. **Recycled Content:** The Iowa Code encourages purchase of products and materials with recycled content, including but not limited to paper products, oils, plastic products, compost materials, aggregate, solvents, and rubber products. Recycled items or alternatives must be noted in the bid response, if known.
9. **Shipping Terms:** Deliveries shall be F.O.B. Destination unless otherwise specified. All deliveries shall be accompanied by a packing slip indicating the Supplier, quantities shipped, and the purchase order number(s). All delivery charges shall be included in the bid price and paid by the Supplier. No collect C.O.D. deliveries shall be accepted. When entering into a contract, the Supplier shall notify the freight company that all freight and delivery charges are to be prepaid by the Supplier. Goods delivered to the Iowa DOT Distribution Center at 800 Lincoln Way, Ames, IA shall be received between the hours of 7:00 a.m. and 3:00 p.m. on any day except Saturday, Sunday, or a holiday. For deliveries to other Iowa DOT locations, the Supplier may contact the destination location for available times to deliver as not all Iowa DOT locations have the same business hours. The Iowa DOT will not be liable for any freight claims or unpaid freight bills arising from contract or purchase order issues.

B. Award

The binding agreement (award) may be issued in the form a purchase order or contract or both depending on the requirements and complexity of the agreement.

1. **Method of Award:** Award shall be made to the lowest responsible, responsive bidder whose bid meets the requirements of the solicitation and is the most advantageous to the Iowa DOT unless otherwise specified. An Iowa bidder will be given preference over an out-of-state bidder when bid responses are equal in all aspects and are tied in price. By virtue of statutory authority preference will be given to products and provisions grown and coal produced within the State of Iowa.
2. **Award Protests:** Protests of award recommendations are to be addressed to the Director of Purchasing, and shall be made in accordance with paragraph 761--20.4(6)"e" of the Iowa Administrative Code.
3. **Contracts:** Successful contractor(s) may be sent either a formal Contract, Notification of Award or purchase order as confirmation of acceptance and award. Any of these binding agreements shall be for the term stated in the bid proposal or on a purchase order and may be renewed for additional period(s) under the same terms and conditions upon mutual agreement as defined. The successful bidder may not assign a contract to another party without written authorization from the Iowa DOT Purchasing Section. A service contract, including all optional renewals, shall not exceed a term of six years unless a state agency obtains a waiver of this provision pursuant to rule 11-118-11(3).
4. **Payment Terms:** The Iowa DOT typically pays properly submitted vendor invoices within thirty (30) days of receipt, providing goods and/or services have been successfully delivered, installed or inspected (if required), and accepted. Invoices presented for payment must be only for quantities received by the Iowa DOT and must reference the purchase order number to be submitted for processing.

5. **Default:** Failure of the Supplier to adhere to specified delivery schedules or to promptly replace rejected materials shall render the Supplier liable for all costs in excess of the bid price when alternate procurement is necessary. This shall not be the exclusive remedy and the Iowa DOT reserves the right to pursue other remedies available to it by law or under the terms of the binding agreement.
6. **Default:** Failure of a Contractor other than a Supplier to meet any specified project completion deadline shall render the Contractor liable for all costs incurred by the Iowa DOT that were: a) necessary to meet said deadline; or b) necessary to complete said project after said deadline. This shall not be the exclusive remedy and the Iowa DOT reserves the right to pursue other remedies available to it by law or under the terms of the agreement.

C. General

1. **Administrative Rules:** For Additional details on the rules governing the actions of the Iowa DOT Purchasing Section, refer to 761 IAC, Chapter 20, Iowa Administrative Code, entitled "Procurement of Equipment, Materials, Supplies and Services".
2. **Affirmative Action:** The Contractor (and also subcontractor, vendor or supplier) is prohibited from engaging in discriminatory employment practices forbidden by federal and state law, executive orders and rules of the Iowa Department of Management, pertaining to equal employment opportunity and affirmative action. Contractor may be required to have on file a copy of their affirmative action program, containing goal and time specifications. Contractors doing business with Iowa in excess of \$5,000 annually and employing 50 or more full time employees may be required to file with the Iowa Department of Management a copy of their affirmative action plan. Failure to fulfill these non-discrimination requirements may cause the contract to be canceled and the contractor declared ineligible for future state contracts or subject to other sanctions as provided by law or rule.
3. **Applicable Law:** The contract shall be governed under the laws of the State of Iowa. The contractor shall at all times comply with and observe all federal and state laws, local laws, ordinances, and regulations which are in effect during the period of a contract and which in any manner affect the work or its conduct. Any legal action relating to a contract shall only be commenced in the Story County, Iowa, District Court or the United States District Court for the Southern District of Iowa.
4. **Conflict of Interest:** No state or county official or employee, elective or appointive shall be directly or indirectly interested in any contract issued by the Iowa DOT, see Code of Iowa 314.2.
5. **Debarment and Vendor Suspension:** By submitting a proposal, the contractor is certifying that it and its principals and/or subcontractors are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by the State of Iowa or any Federal department or agency.
6. **Equal Opportunity:** Firms submitting bids must be an "Equal Opportunity Employer" as defined in the Civil Rights Act of 1964 and in Iowa Executive Order Number Thirty-four.
7. **Infringement:** Goods shall be delivered free of the rightful claim of any third party by way of infringement. Contractor shall indemnify and save harmless the State of Iowa and the Iowa DOT against all claims for infringement of, and/or royalties claimed under, patents or copyrights on materials and equipment furnished under this bid.
8. **Records Audit:** The contractor agrees that the Auditor of the State of Iowa or any authorized representative of the state, and where federal funds are involved, the Comptroller General of the U.S. Government, shall have access to and the right to examine, audit, excerpt, and transcribe any directly pertinent books, documents, papers, and records of the contractor relating to orders, invoices, or payments of a contract or purchase order.
9. **Targeted Small Businesses:** The Iowa DOT seeks to provide opportunities for women and/or minority small business enterprises. To apply for certification as an Iowa Targeted Small Business, contact the Iowa Department of Inspection and Appeals (515-281-5796). Contractors shall take documented steps to encourage participation from Targeted Small Businesses for the purpose of subcontracting and supplying of goods or services or both.
10. **Taxes:** Prices quoted shall not include state or federal taxes from which the state is exempt. Exemption certificates will be furnished upon request.

11. Termination:

• **Termination Due to Lack of Funds or Change in Law**

The Iowa DOT shall have the right to terminate this Contract without penalty by giving thirty (30) days written notice to the vendor as a result of any of the following:

- Adequate funds are not appropriated or granted to allow the Iowa DOT to operate as required and to fulfill its obligations under contract.
- Funds are de-appropriated or not allocated or if funds needed by the Iowa DOT, at the Iowa DOT's sole discretion, are insufficient for any reason.
- The Iowa DOT's authorization to operate is withdrawn or there is a material alteration in the programs administered by the Iowa DOT.
- The Iowa DOT's duties are substantially modified.

Following a 30 day written notice, the Iowa DOT may terminate a binding agreement in whole or in part without the payment of any penalty or incurring any further obligation to the Supplier. Following termination upon notice, the Supplier shall be entitled to compensation upon submission of invoices and proper proof of claim for goods and services under contract up to and including the date of termination.

STD TERMS FORM. rev 08-25-15

Schedule of Prices

Project Description: Materials Lab Main Distribution Panel (MDP) replacement

Item No.	Description	Quantity	Unit/Price	Total Bid Amount
1	Contractor to provide all materials, labor and equipment needed for the completion of this project as per the plans and specifications included.	1	Lump/ sum	\$ _____

I hereby certify that this Bid Response meets or exceeds the minimum requirements including specifications and addendums.

Authorized
Signature:

Contact Person:

Company:

(Print Name)

Address:

(City) (State) (Zip Code)

Contractor's
Registration No (If applicable): _____

Phone No: _____

Email: _____

Fax No.: _____

I acknowledge receipt of addendums: _____

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Section 1 Introduction

1.1 Purpose & Overview of the RFB Process

The purpose of this Request for Bid (RFB) is to solicit Bid Responses from responsible, responsive Bidders to provide the goods and/or services identified on the RFB cover page and described further in Section 3 of this RFB. The Iowa DOT intends to award a contract(s) beginning and ending on the dates listed on the Procurement Timetable. The Iowa DOT may renew the contract(s) for up to the number of annual extensions identified on the Procurement Timetable at the sole discretion of the Iowa DOT. Any contract(s) resulting from the RFB shall not be an exclusive contract.

Bidders will be required to submit Bid Responses according to the Procurement Timetable. The Iowa DOT will evaluate all responsible Bidders that submit timely responsive Bid Responses to be considered for award.

1.2 Definitions

The terms used in individual sections of this document are intended to be consistent with those commonly used in the application field in question. When responding, use the terms and acronyms used in this document, and define any terms or conditions that require further clarification.

1.2.1 “Bid Response” means the bid document submitted by the bidder in response to the RFB.

1.2.2 “Contract” or “Resulting Contract” means the contract(s) entered into with the successful Bidder(s) as described in section 4.

1.2.3 “Bidder” means individual, company or entity submitting a response in response to the RFB.

1.2.4 “Iowa DOT” means the Iowa Department of Transportation.

1.2.5 “Participating Agency” or “Participating Agencies” means the all state boards, and commissions, and any political subdivisions as identified on the RFB cover sheet as Participating Agencies and any other agency that decides to utilize the executed contract.

1.2.6 “Procurement Timetable” (*on the page immediately following the RFB cover*) provide timeline, event and date information.

1.2.7 “Purchase Order” means the documentation issued by the State to the Contractor for a purchase of goods and/or services in accordance with the terms and conditions of the Contract. It may include an identification of the items to be purchased, the delivery date and location, the address where the supplier should submit the invoices, and any other requirements deemed necessary by the State. Any preprinted contract terms and conditions included on Bidder’s forms or invoices shall be null and void.

1.2.8 “Responsible Bidder” means a bidder that has the capability in all respects to perform the requirements of the Bid Proposal specifications. In determining whether a Bidder is a responsible, responsive Bidder, the Iowa DOT may consider various factors including, but not limited to, the Bidder’s competence and qualifications to provide the goods or services requested, the Bidder’s integrity and reliability, the past performance of the Bidder relative to the quality of the goods or services offered by the Bidder, the proposed terms of delivery, and the best interest of the Iowa DOT and Participating Agencies.

1.2.9 “RFB” means Request for Bid and any attachments, exhibits, schedules or addenda hereto. A written response by a Bidder shall be considered a bid and referred to as a Bid Response.

1.2.10 “State” means the Iowa DOT, State of Iowa, and Participating Agencies identified on the title page and all state agencies, boards, and commissions, and any political subdivisions making purchases off of the resulting Contract as permitted by this RFB.

1.2.11 “Subcontractor” Includes every person furnishing material, equipment or performing labor as a sublet of any part of contract.

1.3 General

1.3.1 Owner:

The Owner of these projects is the Iowa Department of Transportation, 800 Lincoln Way, Ames, Iowa 50010.

Project Location: Materials Lab 800 Lincoln Way, Ames IA 50010

1.4 Bidding Documents

1.4.1 Addenda

- Addenda, if issued, will be posted to the Iowa DOT’s website. All addendums must be acknowledged by bidders and included in the Bid Response.
- All addenda so issued shall become part of the contract documents.

1.4.2 Withdrawal Period

Prime Contractors, subcontractors and material suppliers on these projects agree to guarantee their proposal costs and work to be performed for a period of thirty (30) days after the date of receipt of bids.

Section 2 Administrative Information

2.1 Issuing Agent

The Issuing Agent, identified on the cover page is the sole point of contact regarding the RFB from the date of issuance until the notice of intent to award is issued (selection of the successful contractor).

2.2 Restriction on Communication

From the issue date of this RFB until the notice of intent to award is issued (announcement of the successful bidder), bidders may contact only the Issuing Agent.

The Issuing Agent will respond only to questions regarding the procurement process. Questions related to the interpretation of this RFB must be submitted in writing to the Issuing Officer by the deadline found in the Procurement Timetable listed immediately after the cover sheet. Verbal questions related to the interpretation of this RFB will not be accepted. Questions related to the interpretation of this RFB must be submitted as provided in section 2.5. Contractors may be disqualified if they contact any state employee other than the Issuing Agent. *Exception: Contractors may contact the State Targeted Small Business Office on issues related to the preference for Targeted Small Businesses.*

In NO CASE shall verbal communication override written communications. Only written communications are binding on the State.

The Iowa DOT assumes no responsibility for representations concerning conditions made by its officers or employees prior to the execution of a contract, unless such representations are specifically incorporated into this RFB. Verbal discussions pertaining to modifications or clarifications of this RFB shall not be considered part of the RFB unless confirmed in writing. All such requests for clarification shall be submitted in writing. Any information provided by the Contractor verbally shall not be considered part of that Contractor's proposal. Only written communications from the Contractor and received by the Department shall be accepted.

With the exception of the written Bid Response which must be submitted by Contractors in accordance with Section 2 herein, communications between the Issuing Agent and Contractors may be conducted by regular prepaid US mail, courier service, e-mail or facsimile transmission.

2.3 Downloading the RFB from the Internet

All correspondence for this Bid Proposal will be posted on the Iowa DOT's website at www.iowadot.gov/purchasing/lettingschedule. **Bidders are required** to visit the Iowa DOT's home page periodically for any and all addendums or other pertinent information regarding this bid opportunity.

2.4 Procurement Timetable

The dates listed in the Procurement Timetable (on the page immediately following the RFB cover) are set forth for informational and planning purposes; however, the Iowa DOT reserves the right to change the dates. If a change is made to any of the deadlines for Contractor submission, the Iowa DOT will issue an addendum to the RFB. All times listed are Central Times.

2.5 Questions, Requests for Clarification, and Suggested Changes

Contractors are invited to submit written questions and requests for clarifications regarding the RFB during the time indicated in the Procurement Timetable. Contractors may also submit suggestions for changes to the requirements of this RFB. The questions, requests for clarifications or suggestions must be in writing and received by the Issuing Agent on or before the deadline stated in the Procurement Timetable. Oral questions will not be permitted. If the questions, requests for clarifications, or suggestions pertain to a specific section of the RFB must be referenced.

Written responses to questions, requests for clarifications or suggestions will be posted on or before the deadline stated in the Procurement Timetable and posted on the Iowa DOT's website (see Section 2.3) If the Iowa DOT decides to adopt a suggestion, the Iowa DOT will issue an addendum to the RFB.

The Iowa DOT assumes no responsibility for verbal representations made by its officers or employees unless such representations are confirmed in writing and incorporated into the RFB.

Each bidder must inform themselves fully of the conditions relating to the proposal. Failure to do so will not relieve a successful bidder of their obligation to furnish all services required to carry out the provisions of his contract. Insofar, as possible, the Contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of, or interference with the work of any other contractor.

If a bidder discovers any significant ambiguity, error, conflict, discrepancy, omission, or other deficiency in this RFB, the bidder should immediately notify the Issuing Agent in writing of such error and request modification or clarification of the RFB document.

2.6 Revisions to Contractor Bid Response

Contractors who submit Bid Proposals in advance of the bid opening date may withdraw, modify, and resubmit Bid Proposals at any time until the bid opening date and time. Contractors must notify the Issuing Agent in writing if they wish to withdraw their Bid Response. A Contractor shall not withdraw its Bid Response or its prices prior to the end of the one hundred and eighty (180) day period immediately following the notice of intent to award a contract.

2.7 Submission of Bid Responses

The Iowa DOT must receive Bid Responses addressed to the Department of Transportation, Purchasing Section, 800 Lincoln Way, Ames, Iowa 50010 before the deadline stated in the Procurement Timetable. **This is a mandatory requirement and will not be waived by the Iowa DOT.** Any Bid Response received after this deadline will be rejected and returned unopened to the contractor.

Contractors mailing Bid Responses must allow ample mail delivery time to ensure receipt by the Iowa DOT on or before the due date. Postmarking by the due date will not substitute for actual receipt of the Bid Response.

Electronic mail and faxed Bid Responses will not be accepted.

Contractors must furnish all information necessary to evaluate the Bid Response. Bid Responses that fail to meet the mandatory requirements of the RFB will be disqualified. Verbal information provided by the Contractor shall not be considered part of the Contractor's Bid Response.

2.8 Bid Response Opening

The Iowa DOT will open Bid Responses on the date and time stated in the Procurement Timetable. Bid Responses will remain confidential until a bid tabulation has been posted on the Iowa DOT's website for all bidders to view the results in the form of "Intent to Award" See Iowa Code Section 72.3.

The names of the Contractors who submit compliant Bid Responses within the time frame permitted will be available for public review after the contract has been awarded.

2.9 Costs of Preparing the Bid Response

The costs of preparation and delivery of a Bid Response are solely the responsibility of the Contractor.

No payments shall be made by the State to cover costs incurred by any Contractor in the preparation of or the submission of this RFB or any other associated costs.

2.10 Reasonable Accommodations

Upon request, the Iowa DOT will provide reasonable accommodations, including the provision of informational material in an alternative format, for individuals with disabilities. If accommodations are required at time of a bid opening, contact the Issuing Agent designated on the cover page.

2.11 Rejection of Bid Responses

The Iowa DOT reserves the right to reject any or all Bid Responses, in whole or in part, received in response to this RFB at any time prior to the execution of a written contract. Issuance of this RFB in no way constitutes a commitment by the Iowa DOT to award a contract. This RFB is designed to provide Contractors with the information necessary to prepare a competitive Bid Response. This RFB process is for the Iowa DOT benefit and is intended to provide the Iowa DOT with competitive information to assist in the selection of a Contractor to provide services.

It is not intended to be comprehensive and each Contractor is responsible for determining all factors necessary for submission of a comprehensive Bid Response.

The Iowa DOT reserves the right to negotiate the terms of the contract, including the award amount, with the awarded Contractor prior to entering into a contract. If contract negotiations cannot be concluded successfully, the Iowa DOT reserves the right to negotiate a contract with the next lowest Bidder.

2.12 Disqualification

The Iowa DOT may reject outright and shall not evaluate proposals for any one of the following reasons:

2.12.1 The Contractor states that a requirement of the RFB cannot be met.

2.12.2 The Contractor's Bid Response materially changes a requirement of the RFB or the Bid Response is not compliant with the requirements of the RFB.

2.12.3 The Contractor's response limits the rights of the Iowa DOT.

2.12.4 The Contractor fails to include a *proposal guarantee*, also known as bid bond or bid security, *if required*. See Bid Response cover page and **Section 2.33**.

2.12.5 The Contractor fails to include any signature, certification, authorization, stipulation, disclosure or guarantee (if required).

2.12.6 The Contractor presents the information requested by this RFB in a format inconsistent with the instructions of the RFB or otherwise fails to comply with the requirements of this RFB.

2.12.7 The Contractor initiates unauthorized contact regarding the RFB with state employees.

2.12.8 The Contractor provides misleading or inaccurate responses.

2.12.9 The Contractor fails to attend the mandatory Contractors Conference or Pre-Bid meeting.

2.12.10 The Contractor's Bid Response is materially unbalanced.

2.12.11 There is insufficient evidence (including evidence submitted by the Contractor and evidence obtained by the Iowa DOT from other sources) to satisfy the Iowa DOT that the Contractor is a "Responsible Contractor".

2.12.12 The Contractor alters the Bid Proposal language in any way.

2.13 Nonmaterial and Material Variances

The Iowa DOT reserves the right to waive or permit cure of nonmaterial variances in the Bidder's Bid Response if, in the judgment of the Iowa DOT, it is in the Iowa DOT best interest to do so. Nonmaterial variances include minor informalities that do not affect responsiveness; that are merely a matter of form or format; that do not change the relative standing or otherwise prejudice other Contractors; that do not change the meaning or scope of the RFB; or that do not reflect a material change in the services. In the event the Iowa DOT waives or permits cure of nonmaterial variances, such waiver or cure will not modify the RFB requirements or excuse the Contractor from full compliance with RFB specifications or other contract requirements if the Contractor is awarded the contract. The determination of materiality is in the sole discretion of the Iowa DOT.

2.14 Reference Checks

The Iowa DOT reserves the right to contact any reference to assist in the evaluation of the Bid Response, to verify information contained in the Bid Response and to discuss the Contractor's qualifications and the qualifications of any subcontractor identified in the bidders Bid Response.

2.15 Information From Other Sources

The Iowa DOT reserves the right to obtain and consider information from other sources concerning a Contractor, such as the Contractor's capability and performance under other contracts, the qualifications of any subcontractor identified in the Contractor's Bid Response, specifically, the Contractor's financial stability, past or pending litigation, and publicly available information.

2.16 Verification of Bid Response Contents

The content of a Bid Response submitted by a Contractor is subject to verification. Misleading or inaccurate responses shall result in disqualification and rejection of the Bid Response.

2.17 Criminal History and Background Investigation

The Contractor hereby explicitly authorizes the Iowa DOT to conduct criminal history and/or other background investigation(s) of the Contractor, its officers, directors, shareholders, partners and managerial and supervisory personnel retained by the Contractor for the performance of the contract.

2.18 Bid Response Clarification Process The Iowa DOT reserves the right to contact a Contractor after the submission of Bid Response for the purpose of clarification to ensure mutual understanding.

This contact may include written questions, interviews, site visits, a review of past performance if the Contractor has provided goods or services to the Iowa DOT or any other political subdivision wherever located, or requests for corrective pages in the Contractor's Bid Response. The Iowa DOT will not consider information received if the information materially alters the content of this Bid Proposal or alters the type of goods and services the Contractor is offering to the Iowa DOT. An individual authorized to legally bind the Contractor shall sign responses to any request for clarification. Responses shall be submitted to the Iowa DOT within the time specified in the Iowa DOT request. Failure to comply with requests for additional information may result in rejection of the Bid Response as non-compliant.

2.19 Disposition of Bid Responses

At the conclusion of the selection process, the contents of all Bid Responses will be in the public domain and be open to inspection by interested parties except for information for which Contractor properly requests confidential treatment or is subject to exceptions provided in Iowa Code Chapter 22 or other applicable law.

2.20 Public Records and Requests for Confidential Treatment

The Iowa DOT may treat all information submitted by a Contractor as public information following the conclusion of the Intent to Award. Iowa DOT release of information is governed by Iowa Code chapter 22. Contractors are encouraged to familiarize themselves with chapter 22 before submitting a Bid Response. The Iowa DOT will copy and produce public records as required to comply with the public records laws.

2.21 Release of Claims

By submitting a Bid Response, the Contractor agrees that it will not bring any claim or cause of action against the Iowa DOT based on any misunderstanding concerning the information provided herein or concerning the Iowa DOT failure, negligent or otherwise, to provide the Contractor with pertinent information as intended by this RFB.

2.22 Award Notice and Acceptance Period

Notice of intent to award will be posted on the Iowa DOT's website at www.iowadot.gov/purchasing/bidaward. Final negotiation and execution of the contract(s) shall be completed no later than thirty (30) days from the date of the Notice of Intent to Award or such other time as designated by the Iowa DOT.

If the successful Contractor fails to negotiate and deliver an executed contract by that date, the Iowa DOT in its sole discretion may cancel the award and redirect the contract to the next lowest bidder meeting the specifications.

2.23 No Contract Rights until Execution

The full execution of a written contract shall constitute the making of a contract for services and no Contractor shall acquire any legal or equitable rights relative to the contract services until the contract has been fully executed by the successful Contractor and the Iowa DOT.

2.24 Restrictions on Gifts and Activities

Iowa Code Chapter 68B restricts gifts which may be given or received by state employees and requires certain individuals to disclose information concerning their activities with state government. Contractors are responsible to determine the applicability of this Chapter to their activities and to comply with the requirements. In addition, pursuant to Iowa Code section 722.1, it is a felony offense to bribe or attempt to bribe a public official.

The laws of Iowa provide that it is a felony to offer, promise, or give anything of value or benefit to a state employee with the intent to influence that employee's acts, opinion, judgment or exercise of discretion with respect to that employee's duties. Evidence of violations of this statute will be submitted to the proper prosecuting attorney.

2.25 No Minimum Guaranteed

The Iowa DOT anticipates that the selected Contractor will provide services as requested by the Iowa DOT. The Iowa DOT will not guarantee any minimum compensation will be paid to the Contractor or any minimum usage of the Contractor's services.

2.26 Conflicts Between Terms

The Iowa DOT reserves the right to accept or reject any exception taken by the Contractor to the terms and conditions contained in this RFB. Should the Contractor take exception to the terms and conditions required by the Iowa DOT, the Contractor's exceptions may be rejected and the entire proposal declared nonresponsive. The Iowa DOT may elect to negotiate with the Contractor regarding contract terms that do not materially alter the substantive requirements of the request for proposals or the contents of the Contractor's Bid Response.

2.27 News Releases

No news releases or other materials pertaining to this procurement, or any part of this proposal, will be made available to the media or the public, the Contractor's clients or potential clients without the prior written approval of the Iowa DOT.

2.28 Pre-Bid Conference

If the Procurement Timetable indicates a Contractor's Pre-Bid Conference will be held in conjunction with this RFB, it will be held at the date, time, and location listed on the Procurement Timetable immediately following the cover page. If Attendance at the Contractor's Pre-Bid Conference is a mandatory requirement to submit a Bid Response, it will be indicated on the Procurement Timetable. The purpose of the Pre-Bid conference is to discuss with prospective Contractors the work to be performed and allow prospective Contractors an opportunity to ask questions regarding the RFB. Verbal discussions at the Pre-Bid conference shall not be considered part of the RFB unless confirmed in writing by the Iowa DOT and incorporated into this RFB. The conference may be recorded. Questions asked at the conference that cannot be adequately answered during the conference may be deferred.

A copy of the questions and answers will be posted on the DOT website for viewing.

2.29 Contractors Responsibilities

2.29.1 Codes, Laws and Regulations

The laws of the State of Iowa in relation to and pertaining to public improvements shall apply to these projects. All construction, materials and methods shall comply with the State and Local Building Codes and with Local Ordinances, except where plans and specifications establish a higher standard.

2.29.2 Licenses, Permits and Inspections

The Bidders shall comply with all codes, laws, ordinances, rules and regulations of any public authority having jurisdiction that bears on the performance of its work. Bidders shall pay for all licenses, permits and inspection fees required for its work. Bidders must furnish copies of all approved inspection certificates and approvals from authorities having jurisdiction in a timely fashion upon completion of the work.

2.30 Consideration of Bids

2.30.1 Rejection of Bids

The Iowa DOT reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Iowa DOT that such bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein. Conditional bids will not be accepted.

2.30.2 Qualification of Bidder

The Iowa DOT may make such investigations as they deem necessary to determine the ability of the Bidder to perform the required work, and the bidder shall furnish to the Iowa DOT all such information and data for this purpose as the Iowa DOT may request.

2.31 Performance and Payment Bonds

2.31.1 Bonds

If the contracted estimated value is \$25,000 or more, the successful Bidder shall furnish bonds covering the faithful performance of 100% of the Contract and the payment of all obligations arising thereunder. One copy of the bond shall be submitted on Iowa Department of Transportation **Form 131070**. All items must be properly filled in, including Bidder's signature. Resident commission agent or attorney-in-fact must file a copy of the power of attorney.

2.31.2 Power of Attorney

Attorney-in-fact who signs the Proposal Guarantee, Performance Bond, and Labor and Material Payment Bond must file with each bond a certified and effectively dated copy of the Power of Attorney.

2.32 Labor Regulations

All Bidders, before entering into a contract with the Department, must be registered with the Division of Labor in the Iowa Department of Workforce Development (515-281-3606) according to chapter 91C, Code of Iowa 2003.

2.33 Proposal Guarantee

If required each bid must be supported by a Proposal Guarantee in the sum indicated on the Bid Response cover page. See Standard Terms and Conditions included in the Bid Proposal section A-3.

Certified checks and credit union share drafts shall be certified, or the cashier's check shall be drawn and endorsed, in an amount not less than indicated in the Bid Proposal. If a proposal guarantee is submitted, it must be submitted on **Iowa DOT Form No. 131084** or **bid will be rejected**.

The proposal guarantee from the qualified responsive low bidder will be retained until a contract is entered into and the required Bonds and Insurance Certificates are filed. All other bid securities will be returned after the award has been made.

Section 3 General Requirements

3.1 Scope of Work

Successful Bidder shall be required to provide all materials, labor, and equipment necessary for the construction of the Materials Lab Main Distribution Panel (MDP) replacement as per the plans and specifications. This includes demolition of the existing area and removal of all materials from work site, and installation of the new Materials Lab MDP.

3.2 Adoption of General Conditions

3.2.1 The General Requirements of this Contract shall include the "General Conditions", "Plans and Specifications" and any and all requirements of this RFB, as herein stated.

3.2.2 "THE GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION", A.I.A. FORM #A-201, LATEST EDITION AND A.I.A. DOCUMENT, "INSTRUCTIONS TO BIDDERS", FORM #A-701, LATEST EDITION, SHALL BE INCLUDED, AS MODIFIED IN THE "SUPPLEMENTARY INSTRUCTIONS TO BIDDERS" AND "SUPPLEMENTARY GENERAL CONDITIONS", AND BOUND WITH THE STANDARD FORM OF AGREEMENT BETWEEN THE CONTRACTOR AND OWNER", A.I.A. FORM #101, LATEST EDITION, AS A PART OF THIS CONTRACT SPECIFICATION.

3.2.3 All bidder information and conditions, bid check lists and similar documents included in the specifications issued by the Iowa DOT, Ames, Iowa are hereby made a part of the General Conditions.

3.3 Contractor Response

3.3.1 Guidelines

- Contractors shall comply with Iowa Occupational Safety and Health Standards as found in 29 CFR Parts 1910 and 1926. Of particular importance are those standards referring to the use of personal protective equipment (PPE), fall protection and ventilation.
- Contractor may be required to make available to the Iowa DOT all Material Safety Data Sheets (MSDS) for all products provided at time the apparent low bidder has been determined. MSDS shall be sent to the Issuing Agent (when applicable) prior to issuance of the contract.

3.3.2 Guarantee

The Contractor shall guarantee all work executed under this contract, both as the workmanship and materials, for a period of twelve (12) months after the substantial completion date. Neither the final payment nor any provision of the contract documents shall relieve the Contractor of responsibility for faulty materials or workmanship. The Contractor shall remedy any defect thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of the final acceptance. With one month remaining in the guarantee period, the Contractor shall notify the Iowa DOT and set up a complete walk-through inspection.

- All materials, items of equipment, and workmanship furnished under this division of the specifications shall carry the standard warranty against all defects in material and workmanship. Any fault due to defective or improper material, equipment, or workmanship which may develop, shall be made good, forthwith.
- The Guarantee shall include, but not be limited to the following elements and services:
 - a. Repair or replace defective materials, equipment, workmanship and installation that develops within the guarantee period, promptly and to Iowa DOT's satisfaction and correct damage caused in making necessary repairs and replacements, including all other damage done to areas, materials, and other systems resulting from the failure or defect, under guarantee by and at the expense of the Contractor.
 - b. Replace material or equipment that requires excessive service during guarantee period, as defined and as directed by the Iowa DOT.
 - c. Make all service calls, replacements, repairs and adjustments during the guarantee period without cost to the Iowa DOT.

3.3.3 Workmanship

Work shall be performed in best, most workmanlike manner by mechanics, Contractor personnel. Installation shall be made by the manufacturer or their authorized installer where specified. Unsatisfactory work shall be replaced at Contractor's expense.

3.3.4 Shop Drawings and Samples

Shop drawings, specification data, and samples shall be submitted to the Iowa DOT for approval and/or selection prior to the placing of orders for any equipment and materials.

- Shop Drawings: Submit details of materials, systems and equipment to the Iowa DOT for review. The Contractor shall provide **one (1) electronic copy** of each shop drawing for all systems and equipment as indicated in each Division of the specifications: (Note: Submission of Shop Drawings not in binders, but in loose sheet form, may be considered cause for rejection with resubmission in proper form required).
- Product Data: Submit manufacturer's product data to the Iowa DOT for approval, consisting of complete specifications, test report data, installation instructions, and other pertinent technical data required to complete product.

- a. Intent of Shop Drawings and Product Data review is to check for capacity, rating and certain construction features. Ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction, and for coordination of work of this and other Sections.
- b. Perform work in accordance with submittals marked "No Exception Taken" to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports, access, service and errors, nor for deviations from requirements of Contract Documents. Requirements of Contract Documents are not limited, waived, nor superseded by Shop Drawing Review.
- c. Submittals of various systems shall indicate equipment supplier used and that all equipment of particular system is being furnished by same supplier. Supplier shall be qualified to supervise installation, connection and testing of system and have competent maintenance service for respective systems.
- d. Shop Drawings and samples will be reviewed with reasonable promptness and will be stamped indicating appropriate action as follows:
 - 1) **"No Exception Taken"** means that fabrication, manufacture, or construction may proceed providing submittal complies with Contract Documents.
 - 2) **"Make Corrections Noted"** means that fabrication, manufacture, or construction may proceed providing submittal complies with Engineer's notation and Contract Documents. If, for any reason, notations cannot be complied with, resubmit as described for submittals stamped **"Reject"**.
 - 3) **"Revise and Resubmit"** means submittal information is incomplete or ambiguous and therefore clarification or additional information is required to ascertain compliance with the contract documents, and that fabrication, manufacture or construction shall not proceed. Provide additional data required by the contract documents and resubmit.
 - 4) **"Reject"** means that submittal does not comply with Contract Documents and that fabrication, manufacture, or construction shall not proceed. Resubmit in accordance with requirements of Contract Documents.

3.3.5 Use of Premises

- All Contractors shall confine all apparatus, storage of materials and construction to areas as directed by the Iowa DOT and shall not encumber the premises with materials.
- Notwithstanding any approvals or instructions which must be obtained by the Contractors from the Iowa DOT in connection with use of premises, the responsibility for the safe working conditions at the site shall remain that of the Contractors.

3.3.6 Cutting and Patching

Similarly, each Contractor shall perform all necessary patching that result from cutting of holes. The Prime Contractor shall resolve any conflict between trades, and it will be the Contractor's responsibility to see all patches are made. Any and all through-wall penetration requiring structural modifications and or structural members shall be provided by the Prime Contractor.

3.3.7 Clean-Up

Throughout the period of construction, the Contractor shall clean up all work and yard areas and keep the area reasonably free of debris, etc., as required for proper protection of the work. Prior to final acceptance, the Contractor shall remove all debris, tools and equipment from the project site.

3.3.8 Inspection and Supervision

- All work shall be according to the approved design and shall be under the direct supervision of the Iowa DOT.
- Periodic site inspections will be carried on by the Iowa DOT with the Contractor to ensure coordination of the project.
- The Iowa DOT will provide a list of items requiring inspection prior to or during installation. The Contractor is to give the Iowa DOT notice no less than 24 hours in advance of installation.
- The Iowa DOT contact after the contract award shall be: Ashley Smelser

3.3.9 Contractors Construction Schedule

The Successful Bidder will, at the pre-construction meeting, submit a detailed construction schedule including dates of commencement and completion on each phase of the proposed construction. Upon acceptance of the schedule, the Contractor will be expected to adhere to these dates as proposed.

3.3.10 Verifying Work of Other Contractors

- When a Contractor's work depends on proper execution of work by other contractors, such Contractor shall promptly report to the Iowa DOT project lead any defects in such work and/or discrepancies between executed work plans, drawings or specifications.
- Contractors shall employ such methods and means in carrying out work as will not cause interruption or interference with any other Contractor. General Contractors shall give other Contractors sufficient notice to permit installation of sleeves, piping, conduit, and other items, prior to placing concrete or laying masonry. Any Contractor failing to comply with above shall be responsible for expense caused by such failure.

3.4 Sub-Contractors

- Specific attention shall be given by the Contractor to Article 5 of the A.I.A. Document A-201, "The General Conditions of the Contract for Construction".
- The Successful Bidder for the project shall furnish the Iowa DOT with a complete list of subcontractors, schedule of values, and major material suppliers at the pre-construction meeting.
- The Iowa DOT shall approve and maintain the list of subcontractors and major suppliers and issue a general approval of same after official award of the contract, subject to the specific requirements of the Plans, Specifications and the "General Conditions of the Contract, and of these supplementary Conditions," " Special Provisions," and elsewhere with contract documents, as applicable. Deviations from the list of subcontractors and material suppliers shall be made only with the specific approval of, or at the request of the Iowa DOT.

3.5 Protection of Persons and Property

3.5.1 Safety and Health Regulations

The Contractor, serving in the role of the employer for the project, shall exercise at all times the protection of all persons and property. Contractor shall comply with all requirements of the Occupational Safety and Health Act of 1970, Iowa Bureau of Labor and all applicable state and municipal laws, as well as building and construction codes. It is the Contractor's responsibility to enforce all regulations that apply to these projects.

3.5.2 Protection of Site

The Contractor shall furnish all permanent and temporary guards, signs, fencing, shoring, and underpinning and other protection necessary in the performance of the contract and for the necessary protection of all public and private property and shall be responsible for any damage caused by failure to comply with this requirement.

- After building operations are completed, the Contractor shall replace or satisfactorily repair all damaged walks or pavements which shall have become damaged due to operations of these projects.
- The Contractor shall take care of all underground pipes, conduits, etc., encountered in the excavations, and protect same from damage until such time as they can be permanently disposed of.
- The Contractor shall continuously maintain adequate protection of all work from damage and shall protect the Owner's property and adjacent property from damage arising in connection with this contract.

3.6 Miscellaneous Provisions

3.6.1 Iowa State Building Code

- All construction under this section shall conform to the requirements of the Iowa State Building Code. The provisions of the Iowa State Building Code will be strictly adhered to, and will take precedence over any local Governmental Body Regulations. Work not regulated by the Iowa State Building Code shall be performed in accordance with local Governmental Body Regulations.

3.6.2 Discriminatory Practices

- All Contractors or subcontractors working under the terms of these projects are prohibited from engaging in discriminatory employment practices as forbidden by the Iowa Civil Rights Act of 1965. These provisions shall be fully enforced, as directed through Executive Order Number 34 dated July 22, 1988. Any breach of the provisions contained in the Iowa Civil Rights Acts of 1965 shall be regarded as a material breach of contract.
- Bidder agrees that if awarded a contract to construct and/or remodel any portion of the project described in these Specifications, neither the Contractor nor any subcontractors will engage in any discriminatory employment practices based on race, color, creed, religion of natural origin and that they will in all contracts comply with all statutes of the State of Iowa against discrimination. Failure to do so could be deemed a material breach of contract.

3.7 Contractors Responsibilities

- No considerations or revision in the contract price or scope of the project will be considered by the Iowa DOT for any item which could have been revealed by a thorough on-site inspection and examination.

3.7.2 Conditions of Work

Bidders must inform themselves fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve successful bidders of their obligation to furnish all material and labor necessary to carry out the provisions of this contract. Insofar as possible, the Contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of, or interference with the work of any other Contractor.

3.7.3 Obligation

At the time of the bid opening, each bidder will be presumed to have read and become thoroughly familiar with the drawings, specifications, and other contract documents, including all addenda.

Bidders are responsible for the proper submission of bids. Omissions by a bidder to examine a form, instrument, or document shall in no way relieve that bidder from any obligations in respect to their bid.

3.8 Bid Proposal Documents

3.8.1 Plans and Specifications

Electronic Plans and specifications are available on the Iowa DOT's website, www.iowadot.gov/purchasing. The Bidder is responsible for all copies of plans and specifications necessary for the execution of the work. In the event of a conflict between the specifications and the drawings, the specifications shall take precedence.

3.8.2 Materials and Equipment

Manufacturers and products, in addition to those specifically listed, may be acceptable when it is proven to the satisfaction of the Iowa DOT that:

- A. The level of quality proposed is equal to or better than that of the referenced manufacturer/Bidder's quality.
- B. The technical characteristics of the proposed product meet or exceed the requirements of the drawings and specifications.
- C. The use of the materials or equipment does not require major revisions of the drawings and specifications to permit their use.
 - Any additional cost in other work incurred as a result of these approvals shall be borne by the Contractor, including all costs for modifying other related materials/systems and the cost of any additional engineering or design fees required to accommodate the substitution/approval.
 - Contractors must be confident that a proposed product or material meets or exceeds the requirements shown on the drawings and specifications. It will be the responsibility of the Contractor to verify and demonstrate that a proposed product meets or exceed the drawings and specifications at time of shop drawing reviews. If a proposed product or material is determined to be technically unacceptable as judged by the Iowa DOT, the Contractor shall be required to supply products or materials that meet the requirements required to supply products or materials that meet the requirements stated in the drawings and specifications at no cost increase to the Iowa DOT. Under no circumstances will the Iowa DOT be required to prove that proposed substitutions is not equal to the project requirements. The decision of the Iowa DOT on all requested proposals/substitutions is final.

3.8.3 Alternates or Exceptions- Substitutions will not be accepted.

Section 4 Contract Terms & Conditions

4.1 Contract Award

Award will be based on the total lump sum amount of bid price shown on the Schedule of Prices. The DOT will award to the lowest, most responsive, responsible bidder. The Iowa DOT reserves the right to accept the bid(s) which best serves the interest of the State.

Bid price will include all requirements listed in Section 3 to complete this proposed project. The Prime Contractor shall be responsible for taking all sub-bids and for all coordination between trades.

A "Prime" contract shall be awarded for each project for all work shown on the Drawings and described in the Specifications including Site work, General construction, Demolition, Plumbing, Mechanical, Energy management and control and Electrical work. The Prime Contractor shall be responsible for taking all sub-bids and for all coordination between trades.

Protests of award recommendations shall be made in accordance with Paragraph 761--20.4(6)"e", Iowa Administrative Code.

4.2 Contract Period

See Bid Proposal timeline for dates. The date of completion shall be stated in calendar days on the Bidder's Bid Response, and if necessary, adjusted by mutual agreement between the Iowa DOT and successful bidder prior to executing the contract documents.

The Iowa DOT realizes that deliveries and site conditions have a definite bearing on the completion date. The Iowa DOT will demand diligence in the prosecution of the work, but with good cause and satisfactory past performance by the Contractor, the Iowa DOT may revise the completion date to another mutually-acceptable date, when requested in writing and in good faith by the Contractor.

4.3 Liquidated Damages

Time is an essential component of the contract, and it is important that the work be to completed on the or before the dates listed on the Procurement Timetable. For each calendar day that any work shall remain uncompleted beyond the substantial completion date and beyond the final completion date or any extension granted under Extension of Contract Period, the amount per calendar day specified in the Bid Response cover page will be assessed, not as a penalty but as predetermined and agreed upon liquidated damages. If work remains uncompleted on more than one portion for which calendar days and liquidated damages have been specified, the liquidated damages assessed will be the total of the damages per day listed for each uncompleted portion. The Iowa DOT shall prepare and forward to the Contractor an invoice or credit change order for such liquidated damages. The final payment shall be withheld until payment of the invoice has been made or the credit change order has been agreed upon.

Assessment of liquidated damages will be based only on the number of calendar

days required to complete the contract beyond the contract completion date, plus authorized extensions.

The provision for the assessment of liquidated damages for failure to complete work within the contract period does not constitute a waiver of the Iowa DOT's right to collect any additional damages other than time delays, which the Iowa DOT may sustain by the failure of the Contractor to carry out the terms of the contract.

4.4 Immunity of Iowa Department of Transportation

The Contractor shall defend, indemnify and hold harmless the Iowa DOT and its officials and employees from liability arising out of or resulting from the Contractor's activities at the designated work site, its performance or attempted performance of the contract, as well as the Contractor's activities with Sub-Contractors and all other third parties.

4.5 Payments and Completion of Contract

4.5.1 Payments on contract will be made monthly by means of state warrants to the extent of ninety-five percent (95%) of the value of work performed, including acceptable material stored at the building site, as determined by the Contractor as governed by the Iowa DOT Standard Specifications for Highway and Bridges Construction, Series 2012 and General Supplemental Specifications. 1109.05 C1 for the purpose of this bid opportunity 5% retainage will be withheld.

4.5.2 At the Pre-Construction Conference, the contractor shall submit a schedule of values of the various parts of the work, aggregating the total sum of the contract, made out in such form as the Iowa DOT may direct and, if required, supported by evidence as to its correctness. This schedule, when approved by the Iowa DOT, shall be used as a basis for requests for payment.

4.5.3 Final payment shall be authorized not later than thirty (30) days following the completion and final acceptance of the contract, provided that the provisions herein and all other contract requirements have been fulfilled, accepted and approved, where no claims have been filed or following adjudication or release of claims as provided in Chapter 573 of the Code of Iowa.

4.5.4 No notification of payment being processed, no payment made to the Contractor, no partial payment, nor the entire use or occupancy of the work by the Iowa DOT shall be held to constitute an acceptance, in whole or in part, by the Iowa DOT prior to making the final payment and acceptance in full completion of the contract.

4.6 Insurance Requirements

Contractor's Insurance

- It shall be the Contractor's responsibility to have liability insurance covering all of the project operations incident to contract completion and the Contractor(s) must have on file with the Contracting Authority a current "Certificate of Insurance" prior to award of contract. The certificate shall identify the insurance company firm name and address, contractor firm name, policy period, type of policy, limits of coverage, and scope of work covered (single contract or statewide). This requirement shall apply with equal force, whether the work is performed by persons employed directly by the Contractor(s) including a subcontractor, persons employed by a subcontractor(s), or by an independent contractor(s).
- In addition to the above, the Iowa DOT shall be included as an insured party, or a separate owner's protective policy shall be filed showing the Iowa DOT as an insured party.
- The liability insurance shall be written by an insurance company (or companies) qualified to do business in Iowa. For independent contractors engaged solely in the transportation of materials, the minimum coverage provided by such insurance shall be not less than that required by Chapter 325A, Code of Iowa, for such truck operators or contract carriers as defined therein. For all other contractors, subcontractors, independent contractors, and the Contracting Authority, the minimum coverage by such insurance shall be as follows:
 - Commercial General Liability including Contractual Liability;
 - Contingent Liability; Explosion, Collapse and Underground Drainage
 - Damage; Occurrence Basis Bodily Injury; Broad Form Personal Injury; Broad Form Property Damage.

Bodily Injury

The contractor will purchase and maintain throughout the term of this contract the following minimum limits and coverage:

- Each person \$750,000
- Each accident/occurrence \$750,000
- Workers Compensation \$750,000
- Statutory Limits \$750,000
- Employer's liability \$750,000
- Occupation Disease \$750,000

Operations

- Property Damage \$250,000 each occurrence

Builders Risk Insurance

- Each Contractor holding a valid contract with the Iowa DOT shall furnish and pay for builder's risk insurance, providing coverage for at least the following losses: fire, extended coverage, vandalism and malicious damage to materials incorporated in the project, and materials purchased to be incorporated in the project, either stored on or off the permanent job site. If this insurance coverage is not provided, the Contractor shall assume all responsibility for the perils outlined above which may occur prior to project completion and acceptance.
- Failure on the part of the Contractor(s) to comply with the requirements of this Article will be considered sufficient cause to suspend the work, withhold estimates, and to deny the Contractor(s) any further contract awards, as provided in Article 1103.01.
- The Contractor(s) shall require all subcontractor(s) meet the above insurance requirements.

The Certificate of Insurance must include the following

- Iowa Department of Transportation must be listed as an additional insured
- Proposal Number
- Proposal Description
- Letting Date
- Contract Period

4.7 Public Contract Termination

The provisions of Iowa law as contained in Chapter 573A of the Code of Iowa, an Act to provide for termination of contracts for the construction of public improvements when construction or work thereon is stopped because of national emergency, shall apply to and be a part of this Contract, and shall be binding upon all parties hereto, including sub-contractors and sureties upon any bond given or filed in connection herewith.

PROJECT MANUAL

IOWA DOT Materials Lab MDP Replacement

800 Lincoln Way
Ames, IA 50010

IA DOT Project No. BG-3A22(038)—80-85

**IOWA DEPARTMENT OF TRANSPORTATION
800 Lincoln Way
Ames, Iowa 50010**



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Project 14063

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800 Lincoln Way
Ames, IA 50010

	<p>I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly registered Architect under the laws of the State of Iowa.</p> <p style="text-align: center;"><u>Stephen J. Stimmel, AIA</u></p> <hr/> <p>Signature _____ Date _____</p> <p>Registration expires <u>June 30, 2017</u> Date issued <u>Sept 23, 2015</u></p> <p>Specification Divisions covered: <u>01 thru 09 (except as noted below)</u></p> <p>Excluded Sections: <u>03 30 00, 05 31 00</u></p>
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	<p>I hereby certify that this engineering document was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p> <p style="text-align: center;">_____, 20____</p> <p style="text-align: center;">Robert A. Hedgepeth, P.E</p> <p>License number: <u>14212</u></p> <p>My license renewal date is December 31, 2015</p> <p>Discipline <u>Electrical Engineering</u></p> <p>Specification Divisions covered: <u>Divisions 26</u></p> <p>Date issued <u>Sept 23, 2015</u></p>
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	<p>I hereby certify that this engineering document was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p> <p style="text-align: center;">_____, 20____</p> <p style="text-align: center;">John Nigro, P.E</p> <p>License number: <u>7843</u></p> <p>My license renewal date is December 31, 2016</p> <p>Discipline <u>Structural Engineering</u></p> <p>Specification Sections covered: <u>03 30 00, 05 31 00</u></p> <p>Date issued <u>Sept 23, 2015</u></p>
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Iowa DOT
MATERIALS LABORATORY MDP REPLACEMENT
 800 Lincoln Way
 Ames, IA 50010
 IA DOT Project No. BG-3A22(038)—80-85

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CONTRACTOR SAFETY AND SECURITY REQUIREMENTS

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1.1 PURPOSE, SCOPE AND PHILOSOPHY

- A. This section defines safety requirements, which Contractor shall comply with and enforce on all State of Iowa worksites. This section also addresses conditions of work and the manner in which owner expects work on their premises to proceed.
- B. Failure of this section to reference specific laws, ordinances, codes, rules, regulations or orders does NOT excuse Contractor or Contractor employees from following those regulations that may be applicable to the scope of work being performed by Contractor. Contractors may employ more restrictive or stringent safety measures in order to comply with specific laws, ordinances, codes, rules, regulations, orders or requirements of Contractor's own safety program or employee safety training.
- C. The safety requirements may be exceeded by the specific safety rules and procedures of individual operating entities. Contractor and Owner safety representatives shall coordinate to resolve conflicting statements.
- D. Contractor shall be aware that the spaces used for construction during this Contract will be occupied by Owner personnel during the entire construction period. All measures necessary will be taken to ensure a safe working environment for Contractor and Owner personnel.
- E. Contractor shall not permit any person to enter upon the premises of Owner at the worksite or non-public building entrances, except in accordance with the safety and security requirements of Owner, or such governmental authority having an interest in the work. Should any

unforeseen considerations or problems arise, they shall be resolved by mutual agreement, recognizing that personnel safety is of paramount importance.

1.2 REFERENCES

- A. The publications listed below and its supplements, including but not limited to, form a part of these requirements:
 - 1. U.S. Department of Labor - Occupational Safety and Health Administration (OSHA).
 - 2. National Crime Information Center (NCIC).
 - 3. National Fire Protection Association (NFPA).
 - 4. National Electrical Code (NEC) - Refer to NFPA 70.
 - 5. Standard for Electrical Safety in the Workplace – Refer to NFPA 70E.
 - 6. American National Standards Institute, Inc. (ANSI).
 - 7. The Material Handling Institute, Inc. (MHI) - Refer to Crane Operators Manual.
 - 8. Environmental Protection Agency (EPA).
 - 9. Uniform Fire Code or applicable fire code.
 - 10. Uniform Building Code or applicable building code.
- B. Where a standard is referenced in this document, the subject referenced (equipment, material or work) shall be in compliance with the most recent edition of that standard.
- C. The referenced standards are minimum requirements. Where the requirements of this document are in excess of, but not contrary to, the referenced standards, Contractor shall comply with the more stringent requirements.

1.3 OWNER'S FACILITY SECURITY REQUIREMENTS AND SAFETY INDOCTRINATION

- A. At Owner's option, Contractor employees (or select employees) may be required to possess and display an Owner issued ID or Photo ID.
- B. Contractor shall obtain from Owner any safety rules and regulations in effect at Owner's specific worksite. Contractor will be responsible for requiring all of Contractor's employees (including Sub-Contractor employees) to receive and ensure comprehension of this information prior to beginning work.

1.4 PERMITS

- A. Safety permits may be required for certain work activities on Owner worksites. Examples include, but are not limited to the following:
 - 1. Any work such as drilling, soldering, welding, or other work which may burn or produce a flame, including the use of an open flame or any other heat-generating or spark-producing device shall require an "Open-Flame, Cutting, and Spark Hazard Permit" by Contractor to be completed before work begins. Refer to Article 1.6 for welding, cutting and spark production requirements.
 - a. As required, the Contractor shall submit a copy of the "Open Flame, Cutting, and Spark Hazard Permit" for review and approval prior to commencement of work if such conditions may be encountered during work.
 - 2. To perform electrical work on transformers, panels or other equipment shall require a "Lock-Out/Tag-Out Permit" by Contractor to be completed before work begins. Refer to Article 1.7 for electrical work and lock-out/tag-out procedures.
 - a. As required, the Contractor shall submit a copy of the "Lock-Out/Tag-Out Permit" for review and approval prior to commencement of work if such conditions may be encountered during work.

- B. It is imperative that the conditions noted on the permit(s) are identical to the actual job conditions. When the nature or conditions of a job change in any way, or when new tools are required or different methods are employed to do the job, other than those originally covered in the initial permit, WORK SHALL STOP IMMEDIATELY because the permit is invalid. The permit is only good for what it describes - no more. Work cannot progress until the situation can be carefully analyzed and a new permit issued for the new conditions.
- C. Communication is the key to enhancing the effectiveness of the work permits system. Contractor's employees, agents, delegates, invitees and subcontractors and Owner's Designated Representative, including operators and facility supervisors, must all be aware of the permit process and the specific requirements of each permit. This then allows each to review the ongoing work and look for possible changing conditions or deviations during their daily work routine. Permits may only be requested and obtained by Contractor's Designated Representative. After the permit has been issued, but before any work has been performed, the Contractor's copy of the permit shall be read and initialed by Owner's Designated Representative. This assures both Contractor and Owner Designated Representative's knowledge and involvement. After the Owner's Designated Representative has initialed the permits the Contractor's Designated Representative shall distribute the permit to Contractor employees performing that work. Contractor's Designated Representative shall make sure Contractor employees read the permit requirements. These permits must be posted in the work area. If the permit cannot be posted, it must be carried by one of Contractor supervisors in that area. Owner's Designated Representative will, as a routine, periodically question Contractor employees as to the location of the permit and its requirements. Permits are valid for only one day. Permits shall not remain in Contractor's trailer (if a job trailer is required). Permits shall be returned to the Owner's Designated Representative at the end of the day. A historical record shall be maintained by the Owner.

1.5 FIRE PROTECTION AND PREVENTION

- A. Contractor's personnel shall observe owner's fire safety rules and regulations and evacuation procedures.
- B. Contractor shall provide the number of fire extinguishers and fire protection devices required by law and any additional protection devices required by Owner. Contractor shall also maintain the equipment in good operating condition (i.e., fully charged). All fires and types of extinguishing equipment used shall be promptly reported to Owner's Designated Representative.
 - 1. A fire extinguisher, rated not less than 2A, must be provided for each 1,500 square feet of the protected building area with travel distance from any point to the nearest extinguisher not to exceed 75 feet.
- C. Contractor shall be responsible for the development of a fire protection program to be followed throughout all phases of the construction work and shall provide for the fire-fighting equipment in accordance with OSHA regulations, these guidelines, and the requirements appropriate to the type of construction being performed. This shall include, but not be limited to:
 - 1. All fire-fighting equipment provided by Contractor shall be conspicuously located, free for access, periodically inspected, and maintained in good operating condition. Defective equipment shall be replaced immediately. Contractor shall give particular attention to training Contractor's personnel in the use of fire extinguishers and their limitations.
 - 2. Installation of an automatic sprinkler protection system(s) must follow the construction work sequence as soon as possible and be placed in service as soon as applicable laws permit.
 - 3. The telephone number(s) of the nearest appropriate fire department(s) and Owner's security/emergency number(s) shall be conspicuously posted.
 - 4. All smoking areas shall be designated by Owner's Designated Representative. Smoking shall be prohibited elsewhere, including on all roofs and in areas where flammable or combustible liquids and materials are used and stored. No smoking on state property.

- D. Fire prevention program shall also include analysis of potentially hazardous materials, identifying hazardous area classifications, developing guidelines for storage and handling and using items such as fuel oils, flammable gases, solvents, plastics and paints.
- E. Notify Owner of areas where work will take place that will produce dust or smoke that may affect cleanliness or function of fire alarm system smoke detectors. Owner may elect to disable devices to prevent false alarms. Contractor shall protect devices and ensure protection (such as covers or bags) are removed upon completion of work in this immediate area. Inform Owner when work is complete so that proper fire alarm system protection can be restored to the area.

1.6 WELDING, CUTTING AND SPARK PRODUCTION

- A. Contractor's personnel shall observe Owner's safety regulations regarding welding, cutting and spark production.
- B. Provide Owner's Designated Representative a minimum of 48 hours notice for all welding and cutting operations to take place within mechanical spaces with air moving equipment. Timing of such work will be coordinated to take place after normal business hours for the building to allow shutdown of air moving equipment to preclude propagation of fumes throughout building spaces.
- C. Proper precautions (isolating welding and cutting, removing fire hazards from the vicinity, providing a fire watch, etc.) for fire prevention shall be taken in areas where welding or other "hot work" is being done. The "Open-Flame, Cutting, and Spark Hazard Permit" must be issued by the facility designated person at the request of the Owner's Designated Representative prior to any welding, cutting or other "hot work" being performed. No welding, cutting or heating shall be done where the application of flammable paints or the presence of other flammable compounds or ignitable dust concentration creates a fire hazard.
- D. Contractor shall exercise extreme care in the use of all open flame equipment. Owner's Designated Representative shall be informed daily of all such activities. The following items are of particular importance and shall be strictly enforced by Contractor:
 - 1. Contractor shall enforce strict compliance with the above "Open-Flame, Cutting, and Spark Hazard Permit".
 - 2. Contractor's welding, cutting or spark production shall be permitted in flammable liquid areas only if vapor checks are made and automatic sprinklers are in service.
 - 3. Contractor shall use fire-resistant tarpaulins to contain sparks and hot metals.
 - 4. Contractor shall confine flammable liquids in approved safety containers.
- E. Contractor shall perform welding and cutting in accordance with OSHA regulations. These shall include, but not be limited to:
 - 1. All exposed combustible materials located below the welding and cutting area shall be removed to a safe location, covered with a fire-resistant material or protected by an approved spark catcher to contain all sparks and slag.
 - 2. A fire extinguisher suitable for the hazards must be within the immediate area of any welding, cutting, or open flame work. A welder's helper or fire watcher shall be required whenever cutting or welding is performed in locations where a fire might develop.
 - 3. The user shall inspect all leads, grounds, clamps, welding machines, hoses, gages, torches and cylinders before they are put into operation. Leads must not be placed in traffic areas.
 - 4. All fittings, couplings and connections are to be "leak-free".
 - 5. Provide adequate ventilation while cutting, welding, soldering or working on galvanized material and while working within enclosed shelters.
 - 6. All work shall have a separate and adequate ground, pulled from the welding machine to the item being welded.

7. At the end of each shift (or when not in use for extended periods or unattended), the welding machine shall be turned off.
8. An approved welding helmet shall be worn.
9. Electric welding is prohibited from any metal ladder. (Metal ladders are not permitted on site.)
10. Compressed gas cylinders shall be secured vertically to an adequate support while in storage or transit. The protective cap must be on during storage and transit. All oxygen cylinders shall be separated while in storage from any flammable gas such as LP or acetylene cylinders by a 5 foot high fire barrier having a 1/2 hour fire rating or separated by a minimum distance of 20 feet. Under no circumstances shall acetylene cylinders be laid down.
11. Keep oil and grease away from oxygen regulators, hoses and fittings. Do not store wrenches, dies, cutters or other grease covered tools in the same compartment with oxygen equipment.
12. Approved cutting goggles shall be worn.
13. Gloves shall be worn to protect hands and wrists. Flying chips and weld slag travel a considerable distance and may be dangerous to other personnel in the area and, therefore, shall require screening or shielding. Heavy leather work gloves, long sleeve shirts or jackets and goggles or a full face shield shall be worn when welding, cleaning, grinding, and brushing surfaces. The same precautions shall be taken for wire brushing and power brushing. Flame-resistant aprons of leather or other suitable material shall be worn as protection against radiating heat and sparks. Clothing should be free of oil and grease.
14. Torches shall never be left in a vessel due to potential leaks.
15. Oxygen shall not be used to operate pneumatic tools, pressurize a container, blow out lines or as a substitute for compressed air or other gases.
16. Cylinders and hoses shall be placed where they are not exposed to sparks and slag from a welding or cutting operation.
17. Cylinders shall be raised to upper levels with approved rigging gear. Do not lift them with slings or by the protective cap.
18. Do not strike an arc on cylinders or use them as rollers.
19. Cutting/burning units must have hoses bled and gages zeroed when not in use.

1.7 ELECTRICAL WORK AND LOCK-OUT/TAG-OUT PROCEDURES

A. General Requirements:

1. All electrical work shall be performed by qualified personnel. Work shall be performed on locked out de-energized circuits whenever possible. Exceptions include: testing of circuits, working on a portion of a continuous industrial process where shutdown of the entire process is not feasible, etc. Work on energized parts shall follow requirements of OSHA.
2. All electrical work, installation, and wire capacities shall be in accordance with the pertinent provisions of NFPA 70 (latest revision) and area classifications.
3. The construction and installation of permanent and temporary electrical power shall comply with OSHA standards.
4. Contractor shall be in compliance with Lock-out/Tag-out procedures prior to starting electrical work, which involves cutting, splicing or tapping existing cables. Contractor shall tag and identify all cables present in the area. Contractor shall check to make sure that the circuit to be worked on has been de-energized and the source locked out. Contractor shall use its own padlock on the disconnect device. Review one line diagram to be sure there are no alternate power sources.
 - a. Contractor will check for energized cable with a device intended for the purpose before cutting into the cable or opening a splice or termination. Solidly ground the cable to a KNOWN low resistance ground point while working on the cable.
 - b. Electrical lines shall be de-energized while work is performed with the energy control source locked out. When it is necessary to work with energized lines, only

qualified personnel and effective means of personal protection shall be utilized in accordance with NFPA 70E, such as, but not limited to, rubber gloves and blankets which have been tested regularly in accordance with ANSI.

5. At least two people shall be assigned to work on any energized lines or in substations.

B. Grounding Requirements:

1. All electrical circuits shall be grounded in accordance with the NEC, unless otherwise noted in this specification.
2. A ground shall be provided for non-current-carrying metallic parts of equipment such as: generators (if not exempted by NEC 250-6), electrically powered welders, switches, motor-controller cases, fuse boxes, distribution cabinets, frames, non-current-carrying rails used for travel, motors of electrically operated cranes, electric elevators, metal frames of non-electric elevators to which electric conductors are attached, other electric equipment and metal enclosures around electric equipment.
3. Portable and semi-portable electrical tools and equipment shall be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
4. Semi-portable equipment, floodlights and work lights shall be grounded. The protective ground of such equipment shall be maintained during moving unless supply circuits are de-energized.
5. Tools protected by a system of double insulation, or its equivalent, need not be grounded. Double-insulated tools shall be distinctly marked and listed by UL or FM.
6. Grounding circuits shall be checked to ensure that the circuit between the ground and a grounded power conductor has a resistance, which is low enough to permit current flow sufficient to cause the fuse or circuit breaker to interrupt the current.
7. Conductors used for bonding and grounding stationary and movable equipment shall be of ample size to carry the anticipated current. When attaching bonding and grounding clamps or clips, a secure and positive metal-to-metal contact shall be made. The ground end shall be attached first and the other end shall be attached and removed by insulated tools or other suitable devices. When removing grounds, the grounding device shall first be removed from the line or equipment using insulated tools or other suitable devices. Such bonding and grounding attachments shall be made before closures are opened and material movements are started and should not be broken until after material movements are stopped and closures are made.
8. All 120-volt single-phase 15 and 20 ampere receptacle outlets which are not a part of the permanent wiring of the building or structure shall have ground-fault circuit interrupters (GFCI) for personnel protection or an assured equipment-grounding conductor program. Permanent wiring of electrical circuits shall be grounded in accordance with NEC. GFCI's may be sensitive to some equipment such as concrete vibrators. In these instances, other precautions shall be taken to protect the equipment.

C. Temporary Wiring:

1. Temporary wiring shall be guarded or isolated by elevation to prevent accidental contact by workers or equipment.
2. Flexible/extension cord sets shall be of a type listed by the UL. Flexible/extension cord sets used on construction worksites shall contain the number of conductors required for the service, plus an equipment ground wire. The cords shall be hard usage or extra-hard usage as specified in the NEC. Approved cords may be identified by the word "outdoor" or letters "WA" on the jacket. All portable receptacle boxes must be approved for outside use (free of knock out plugs).
3. Exposed empty light sockets and broken bulbs shall not be permitted. Replace missing or broken lamps as soon as possible.
4. Temporary lights shall be equipped with heavy-duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this suspension. Splices shall have insulation equal to that of the cable.

5. Temporary lights shall be equipped with guards to prevent accidental contact with the bulb.
6. Attachment plugs for use in work areas shall be constructed so that they will endure rough use. They shall be equipped with a cord grip to prevent strain on the terminal screws.

1.8 CONTRACTOR'S SAFETY TRAINING AND EDUCATION

- A. Contractor shall instruct each employee in the recognition and correction of unsafe acts, behavior and conditions and the regulations applicable to contractor's work environment. The employee shall use these instructions to control or eliminate any hazards or other exposure to illness or injury.
- B. Contractor shall acquaint each Contractor employee with the safety and emergency equipment available and the procedures to be followed in each type of emergency.
- C. At a minimum, each Contractor shall be required to conduct weekly safety meetings with Contractor personnel and Subcontractors. Minutes must be kept and submitted to the Owner's Designated Representative, if requested.
- D. Contractor shall provide a qualified employee who is responsible for maintaining worksite safety during all phases on worksite. The qualified employee shall conduct safety meetings with all personnel weekly, monitor site safety continuously, and thoroughly investigate all accidents and near misses. The qualified employee may have other worksite responsibilities.
- E. All Contractor personnel shall receive an initial indoctrination by Contractor's safety supervisor into Contractor's safety procedures and the requirements of this section.
- F. Before work begins, Contractor shall provide to Owner a hazardous chemical inventory for contractor-supplied hazardous materials and corresponding MSDS information. Contractors are required to inform Owner's Designated Representative of hazardous substances brought on worksite and to update the hazardous chemical inventory.
 1. The hazardous chemical inventory, along with all update information shall be made available to Owner's Designated Representative on a regular scheduled basis with copies of MSDS information as requested by Owner.
- G. Contractors are required to strictly enforce container labeling. Labels are to include the identity of the substance and the appropriate hazard warning on all containers of hazardous substances.
 1. In the event that containers suspected of containing hazardous substances are received without the manufacturer's label, the shipment shall be rejected. All containers of hazardous substances shall be appropriately labeled and identified.
 2. If a shipment of properly labeled containers is received by Contractor without a MSDS, Contractor shall immediately request the MSDS from the manufacturer; a copy of the written request shall be submitted to Owner's Designated Representative. The MSDS is not required for subsequent deliveries of the same product.
- H. Contractors are responsible for educating their personnel on the requirements of the Federal Hazard Communication Standard regarding hazardous chemical inventories, MSDS information, container labeling and evacuation procedures.
- I. Documentation of employee training is of paramount importance to ensure Federal Hazard Communication Standard compliance. Contractor shall keep complete and accurate records of Contractor personnel training and attendance. This documentation, as well as the hazardous

chemical inventory and MSDS file, shall be ready for audit at any time by either Owner's Designated Representative or an OSHA inspector.

1.9 RECORDING AND REPORTING OF INJURIES

- A. Every Contractor and Subcontractor shall keep occupational injury and illness records for employees which shall include the following forms:
 - 1. Supplementary Record of Occupational Injuries and Illnesses or a "First Report of Injury/Illness" as required by the state.
 - 2. Log and Summary of Occupational Injuries and Illnesses.
 - 3. Any state safety and health records required.
- B. Contractor shall notify Owner of the name of Contractor's employee who will be knowledgeable in the prevention of accidents at the worksite, and whose duty will be to report immediately to Owner's Designated Representative, all accidents and injuries occurring at the worksite. A written report shall be filed with the Owner as soon as practical. If Contractor is required to file an accident report with a public authority, Contractor shall provide a copy of the report to Owner.
- C. Contractor shall investigate each OSHA recordable accident to determine the cause and implement future corrective measures. Contractor shall present a written copy of its investigation report and corrective action measures to Owner's Designated Representative.
- D. Every Contractor and Subcontractor shall provide the total employee hours worked each day on the worksite to the Owner's Designated Representative or according to the local facility procedures.

1.10 FIRST AID AND MEDICAL ATTENTION

- A. All first aid and medical attention for Contractor's workers shall be handled by Contractor in accordance with OSHA regulations.
- B. Contractor shall set up a first aid station in compliance with OSHA and state regulations.

1.11 PERSONAL PROTECTIVE EQUIPMENT

- A. Contractor is responsible for providing and requiring employees to wear appropriate personal protective equipment for all operations where there is an exposure to hazardous conditions, where there is the need for using such equipment to reduce the hazards to employees, where required by the specifications or where required by plant operating procedures. The most stringent requirements shall take precedence and shall include, but not be limited to:
 - 1. Hard hats (metal hard hats shall not be worn), safety glasses and full-length trousers are required personal protective equipment and must be worn at all times when tasks performed at the worksite make such items required. Flexible slip-on side shields are acceptable alternatives to safety glasses. Additional personal protective equipment such as ear plugs, goggles, conductive shoes, grounding straps, safety harness and energy-absorbing lanyard, gloves, safety nets, respirators and similar safety items may be required depending on the nature of the work area and the work involved. Safety belts are not to be used on any worksite.
 - 2. When the possibility of loose particles or flying projectiles exists, the proper safety wearing apparel and safety protection devices shall be worn. Safety shoes are recommended.
 - 3. Contact lenses may not be worn in operating areas.

4. Flame Retardant clothing and other appropriate and insulating clothing, tools and equipment for use with work on energized electrical equipment in accordance with NFPA 70E.
- B. Contractor shall have extra safety glasses and hard hats available on the worksite. Safety glass cleaner shall also be made readily available to all contractor employees on the worksite.

1.12 PERSONAL CONDUCT

- A. Horseplay, fighting, gambling, explosives, possession of firearms, drinking alcoholic beverages, use of regulated drugs, being under the influence of drugs or alcohol, theft, vandalism, sabotage and distribution of unauthorized literature shall be cause to bar those involved from the worksite.

1.13 SAFETY INSPECTION AND HOUSEKEEPING

- A. At a minimum, Contractor shall check the work area daily at the beginning and at the end of each work shift to ensure safe working conditions are maintained and all safety procedures are followed.
- B. During the course of the work, Contractor shall be responsible for properly organizing all activities on the worksite to the extent that good housekeeping shall be practiced at all times. This shall include, but not be limited to:
1. As the job progresses, work areas shall be kept clean at all times.
 2. All materials, tools and equipment shall be stored in a stable position to prevent rolling or falling. Materials and supplies shall be kept away from edges of floors, hoistways, stairways and floor openings.
 3. A safe access way to all work areas and storage areas shall be maintained. All stairways, corridors, ramps, passageways and work platforms shall be kept clear of loose material and trash.
 4. All debris shall be cleared from work areas, passageways, stairs, and in and around buildings or other structures.
 5. Combustible scrap and debris shall be removed at regular intervals. Safe means shall be provided to facilitate such removal.
 6. Contractor shall supply an adequate number of dumpsters to insure a clean working area at all times. Contractor shall load and transport all refuse and debris to a suitable disposal area away from the worksite and make disposition in a lawful manner.
 - a. Contractor's parking and staging areas shall also be maintained clean and free of all debris at all times.
 7. Contractor break and eating areas shall be maintained in a clean and orderly condition. Garbage containers shall be placed in these areas and frequently emptied. Eating and drinking shall not be permitted in the construction work areas.
 8. Contractor shall restrict the use of flammable liquids and gases to a minimum. Store all flammables not actually needed for immediate use outside building, in a secure shelter. Store flammables outside building during non-work hours. Store rags or wiping waste with oily or flammable residue away from flammable liquids in approved metal containers.
 - a. Contractor shall collect and dispose of flammable debris and dust as it is accumulated.
 - b. Storage locations for gasoline or other flammable materials used for vehicles or equipment shall be in areas agreed to by Owner's Designated Representative. These areas shall be diked to retain spilled material and have an appropriately placed fire extinguisher.
 - c. All items must be properly labeled.
 9. Cords and hoses shall be kept a minimum of 7 feet overhead or laid flat outside of walkways.

10. Tools and equipment shall not be strewn about where they might cause tripping or falling hazards and shall, at the end of each workday, be collected and stored in the tool room or craft gang boxes.
11. Each employee shall be instructed to practice required housekeeping as part of assigned duties.

C. Housekeeping and care of the worksite shall be in accordance with the Contract.

1.14 MATERIAL HANDLING AND STORAGE

A. General:

1. Contractor shall be responsible for using safe methods of handling, storage and disposal of materials on the worksite.
2. Contractor's personnel shall observe Owner's safety rules and regulations for receiving, handling, storage and disposal of all materials. See Article 1.18 for proper environmental disposal procedures.

B. Material Storage:

1. All materials stored shall be stacked, braced, racked, blocked, interlocked or otherwise secured to prevent sliding, rolling, falling or collapse.
2. Flammable material storage shall be as previously described under Article 1.13 of this section.
3. Materials stored inside buildings under construction shall not be placed within 6 feet of any hoistway or inside floor opening, or within 10 feet of an exterior wall, which does not extend above the top of the material stored.
4. Materials stored on existing structurally supported floors and roofs shall not exceed the uniform design load capacity of floor or roof.
5. Materials shall be stored in a manner to provide unobstructed access to all exits.
6. Storage location shall be approved by Owner's Designated Representative.

1.15 VERTICAL AND HORIZONTAL WORK SAFETY ACCESS CONTROL

A. Ladders:

1. The use and erection of ladders shall comply with OSHA regulations and shall include, but not be limited to:
 - a. Each user must visually inspect each ladder for defects before using.
 - b. While ascending or descending a ladder, carry nothing that will prevent holding onto the ladder with both hands. Use a handline if necessary to raise or lower materials.
 - c. Metal ladders shall not be used.
 - d. Ladders shall be securely tied off.
 - e. When working from ladders, work facing the ladder with both feet on the rungs.
 - f. All ladders shall have appropriate shoes or footings.
 - g. Workers shall not stand on the top or second step of stepladders.

B. Scaffolds:

1. The use and erection of scaffolds shall comply with OSHA regulations and shall include, but not be limited to:
 - a. All scaffolds shall be erected on a firm base.
 - b. Never exceed safe working loads on scaffolds.
 - c. Never rig from scaffold handrails or braces.
 - d. Scaffold handrails, midrails or brace members shall not be climbed. Use ladders for access.
 - e. Appropriate hand and toe rails and cleats are required.

2. Since federal standards are quite detailed in their specifications for the dozens of types of scaffolds, OSHA 29 CFR Part 1926.451 must be referred to for each particular job's scaffolding requirements.
- C. Openings in Floors:
1. The protection of unguarded openings in floors, including access floors shall be barricaded immediately in compliance with OSHA regulations.

1.16 MISCELLANEOUS PROVISIONS

- A. General:
1. Contractor is solely responsible for Contractor equipment and goods. Owner is not responsible for any losses by theft (or by whatever nature) of Contractor's property.
 2. Loose clothing, rings and other jewelry shall not be worn around operating tools or machines. Keep sleeves buttoned.
- B. Illumination:
1. Contractor shall ensure that construction areas, aisles, stairs, ramps, corridors, offices, and storage areas where work is in progress shall be adequately lighted with either natural or artificial illumination. Refer to OSHA Standards for illuminated light levels in all work areas.
- C. Hand and Power Tools:
1. All hand and power tools and similar equipment, whether furnished by Contractor or Contractor employees, shall be maintained in a safe operating condition. Damaged tools shall be immediately repaired or replaced. Tools shall be used only for the purpose for which they were designed.
 2. Any tools that are designed to have guards must have those guards in place at all times. Any worker removing a guard or using an unguarded tool shall be subject to dismissal from the worksite.
 3. Grinders are particularly hazardous. Workers shall be trained in their use. While the grinders are rotating, the operator shall assure that he/she is in a balanced position and that the momentum of the disc will carry the tool away from the operator if it becomes stuck.
- D. Sanitation:
1. Contractor shall be allowed to use water fountains, toilets and handwashing facilities in Owner's building. Contractor personnel shall leave these areas mess-free or Owner may prohibit their use by Contractor personnel.

1.17 SIGNS, SIGNALS AND BARRICADES

- A. The fabrication and use of barricades and handrails shall be in compliance with Owner's safety rules and with OSHA and ANSI regulations. Special attention shall be given by contractor to the following items:
1. To protect workers from injury, Contractor shall construct removable replaceable handrails, temporary barricades or secured covers for all openings in floors, including access floors, in accordance with all applicable safety regulations. Such handrails, barricades and covers may be removed only when removal is necessary for the performance of work near the opening. They shall be replaced when any of the following occur:
 - a. The workers take a break and leave the area; or
 - b. The work is not completed by the end of the working day; or
 - c. As soon as their absence is no longer necessary for the performance of the work.

2. When such handrails, barricades or covers are removed by Contractor or any Subcontractor, they shall be replaced or rebuilt as necessary by Contractor or Subcontractor who removed them.
 3. Contractor shall post areas where it is necessary to do overhead work.
- B. Contractor shall be responsible for posting, installing and maintaining signs, signals and barricades to detour the passage of persons at all locations where potential hazards exist.
 - C. Contractor's employees shall obey all signs, signals and barricades, which are posted to warn of potential or existing hazards.
 - D. Barricades shall be 42 inches high, installed square and level.
 - E. The selection and use of signs and tags shall be in conformance with the appropriate ANSI standard.
 - F. Contractor shall be responsible for attaching danger tags to a piece of equipment (or part of a structure) to warn of potential or immediate hazards.

1.18 ENVIRONMENTAL REQUIREMENTS

- A. Contractor Supplied Materials:
 1. Contractor shall provide the Owner's Designated Representative with a MSDS for all hazardous and/or toxic material before they are brought on site. All hazardous and/or toxic material brought on site must be approved by Owner's facility management or an appointed alternate.
 2. All containers must be properly labeled and kept sealed when not in use.
 3. Chemicals that are environmentally safe and compatible are to be used whenever possible.
 4. Portable tanks (if capacity exceeds 110 gallons each) brought on site must have secondary containment.
- B. Ozone Depleting Chemicals:
 1. The following ozone depleting chemicals shall not be used at State of Iowa facilities, including use in cleaning equipment parts:

CFC-11
(CAS #75-69-4)
Fluorocarbon 11
Fluorotrichloromethane
Trichlorofluoromethane
Freon 11
Trichloromonfluoromethane

CFC-12
(CAS #75-71-8)
Dichlorodifluoromethane
F-12
FC-12
Fluorocarbon 12
Freon 12

CFC-113
(CAS #76-13-1)
FC-113
Freon 113
1, 1, 2-Trichloro-1, 2, 2-tetrafluoroethane
1, 2, 2-Trichlorotrifluoroethane

CFC-114
(CAS #76-14-2)
1, 2-Dichloro-1, 1,2-tetrafluoroethane
FC-114
Freon 114
Sym-Dichlorotetrafluoroethane

CFC-115
(CAS #76-15-3)
Chloropentafluoroethane
Fluorocarbon 115
Freon 115

Carbon tetrachloride
(CAS #56-23-5)
Tetrachloromethane
Perchloromethane

Methyl Chloroform
(CAS #71-55-6)
1, 1, 1-Trichloroethane
Chloroethene

2. Refrigeration and air conditioning equipment containing CFCs may continue to be used until feasible substitutes exist. However, when such equipment is disposed of or replaced, the CFCs should be collected for reclamation or proper disposal.
3. Contractor shall notify Owner's Designated Representative for packaging and disposal requirements.
4. Contractor is responsible for ensuring employees handling CFCs are trained and certified.

C. Permits and Notifications:

1. All required environmental permits and notifications must be in hand before installation, modification, or operation of equipment or process begins.

D. Polychlorinated Biphenyls (PCBs):

1. Polychlorinated Biphenyls (PCBs) and PCB-containing equipment shall not be used at or installed in State of Iowa facilities and equipment.
2. All PCB light ballasts and capacitors removed from equipment at a State facility remain the property of the State.

E. Spills:

1. Contractor shall notify the Owner's Designated Representative for instructions on all waste management issues, including packaging and disposal.
2. Contractor shall take steps necessary to minimize the risk of releases of any fuel, oils, solvents, paints and other liquids. This includes releases to the ground, surface waters, sewers and/or atmosphere.
3. Contractor must report spills immediately to the Owner's Designated Representative or site security.

F. Waste Management:

1. Contractor is responsible for ensuring their employees are trained and certified.
2. Contractor shall maintain good housekeeping procedures.
3. Contractor shall notify Owner's Designated Representative for instructions on all waste management issues including packaging and disposal. Contractor shall comply with applicable federal, state and local regulatory requirements, laws and ordinances.
4. Waste may not be discharged to the sewer without prior approval from Owner.
5. No materials used on site may be left on site without prior approval from Owner.

- G. Asbestos:
1. Asbestos-containing material (ACM) will not be installed in any State of Iowa facility or equipment.
 2. Only Contractors trained and licensed in asbestos removal techniques may remove or otherwise disturb ACM.
 3. Contractor must contact the Owner's Designated Representative prior to beginning work in an area to identify the presence or absence of ACM. No work may be conducted that may potentially disturb ACM. If work in an area has already begun, the Contractor is to stop work and contact the Owner's Designated Representative to verify any question as to the presence of asbestos in any material to be disturbed.
- H. Lead:
1. Contractor must contact the Owner's Designated Representative prior to beginning work in an area to identify the presence or absence of lead in painted, coated or other suspected materials that may be disturbed during the course of work.
 2. Contractor must comply with the federal, state and local regulations related to construction activities involving lead-containing materials.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

SECTION 01 0163
PRE-BID SUBSTITUTIONS

PART 1 GENERAL

1.01 DOCUMENT INCLUDES

- A. Pre-Bid Substitutions
- B. Sample Form: Request For Substitution
 1. Contractor shall make copies as needed.
 2. Use one form for each Specified Item.

1.02 BIDDER'S OPTIONS

- A. For products specified by reference standard only, select product meeting that standard, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select one of the products and manufacturers named which complies with the technical Specifications. No substitutions will be allowed.
- C. For products specified by naming several products or manufacturers and stating "or equivalent", or "equal", or "Architect approved equivalent", or similar wording, submit a Request For Substitution for any product or manufacturer which is not specifically named. Architect and/or Engineer will review and consider for approval. If not approved prior to bidding, product is not allowed for use in the project.
- D. For products specified by naming only one product/manufacturer, there is no option and no substitution will be allowed.

1.03 SUBSTITUTIONS

- A. Prepare Base Bid in accordance with requirements of the Bidding Documents.
 1. Substitutions for products may be made during the bidding period by submitting completed Request For Substitution form and providing substantiating product information. Request For Substitution form must be received by the Office of Purchasing a minimum of seven (7) calendar days prior to the Bid Date.
 2. The Iowa DOT will consider substitution requests for approval provided they meet the submittal requirements and product information is complete and accurate.
 3. The Office of Purchasing will notify Bidders of approved product substitutions in an addendum.
- B. Submit separate request for each item. Provide the following with each request:
 1. Complete data substantiating compliance of proposed substitution with requirements stated in Bidding Documents:
 - a. Product identification, including manufacturers name and address.
 - b. Manufacturer's literature, identifying:
 - 1) Product description and model number.
 - 2) Reference standards.
 - 3) Performance and test data.
 - 4) Samples, as applicable.
 - c. Name and address of projects on which product has been used and date of each installation.
 2. Itemized comparison of the proposed substitution with product specified, listing significant variations.
 3. Advise of any change in construction schedule resulting from use of proposed substitution.
 4. All effects of substitution on separate contracts.
 5. List of changes required in other work or products.
 6. Designation of responsibility for cost of required license fees or royalties.
 - a. Description of availability of maintenance services and sources of replacement materials and parts.

- C. Substitutions will not be considered for acceptance when:
 - 1. Acceptance will require substantial revision of Contract Documents.
 - 2. In the judgment of the Iowa DOT, the submittal does not include adequate information for a comprehensive evaluation.

1.04 BIDDER'S REPRESENTATION

- A. In making formal request for substitution the bidder represents that:
 - 1. The bidder has investigated proposed product and has determined that it is equivalent to or superior in all respects to that specified.
 - 2. The bidder will provide the same warranties or bonds for substitution as for the product specified.
 - 3. The bidder will coordinate installation of the accepted substitution into the Work, and will make such changes as may be required for the Work to be completed in all respects.
 - 4. The bidder waives claims for additional costs caused by substitution which may subsequently become apparent.

1.05 ARCHITECT'S ACTION

- A. Review requests for substitution. Substitution requests that are either approved or not approved will not be returned to person submitting request.
- B. Issue an addendum to identify accepted substitutions.
- C. Only those substitutions noted as approved in an addendum may be included in the Bid.

1.06 SUBSTITUTION REQUEST FORM

- A. See Request for Substitution form at the end of this RFP.
- B. Substitutions will be considered only when the Request for Substitution form is completed and submitted with product information requested.

END OF SECTION

SECTION 01 1000

SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Materials Laboratory MDP Replacement
- B. Owner's Name: Iowa Department of Transportation.
- C. The Project consists of the replacement of main distribution panel and other electrical equipment. The construction of electrical room for panel and transformer..

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price.

1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is shown on drawings and specified in Section 02 4100.
- B. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

1.04 OWNER OCCUPANCY

- A. Owner intends to continue to occupy all portions of the existing building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

- A. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Use of site and premises by the public.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 14 00

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

1.02	Schedule Of Values
1.03	Applications For Payment
1.04	Change Procedures
1.05	Owner Use Of Site
1.06	Coordination
1.07	Unanticipated Utility Lines
1.08	Demolition, Cutting And Patching And Alterations
1.09	Conferences
1.10	Progress Meetings
1.11	Submittal Procedures
1.12	Submittals For Review
1.13	Construction Schedules
1.14	Quality Assurance/Control
1.15	References
1.16	Inspections, Sampling, And Tests
1.17	Manufacturers' Field Services And Reports
1.18	Security
1.19	Temporary Facilities and Controls
1.20	Parking
1.21	Progress Cleaning
1.22	Products
1.23	Transportation, Handling, Storage And Protection
1.24	Product Options
1.25	Anchoring to New and Existing Construction
1.26	Demonstration And Instructions
1.27	Project Record Documents
1.28	Final Cleaning
1.29	Operation And Maintenance Data
1.30	Extended Warranties
1.31	Maintenance Materials
1.32	Contract Closeout Procedures

1.02 SCHEDULE OF VALUES

- A. Submit schedule on AIA Form G703 or in a computer generated printout which follows the format used in the AIA Form G703. Form must be typed.
- B. Submit two copies of the Schedule of Values for review within 15 days after date of Owner-Contractor Agreement established in Notice to Proceed but in no case later than one week before the first request for payment.
- C. Schedule of Values must be approved before first request for payment can be reviewed.
- D. Update Schedule of Values at each submission of request for payment by indicating modifications in individual items and additions or subtractions made through Change Orders (COs) or Construction Change Directives (CCDs). Place COs and CCDs at the end of the Schedule of Values.

1.03 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application on AIA Form G702.
- B. Content and Format:
 - 1. Utilize Schedule of Values to organize items listed in Application for Payment.
 - 2. If approved by the Owner, CCDs may be included in the request for payment once they have been signed by all parties.
 - 3. COs may be included in the request for payment once they have been signed by all parties. When a CO is added which contains previously authorized CCDs, the CCDs included in the CO must be removed from the Schedule of Values or listed as a sub-item to the CO.
- C. Payment Period: As specified in Contract.

1.04 CHANGE PROCEDURES

- A. The Architect/Engineer may initiate Instructions to Contractor (ITC) describing clarifications or modifications to the Contract Documents. If the Contractor believes a modification requires additional fee or time, Contractor shall prepare and submit a price quotation. Proposals by the Contractor shall include all related items including modifications to other Work resulting from the proposed change. If Contractor does not indicate that a change in cost or time is required within 14 calendars after receiving an ITC, it shall indicate that the Contractor accepts that change as no cost / no time change.
- B. The Contractor may propose a change by submitting a request for change to the Architect/Engineer, describing the proposed change and its full effect on the Work, with a statement of the reason for the change, and the effect on the Contract Sum Price and Contract Time with full documentation, and a statement of the effect on the rest of the Work.
- C. Contractor's proposals (in response to a request for proposal or when initiated by him/her) shall be accompanied by a draft AIA Form G701 with all information filled out by the Contractor.
- D. Construction Change Directive (CCD) may be issued by the Architect/Engineer, based on agreement of all parties, when it is important that work proceed on an item of work before a Change Order can be fully processed.
- E. Final Change Order package will be prepared by the Owner as indicated in Contract.

1.05 OWNER USE OF SITE

- A. Owner will occupy site for the duration of the project.
 - 1. Coordinate work around Owner use of the facility.
 - 2. Normal Owner work hours at the facility are from 7:00 am to 6:00 pm Monday thru Friday. Special road, weather or other conditions may cause Owner to work outside those hours.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of the Project Manual and as described on the Drawings to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Coordinate work of all subcontractors and sub-subcontractors.

- C. Coordinate delivery scheduling, equipment requirements, installation details and rough-in requirements with Equipment Vendor selected by Owner by separate bid.
- D. Coordinate space requirements and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable.
- E. In finished areas, conceal pipes, ducts, and wiring within the construction.

1.07 UNANTICIPATED UTILITY LINES

- A. Should utility lines be encountered that are not indicated, advise Owner immediately.
- B. Rectify damage to or repair accidentally damaged or broken utility lines immediately under direction of Owner.

1.08 DEMOLITION, CUTTING AND PATCHING AND ALTERATIONS

- A. See Sections 01 73 29 - Cutting and Patching and 02 41 00 - Selective Demolition.

1.09 CONFERENCES

- A. Preconstruction Conference: Owner will schedule a preconstruction site mobilization conference after Notice of Award for all affected parties.
- B. Preinstallation Conference: If required to verify or resolve issues arising during the construction, convene a conference at project site of all parties involved. Record minutes and distribute to all parties including the Owner and A/E.

1.10 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum two-week intervals.
- B. Preside at meetings, record minutes, and distribute copies within two days to those affected by decisions made.

1.11 SUBMITTAL PROCEDURES

- A. All submittals are to be made electronically in the form of a PDF file sent (electronically) to Architect with copy to the Owner. See Section 01 33 05.
- B. Transmit each submittal with a transmittal indicating, Project Name, IA DOT Project Number, BBSAE Project Number, Product Name, Submittal Number (as noted below).
 - 1. Provide separate transmittal for each product or group of related products that are to be reviewed as a group.
- C. Number the submittal forms with CSI MasterFormat04 Section Number followed by a Submittals Number (e.g. 08 71 00.1, 08 71 00.2, 08 21 00.1.) For resubmittals, use the original number with an additional Revision number (e.g. 08 71 00.1-Rev 1, 08 71 00.1-Rev 2.) If it is not clear what number should be used for given item, request direction from the Architect.
- D. Identify Project, Contractor, subcontractor or supplier. Identify pertinent Drawing sheet and detail number(s), and Specification Section number, as appropriate.

- E. Schedule submittals to expedite the Project. Coordinate submission of related items.
- F. Clearly mark which parts of the submitted documents are to be reviewed. If submitted product data contains multiple products and there is no indication of which are to be used on the Project, the Architect reserves the right to return the submittal without review.
- G. Identify variations from Contract Documents and product or system limitations that may impact the completed Work.
- H. Schedule of Submittals including all proposed products shall be prepared by the Contractor and submitted in duplicate within 15 days after date of Owner-Contractor Agreement Notice to Proceed. Submit complete list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product and include date when submittal will be made to the Architect/Engineer and date when response is needed on each item. Allow minimum 2 weeks for responses.
- I. Maintain Schedule of Submittals showing status of each item. Make available at each Progress Meeting.
- J. Submittals for Information:
 - 1. Architect/Engineer reserves right to not respond to informational submittals.
 - 2. Architect/Engineer will forward informational submittals, unstamped and unmarked, to Owner, without comment.

1.12 SUBMITTALS FOR REVIEW

- A. Architect/Engineer review is for general conformance with design concept and Contract Documents. Markings or comments shall not be construed as releasing Contractor from compliance with Contract Documents. Contractor is responsible for details and accuracy, for confirming and correlating quantities and dimensions, for selection of fabrication processes, for technique of assembly, and for performing work in a safe manner.
- B. Procedure:
 - 1. After Architect/Engineer review of submittal, at least one returned copy will have required corrections marked and/or will be accompanied by a comment sheet.
 - 2. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with comments and indications.
 - 3. Revise and resubmit as required, identifying changes made since previous submittal. Clearly identify any unrequested changes on all submittals and resubmittals.
 - 4. The Architect will use the following marking system for indicating disposition of reviews. See review stamp on the sample Submittal Review/ Comment Form at the end of this section.
 - a. Submittals marked "APPROVED" or "FURNISH AS CORRECTED" shall be considered reviewed and approved by the Owner as noted in accordance with the requirements of Contract Documents. Resubmittal is not necessary.
 - b. Submittals marked with "REVISE AND RESUBMIT" have been reviewed and are considered not approved and subject to notes and markings indicating required revisions. The extent of information to be resubmitted will be specified in the attached notes. The Contractor shall process returned reviewed submittals marked "REVISE AND RESUBMIT" and shall resubmit with requested information or corrections until an approval rating is achieved as indicated in Subparagraph 1 above.
 - c. Submittals marked with "REJECTED" are not considered to meet Project Requirements.

- d. Submittals marked with "NOT REVIEWED" are considered for information only. The Architect neither approves nor disapproves the submittal.

1.13 CONSTRUCTION SCHEDULES

- A. Submit an initial Draft Construction Schedule at least 3 days before the Pre-Construction Conference. Submit copies to the Owner and to the Architect/Engineer.
- B. At the Pre-Construction Conference the Owner and Contractor will discuss scheduling differences and develop a revised Initial Construction Schedule.
- C. Within 5 days after the Pre-Construction Conference, the Contractor shall submit a revised Construction Schedule. All major subcontractors shall sign the revised Construction Schedule indicating agreement therewith. Submit copies to the Owner and to the Architect/Engineer.
- D. Construction Schedule shall be in the form of a bar graph (Gantt Chart) and shall be computer generated. Each task shall include start date, end date and number of days. Required relationships to other tasks shall be shown. Tasks greater than 2 weeks shall be subdivided into smaller tasks.
- E. Maintain construction schedule and provide revised schedules at Progress Meetings as needed to maintained Owner and Architect informed as to progress.

1.14 QUALITY ASSURANCE/CONTROL

- A. Monitor material suppliers', fabricators', and subcontractors' quality control and workmanship to ensure work of specified quality.
- B. Comply fully with manufacturer's instructions and Contract Documents. Should instructions conflict with Contract Documents or deviate from good construction practice, request clarification from Architect/Engineer before proceeding.
- C. Comply with specified standards as a minimum quality for the Work. When more than one specified requirement applies or when additional codes apply, the Contractor shall comply with higher standard of those that are applicable.
- D. Secure products in place with positive anchorage devices designed and sized to withstand foreseeable stresses and vibration without physical distortion or disfigurement.

1.15 REFERENCED STANDARDS

- A. Conform to referenced standard by date of issue current as of date of Contract Documents, except when a specific date is specified or established by applicable code or stated in these Contract Documents.
- B. Should specified referenced standard conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. The Contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.16 INSPECTIONS, SAMPLING, AND TESTS

- A. Contractor shall engage a testing agency to perform all tests required by code or by this specification.

- B. Test agency shall be approved by the Owner. Submit name and credential of the proposed agency to the Owner for approval before engaging the agency in a contract.
- C. Provide all data required by the testing agency (including mixes to be used) in a timely manner.
- D. Notify Architect/Engineer, Owner and the Owner's testing agency at least 24 hours before the need for testing.
- E. Cooperate with testing agency as necessary for performance of their work including providing access and manpower for obtaining of samples and inspection of the Work.

1.17 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual Specification Sections or on the Drawings, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions that are supplementary or contrary to manufacturers' published recommendations.

1.18 SECURITY

- A. Take measures to protect Work and existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Conform to Owner's safety and security requirements.

1.19 TEMPORARY FACILITIES AND CONTROLS

- A. Contractor may use existing electrical service to each building.
- B. Coordinate with the Owner to provide water from the nearest existing source.
- C. Provide additional temporary ventilation, lighting and heating if required to execute Work.
- D. Contractor personnel may use existing toilet facilities in the building. If toilet rooms become dirtied beyond normal use, Contractor shall clean the toilet room.
- E. Provide for storage and security of tools and materials delivered to the site but not yet installed.
 1. Coordinate with the Owner for use of portions of the site outside those areas directly affected by the Work.
 2. Coordinate all usage of the site with the Owner's representative, including scheduling all deliveries.
- F. Barriers
 1. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 2. Provide protection barriers as required to protect building occupants and users from construction operations.
 3. Provide barricades and covered walkways if required by governing authorities for public rights-of-way.
 4. Provide protection for plants designated to remain. Replace damaged plants.
 5. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
 6. Coordinate location, installation and removal of barriers with Owner.

1.20 PARKING

- A. Coordinate parking areas with Owner to accommodate construction personnel.
- B. Coordinate with the Owner for use of the site.

1.21 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Locate collection container in area designated by Owner.
- C. Entire work areas shall be cleaned daily.
- D. Areas outside primary construction area, which become dirtied by construction operations, shall be cleaned immediately.

1.22 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components authorized for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by the Contract Documents.
- C. Use interchangeable components of the same manufacturer for similar components.
- D. Definition of Terms
 1. Furnish: To supply and deliver, unload, inspect for damage (same as supply).
 2. Install: To unpack, assemble, erect, apply, place, connect, finish, cure, protect, clean, and ready for use.
 3. Provide: To furnish or supply, plus install.
 4. Supply: To supply and deliver, unload, inspect for damage (same as furnish).
- E. Substitutions: See article "Substitutions" in this section.

1.23 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

- A. Transport, handle, store and protect products in accordance with manufacturer's instructions and generally accepted construction practice.
- B. Contractor is responsible for protection of stored and installed materials from moisture and mold resulting from failure to control moisture, including humidity levels.
- C. Materials or products which arrive at the site wet or with a moisture content above that designated in the Specification and which have no indication of mold shall be dried out or dried to recommended moisture content level by quickest possible means which will not damage the product or material.
- D. Materials or products which arrive at the site with mold present shall be removed from the site immediately.

1.24 PRODUCT OPTIONS

- A. Products Specified by Referenced Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options allowed. No substitutions allowed after Bid period, except under conditions specified herein.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a pre-bid request for substitution within time limits established in Instructions to Bidders for any manufacturer not named. Lists of manufacturers beginning with "Acceptable manufacturers include:" shall be considered to permit substitutions.
- D. "Similar To" or "Equal To" indicate an example product that meets specifications. "Basis of Design" indicates applicable characteristics of named product were used to design systems. In either case Contractor may propose any product that has the same or similar characteristics. A formal substitution is not required, but submittals must include sufficient data to show that the product has the same or similar characteristics to the products so indicated. The Architect/Engineer may reject any product, which, in his/her opinion, is not sufficiently similar to the indicated product.

1.25 ANCHORING TO NEW AND EXISTING CONSTRUCTION:

- A. Do not anchor items to new or existing construction in a way that will place an excessive load on the construction.
- B. Plaster and Gypsum Board: Do not anchor anything directly to gypsum board or plaster, always anchor to the framing system or to wood blocking or to substrate to which the gypsum board or plaster is anchored
- C. Hollow Masonry
 - 1. Do not anchor anything weighing more than 1 pound or capable of resulting in pressure being applied of more than 3 pounds in any direction to the face of hollow masonry.
 - 2. Where loads heavier than those listed above must be anchored to hollow concrete block, provide one of the following:
 - a. Set anchor into core that has been grouted solid at the core where the anchor is set, at least one core above and two cores below.
 - b. Provide a system that engages both walls of the concrete block and provides a rigid spacer/brace in the core between the walls similar to Hilti HIT HY 70 for Masonry Construction.
 - 3. Under no circumstances use impact driven fasteners on hollow masonry unless the cores are grouted solid.

1.26 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location. Owner shall be allowed to videotape all training.

1.27 PROJECT RECORD DOCUMENTS

- A. Maintain in the Field Office one reference set of the following documents:
 - 1. Drawings.
 - 2. Specifications.

3. Addenda.
 4. Architect's Supplemental Instructions (ASI's) and Instructions to Contractor (ITC's).
 5. Requests for Information and Responses (RFI's).
 6. Requests for Changes (RFC's)
 7. Change Orders and other modifications to the Contract.
 8. Reviewed Shop Drawings, Product Data, and Samples.
 9. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Record Documents: Legibly mark and record actual revisions to the Work on one "Record" set of the Drawings and Specifications, including the following:
1. Changes made by Addenda.
 2. Product substitutions or alternates utilized and approved.
 3. Manufacturer's name and product model of actual products installed.
 4. Changes made by the following:
 - a. Change Orders.
 - b. Architectural Supplemental Instructions (ASI's) and Instructions to Contractor (ITC's).
 - c. Responses to Requests for Information (RFI's).
 - d. Requests for Changes (RFC's)
 - e. Changes documented by Meeting Notes or Field Reports discussed and agreed to during Progress Meetings or Site Observations.
 5. Record the following:
 - a. Measured location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - b. Measured depths of foundations in relation to finish first main floor datum.
 - c. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - d. Actual equipment locations.
 - e. Field changes of dimensions and details.
 - f. Details not on the original Contract Drawings.
- C. All recorded changes shall be "clouded" and identified; make reference to the document that originated the change.
- D. Ensure entries are complete and accurate, enabling future reference by Owner.
- E. Store record documents separate from documents used for construction.
- F. Record information concurrent with construction progress, not less than weekly. Provide status update as agenda item at regular progress meetings. Provide record documents for review during progress meeting when requested.
- G. Submit Record Documents to Architect/Engineer with final Application for Payment.

1.28 FINAL CLEANING

- A. Execute final cleaning prior to substantial completion inspection for each phase.
- B. Dismantle and remove from the site all temporary barriers, closures and other temporary structures or materials.
- C. Remove waste and surplus materials, rubbish, and construction facilities from the site.
- D. Final cleaning must follow all procedure requirements indicated for Progress Cleaning.

1.29 OPERATION AND MAINTENANCE DATA

- A. In addition to electronic copies of all project data indicated in Section 01 33 00, provide one hard copy of Operation and Maintenance Data in "hard copy" form as described in this article. Provide similarly organized Operation and Maintenance Data on the electronic copy required in Section 01 33 05.
- B. Bind in a three ring binders with durable covers.
- C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of project.
- D. Internally subdivide the binder contents with permanent, tabbed page dividers, logically organized, with title clearly printed on or under reinforced laminated plastic tabs. Organize product data according to MasterFormat04 numbering.
- E. O&M binders shall include all final, approved submittals that appear in the electronic version. Do not submit O&M binders until all electronic copies of the required O&M and Warranty submittals transmitted and have achieved final approval.
- F. Contents:
 - 1. Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Product and system descriptions data.
 - 3. Operation and maintenance instructions, arranged by system.
 - 4. Project documents and certificates.
- G. Submit one copy of completed volumes in final form with request for substantial completion site inspection. A/E shall review the O&M binders to verify completion. Contractor shall make any corrections to the O&M binders noted and upon final approval submit the number of final copies requested by the Owner (up to two copies maximum).
- H. In addition to one (1) paper copy, Contractor shall submit an electronic copy of final, approved Operation and Maintenance Data at Project Close-Out in the form described in Section 01 33 00. All submittals shall be scanned by the contractor in .pdf format and submitted on a CD.

1.30 EXTENDED WARRANTIES

- A. Effective dates of warranties shall be the Date of Substantial Completion (not the date of installation) and must be identified on the warranty or by signed letter modifying the warranty.
- B. Provide two copies of all extended warranties.
- C. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- D. Submit with request for final inspection.
- E. Include warranties under a separate page divider at the end of the Operation and Maintenance Manual or in a separate binder, labeled as described for the Operations and Maintenance Manual.

1.31 MAINTENANCE MATERIALS

- A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual Specification Sections or on the Drawings.
- B. Deliver to Project site and place in location as directed by Owner; deliver prior to final payment; obtain a written receipt.

1.32 CONTRACT CLOSEOUT PROCEDURES

- A. After all utilities have been installed but prior to substantial completion, Contractor shall demonstrate, in the presence of the Owner, continuity of all tracer wires from end to end at all underground utilities. Tracer wires which fail a continuity test shall be repaired or replaced and re-tested until a successful continuity test is achieved. Provide Owner 48 hour notice of this activity.
- B. Substantial Completion
 - 1. Submit with request for substantial completion inspection:
 - a. List of incomplete work, value of incomplete work, and reasons for being incomplete.
 - b. One copy of Operation and Maintenance Manuals completed volumes in final form. This copy will be returned after substantial completion inspection, with Architect/Engineer comments. Revise content of documents as required prior to final submittal.
 - 2. If Work is found to be acceptable, the Architect/Engineer will provide a certification of substantial completion accompanied by a Punchlist showing items not yet completed or not yet completed satisfactorily. Omission of an item from the Punchlist does not relieve Contractor from the requirement to completely conform to the Contract Documents.
- C. Final Inspection
 - 1. Do not request a Final Inspection until all construction requirements of the Project have been met in conformance with the Contract Documents.
 - 2. Prior to requesting final inspection and final payment, as required by General Conditions, complete the following:
 - a. Submit copy of final punchlist of work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
 - b. Submit Project Record Documents.
 - c. Submit two "hard copies" and one electronic copy of Operation and Maintenance Manuals, final volumes, revised.
 - d. Two copies of all written warranties, workmanship/maintenance bonds, agreements, final certifications and similar documents.
 - 1) For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of completion as start of warranty period.
 - e. Submit electronic copy of all submittals.
 - f. Submit Energy Rebate Forms.
 - g. Submit proof, satisfactory to Owner, that fees and similar obligations of Contractor have been paid.
 - h. Submit proof to the Owner that all keys borrowed during the course of the project have been returned.
 - i. Deliver tools, spare parts, extra stocks of materials (if any), and similar physical items to Owner.
 - j. List of Extra Material: See individual sections for specific requirements.
 - 3. Submit the following to the Architect/Engineer with request for final inspection:

- a. Written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's and Owner's Representative's inspection.
 - b. Written certification from product manufacturers stating that no asbestos containing materials have been installed in the Project. Statements are required from each manufacturer supplying materials installed on this job including those installed by all subcontractors and sub-subcontractors.
- 4. Coordinate schedule of final inspection so that all parties required to view and approve the Work are present.

- D. Complete items of work determined by Architect/Engineer's final inspection to be incomplete or unacceptable and request additional inspections as necessary.

- E. Reinspection Costs: Should the Owner or the Architect/Engineer be required to perform additional Final Inspections because of failure of work to comply with Contract Documents, Contractor shall compensate Owner and/or Architect/Engineer for additional services. Owner may deduct the cost of the inspections from final payment to Contractor.

- F. Final Acceptance and Payment
 - 1. Submit after final inspection and acceptance:
 - a. Two copies of all inspections and certifications required by authorities having jurisdiction.
 - b. Final Application for Payment, identifying total adjusted Contract Sum, previous payments, and amount remaining due.
 - c. AIA Forms G706 - Contractor's Affidavit of Payment of Debts and Claims, G706A - Contractor's Affidavit of Release of Liens, and G707 - Consent of Surety to Final Payment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Price and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 01 2100 - Allowances: Payment procedures relating to allowances.

1.03 SCHEDULE OF VALUES

- A. Form to be used: AIA G702 - Application and Certificate of Payment, AIA G703 - Continuation Sheet.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization, bonds and insurance, and General Requirements as separate line items for each structure.
- E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Form to be used: AIA G702 and G703.
 - 1. Application for payment must be accompanied by updated schedule.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. Submit three original copies of each Application for Payment.
- H. Include the following with the application:
 - 1. Construction progress schedule, revised and current as specified in Section 01 3000.
 - 2. Updated Submittal Log.

3. Progress meeting minutes.
- I. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue an AIA Document G701 change order document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 1. The document will describe the required changes and will designate method of determining any change in Contract Price or Contract Time.
 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue an AIA Document G709 work change proposal request that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 1. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 2. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Overhead and profit.
 - 1) Profit and overhead not to exceed 15 percent total between General Contractor and Sub Contractor.
 2. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Price, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 1. All closeout procedures specified in Section 01 7000.

2. All punch list items have been completed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Special procedures.
- D. Construction progress schedule.
- E. Coordination drawings.
- F. Submittals for review and for information.
- G. Number of copies of submittals.
- H. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- B. Section 01 7800 - Closeout Submittals: Project record documents, construction progress schedules, closeout submittals.

1.03 PROJECT COORDINATION

- A. Project Coordinator: Project Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for vehicular access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.
- B. Project Coordinator will schedule a meeting after Notice of Award.
- C. Attendance Required:
 - 1. Owner.

2. Architect/Engineer.
 3. General Contractor.
 4. All major Sub-Contractors.
- D. Agenda:
1. Review Owner-Contractor Agreement and contract conditions.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Review list of Subcontractors, list of Products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract, Owner and Architect.
 6. Designation of personnel representing the parties to Contract, Owner and Architect/Engineer.
 7. Review procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Coordinate commencement of construction.
 9. Use of premises by Owner and Contractor.
 10. Construction facilities and controls provided by Owner.
 11. Temporary utilities provided by Contractor.
 12. Security and housekeeping procedures.
 13. Procedures for testing.
 14. Procedures for maintaining record documents.
 15. Requirements for start-up of equipment.
 16. Inspection and acceptance of equipment put into service during construction period.
 17. Scheduling.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. General Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Coordination of projected progress.
 11. Status of Proposal Requests, Change Orders, Architect's Supplemental Instructions and Requests For Information. Maintenance of quality and work standards.
 12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to Work.
- E. General Contractor will record minutes and distribute copies to participants and those affected by decisions made within (5) five days of progress meeting. The distribution will be made electronically unless requested otherwise.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Within 10 days after joint review, submit complete schedule.
- D. Submit updated schedule with each Application for Payment.

3.04 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.05 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Documents for Information: Submit one copy electronically.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

- A. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

- B. Transmit each submittal with a copy of approved submittal form.
- C. Transmit each submittal with standard company cover sheet.
- D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- G. Deliver submittals to Owner in electronic format only.
 - 1. Only physical samples to be submitted to Owner's address.
- H. Schedule submittals to expedite the Project, and coordinate submission of related items.
- I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- K. Provide space for Contractor and Architect review stamps.
- L. When revised for resubmission, identify all changes made since previous submission.
- M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- N. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction progress schedule, with network analysis diagrams and reports.

1.02 RELATED SECTIONS

- A. Section 01 1000 - Summary: Work sequence.

1.03 REFERENCES

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; Associated General Contractors of America; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM, O'Brien, McGraw-Hill Book Company; 2006.

1.04 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. Submit updated schedule with each Application for Payment.
- C. Submit under transmittal letter form specified in Section 01 3000 - Administrative Requirements.

1.05 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.06 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

3.02 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.

5. Earliest finish date.
 6. Actual start date.
 7. Actual finish date.
 8. Latest start date.
 9. Latest finish date.
 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 11. Monetary value of activity, keyed to Schedule of Values.
 12. Percentage of activity completed.
 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
1. By preceding work item or event number from lowest to highest.
 2. By amount of float, then in order of early start.

3.03 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.04 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.05 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 33 05

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a list of anticipated submittal.
 - 1. For each item:
 - a. Indicate when submittal will be made to the Architect.
 - b. Indicate when the submittal review is needed from the Architect.
 - 2. Submit no later than first Project Meeting after Preconstruction Conference.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Upon written request the Architect may make available limited electronic digital data files of the Contract Drawings for Contractor's use in preparing submittals.
 - 1. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - 2. Digital Drawing Software Program: The Contract Drawings are available in electronic format.
 - 3. Before Architect will release files, Contractor shall execute a data use agreement on the form provided by the Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 7 working days for review of each resubmittal.
- D. Submittal Numbering:
1. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01, 061000.02, 081000.01). Resubmittals shall include a suffix (e.g., 061000.01 Rev1, 061000.1 Rev2).
- E. Transmittal: Each submittal shall be accompanied by a transmittal.
1. Include the following information on the transmittal.
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Engineer
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.
 - g. Names of subcontractor, manufacturer, and supplier.
 - h. Submittal number as described in this Section.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
 2. For electronic submittals, make transmittal the first page of the PDF file containing the submittal.
 3. For hard paper submittals or samples, submit a paper transmittal with the physical submittal and send a PDF copy of the transmittal for record.
 4. A single transmittal may accompany multiple products if they are related products submitted as a package. However, all products in the submittal must have unique submittal number and be listed separately on the transmittal.

5. On the transmittal or on a separate sheet following the transmittal, provide a stamp indicating the General Contractor's review and disposition and comments or changes noted as a result of that review. Disposition stamp to be signed by the reviewer.
- F. Electronic Submittals:
1. All submittals are to be made electronically unless impossible to do so.
 2. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 3. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use Project identifier and submittal number as described in this Section (e.g., #####-061000.01). Resubmittals shall include a suffix (e.g., #####-061000.01.Rev1)
- G. Physical Object Submittals:
1. Use paper or physical submittal only where impossible to make submittal electronically including physical samples, physical models, and color charts whose visual reproduction as an electronic submittal is not sufficiently controllable to ensure an accurate reproduction for selection of color, texture and the like.
 2. In addition to the transmittal that shall accompany physical object submittals, each individual object or loose page shall have a label affixed to it containing not less than the Project name and the submittal number.
- H. Options: Identify options requiring selection by Architect.
- I. Deviations and Additional Information: On the transmittal or on an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Submit electronic submittals via email as PDF electronic files.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Only one copy of electronic submittal is required.
 3. Where physical object submittals are necessary, submit the following:
 - a. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
 - b. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. Mark each copy of each submittal to show which products and options are applicable. The Architect/Engineer reserves the right to return without review or comment any product data containing multiple products or options on which products or options specific to the Project are not clearly indicated.
 2. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 3. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 4. Submit Product Data before or concurrent with related Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.

- F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 14 00 "General Requirements."
- G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
- H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 14 00 "General Requirements."
- I. Maintenance Data: Comply with requirements specified in Section 01 14 00 "General Requirements."
- J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- K. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- L. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 - 1. Where submitted product data contains written certification of relevant requirements, Architect may waive the requirement for separate manufacturer's letter.
- M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 - 1. Where submitted product data contains written certification of relevant requirements, Architect may waive the requirement for separate manufacturer's letter.
- N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 - 1. Where submitted product data contains written certification of relevant requirements, Architect may waive the requirement for separate manufacturer's letter.
- O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- P. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- Q. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- R. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations.

Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification and Calculations: In addition to Shop Drawings, Product Data, and other required submittals, submit either digital copies of signed documents or digitally signed PDF electronic file and one paper copy of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract, site conditions, and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 14 00 "General Requirements."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents. Sign with full name, not initials.
- D. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- E. Revise and resubmit submittals as required, identify all changes made since previous submittal

3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action. See review stamp on the sample Submittal Review/ Comment Form at the end of this section

1. Submittals marked "APPROVED" or "FURNISH AS CORRECTED" shall be considered reviewed and approved by the Owner as noted in accordance with the requirements of Contract Documents. Resubmittal is not necessary.
 2. Submittals marked "REVISE AND RESUBMIT" have been reviewed and are considered not approved and subject to notes and markings indicating required revisions. The extent of information to be resubmitted will be specified in the attached notes. The Contractor shall process returned reviewed submittals marked "REVISE AND RESUBMIT" and shall resubmit with requested information or corrections until an approval rating is achieved as indicated in Subparagraph 1 above.
 3. Submittals marked "REJECTED" are not considered to meet Project Requirements.
 4. Submittals marked "NOT REVIEWED" are considered for information only. The Architect neither approves nor disapproves the submittal.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION

PROJECT: **IDOT Material Lab MDP Replacement**

BBSAE PROJ. No.: **14063**

SUBMITTAL NUMBER:

SPECIFICATION
SECTION:

DESCRIPTION:

REVIEWED BY:

Primary:
Secondary:

DATE ROUTED:

NUMBER OF COPIES ROUTED:

COMMENTS:

1.

 BROOKS BORG SKILES ARCHITECTURE ENGINEERING LLP	
<input type="checkbox"/> Approved	<input type="checkbox"/> Revise and Resubmit
<input type="checkbox"/> Furnish as Corrected	<input type="checkbox"/> Rejected
<input type="checkbox"/> Not Reviewed	
Date: _____	By: _____
<small>Architect/Engineer review is for general conformance with design concept and Contract Documents. Markings or comments shall not be construed as releasing Contractor from compliance with Contract documents. Contractor is responsible for details and accuracy, for confirming and correlating quantities and dimensions, for selection of fabrication processes, for technique of assembly and for performing work in a safe manner.</small>	

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Quality assurance submittals.
- C. Control of installation.
- D. Tolerances.
- E. Testing and inspection services.
- F. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

- A. Section 01 2100 - Allowances: Allowance for payment of testing services.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures.
- C. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
- B. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.
- C. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2010.

1.04 SUBMITTALS

- A. Testing Agency Qualifications:
 - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.

- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.05 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.04 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Security requirements.
- B. Vehicular access and parking.
- C. Waste removal facilities and services.
- D. Field offices.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

1.03 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.04 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic.
- F. Existing parking areas may be used for construction parking.

1.05 WASTE REMOVAL

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site periodically.
- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.06 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.07 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.03 REFERENCE STANDARDS

- A. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2014.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Architect will consider requests for substitutions only within 5 working days of letting.

- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- E. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- F. Substitution Submittal Procedure:
 - 1. Submit one copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect will notify Contractor in writing of decision to accept or reject request.
 - 4. Request must be submitted on supplied form at the end of the RFP.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.

- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
- E. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
- F. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- G. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
- H. Section 07 8400 - Firestopping.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
 - 2. Identify demolition firm and submit qualifications.
 - 3. Include a summary of safety procedures.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.05 QUALIFICATIONS

- A. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in Iowa.

1.06 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- D. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

- A. See Section 01 1000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 1. Review conditions of examination, preparation and installation procedures.
 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 1. Verify that construction and utility arrangements are as shown.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
 1. Remove items indicated on drawings.
 2. Relocate items indicated on drawings.
 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

- C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 01 1000 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 - 4. Verify that abandoned services serve only abandoned facilities.
 - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- D. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- G. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- H. Clean existing systems and equipment.
- I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- J. Do not begin new construction in alterations areas before demolition is complete.
- K. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.

- 8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Cutting
- B. Patching
- C. Minor modifications to assure exposed surfaces retain a finished appearance.

1.02 RELATED WORK

- A. Section 01 11 40 -General Requirements
- B. Section 02 41 00 – Selective Demolition

1.03 SUBMITTALS

- A. Product Data: Submit all materials to be used in patching that are not submitted under another Section of this Specification.
- B. Cutting and Patching Proposal:
 - 1. Where cutting or patching is found to be necessary to accomplish the Work as described in the Construction Document, provide a description of the cutting and/or patching to be done and the reason it is required. Include what materials and utilities will be affected.
 - 2. Where cutting or patching is discovered to involve structural elements of the building, which are not specifically called out on the drawings, immediately advise the Architect and request direction.
- C. Approval by the Owner of cutting and patching proposal does not waive the Owner's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.04 PAYMENT FOR COSTS

- A. Contractor shall be responsible for all costs of cutting and patching specifically stated in or reasonably implied by the Work described in the Construction Documents.
- B. Contractor shall be responsible for all costs of cutting and patching caused by ill-timed or defective work, or work not conforming to contract documents, including costs for additional services of the Architect or Owner.
- C. Work done on instructions of Architect or Owner (by change order), other than defective or non-conforming Work will be paid for by the Owner.

1.05 QUALITY ASSURANCE

- A. Employ skilled workmen to perform cutting and patching. Where work is of a specific trade (such as plaster) engage tradesmen skilled in that trade to execute the Work.
- B. Requirements for Structural Work: Do not cut or patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching structural elements including, but not limited to, the following:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Preformed metal panels
 - f. Lintels
 - g. Timber and primary wood framing.
 - h. Structural decking.
 - i. Stair systems.
 - j. Miscellaneous structural metals.
 - k. Equipment supports.
 - l. Shoring, bracing, and sheeting.
- C. Operational and Safety Limitations: Do not cut or patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching operating elements or safety related systems including, but not limited to, the following:
 - a. Piping, conduits, ductwork, vessels and equipment.
 - b. Primary operational systems and equipment.
 - c. Air or smoke barriers.
 - d. Water, moisture, or vapor barriers.
 - e. Membrane and flashings.
 - f. Fire protection systems.
 - g. Noise and vibration control elements and systems.
 - h. Control systems.
 - i. Communication systems.
 - j. Conveying systems.
 - k. Electrical wiring systems.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use materials for patching that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.
 - 1. All substitute materials must be approved by the Owner before they may be used on the project.
- B. Use materials whose thermal, chemical or similar properties will not adversely affect the existing materials to remain.

- C. Where new materials are described in this Specification provide patching materials that conform to those Specification Sections in regard to quality unless otherwise indicated.
- D. Where no specific description of materials is found in the Construction Documents, provide materials of Professional or Commercial quality, heavy duty and top quality, meeting the highest commonly used standards in the trade or specialty under which the Work in question would normally be performed.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
- B. Where the cutting involves elements normally handled by differing trades, before proceeding, coordinate with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

- A. Temporary Support: Provide all temporary support of Work to be cut as required to maintain the structural integrity of the remaining construction and as necessary to provide for a safe environment.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Cutting of existing pipe, conduit or ductwork serving the building, which is indicated to be removed or relocated, must be scheduled only after adequate provisions have been made to bypass them. Services must be maintained at all times.

3.03 PERFORMANCE

- A. General
 - 1. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 2. Provide all cutting of existing construction as necessary to provide for installation of other components or performance of other construction activities or the subsequent fitting and patching required to restore surfaces to their original condition.
 - 3. If utilities or structural elements of the construction are encountered which are not specifically noted on the Drawings, immediately inform the Architect and await a response before proceeding.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction.

1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping.
 2. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces.
 3. Temporarily cover openings when not in use.
 4. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 5. Cut no utilities without specific, written authorization from the Owner.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Where removal of walls or partitions extends one finished area into another, patch and repair floor, wall and ceiling surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor, wall and ceiling coverings and replace with new materials, if necessary to achieve uniform color and appearance.
 3. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Where a patch occurs, refinish the entire surface to a point where the surface changes such as at a corner, a joint, a change in plane or a change in material or color.
 - b. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken area containing the patch, after the patched area has received primer and second coat.
- D. Anchoring to Existing:
1. Do not anchor new items or new construction to existing construction in a way that will place an excessive load on the existing construction.
 2. Plaster and Gypsum Board
 - a. Do not anchor anything directly to gypsum board or plaster, always anchor to the framing system or substrate to which the gypsum board or plaster is anchored. If necessary open the gypsum board or plaster wall, provide additional blocking and repair the surface.
 3. Hollow Masonry
 - a. Do not anchor anything weighing more than 1 pound or capable of resulting in pressure being applied of more than 3 pounds in any direction to the face of hollow masonry.
 - b. Where loads heavier than those listed above must be anchored to hollow concrete block, provide one of the following:
 - 1) Open the core and grout solid at the core into which the anchor is to be placed plus at least one core above and two cores below where the anchor is to be placed. Patch and finish the surface of the block to match surrounding block.
 - 2) Provide a system that engages both walls of the concrete block and provides a rigid spacer/brace in the core between the walls similar to Hilti HIT HY 70 system for Masonry Construction.
 - c. Under no circumstances use impact driven fasteners on hollow masonry unless the cores are grouted solid.

3.04 CLEANING

- A. Immediately thoroughly clean walls to remove "runs" or "drips" after saw-cutting or core-drilling penetrations through CMU or concrete
- B. Thoroughly clean areas and spaces where cutting and patching is performed or used as access including cleaning piping, metal framing, conduits, ducts and other similar features.
- C. Thoroughly clean and prepare all surfaces before painting or other finishing is applied.
- D. Remove completely paint, mortar, oils, putty and items of similar nature that are not a part of the intended finish.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 - 6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards.
 - c. Include weight tickets as evidence of quantity.
 - 7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

- A. See Section 01 6000 - Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 6000:
 - 1. Relative amount of waste produced, compared to specified product.
 - 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
 - 3. Proposed disposal method for waste product.

4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 1. Pre-bid meeting.
 2. Pre-construction meeting.
 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 1. Provide containers as required.
 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

**SECTION 01 7800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Addenda.
 - 3. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Record Drawings : Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

END OF SECTION

SECTION 01 7900
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. Electrical systems and equipment.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2010 or 2013 preferred.
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Commissioning Authority for review and inclusion in overall training plan.
 - 2. Submit not less than four weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Provide an overall schedule showing all training sessions.
 - 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.

1.04 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- C. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals.
- D. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 6. Discuss common troubleshooting problems and solutions.
 - 7. Discuss any peculiarities of equipment installation or operation.
 - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 10. Review spare parts and tools required to be furnished by Contractor.
 - 11. Review spare parts suppliers and sources and procurement procedures.
- E. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 41 00

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of building elements for alterations purposes.

1.02 RELATED SECTIONS

- A. Section 01 11 40 "General Requirements"
- B. Section 01 73 29 "Cutting and Patching": Cutting and patching requirements.

1.03 REFERENCES

- A. 29 CFR 1926 -U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 -Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2004.

1.04 SUBMITTALS

- A. Demolition Plan: Submit demolition plan to the Owner including the following:
 1. Schedule of utility shut offs, partial closure of access or pathways and other key items which may affect operations of the facility.
 2. Measures planned to reduce noise and vibration and control dust.
 3. Sequencing of major portions of the work.
 4. Plans for closing off interior portions of the building to remain including submit materials and systems to be used.

1.05 PROJECT CONDITIONS

- A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Temporary Closure materials
 1. Materials used for barriers, enclosures and other temporary structures may be new or used but must be in serviceable condition, safe and visually free of defect.
 2. Wood in contact with the public must not be an easy source of splinters.
 3. Barriers exposed to the public shall be painted a single color (e.g. not piece of old signs cut up with parts of many colors).
- B. Patching Materials: See Section 01 73 29 -Cutting and Patching for material requirements.

PART 3 - EXECUTION

3.01 SCOPE

- A. Provide removal as necessary for all new Work as indicated.
- B. Provide temporary closure at all locations where demolition results in temporary exposure of remaining interior spaces and surfaces to exterior conditions.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Provide, erect, and maintain temporary barriers and security devices.
 - 3. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Do not close or obstruct roadways or sidewalks without permit (if public) or permission of the Owner.
 - 6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 7. Obtain written permission from the Owner for any activity outside the limits indicated on the drawings, including the path to be used by large construction equipment and trucks and dumpsters to and from the site.
 - 8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger and report condition to the Owner and Architect.
- D. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, PCB's, and mercury.

3.03 EXISTING UTILITIES

- A. Coordinate utility work with the Owner; notify before starting work and comply with Owner's requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt operating utilities without written permission from the Owner.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner. Obtain required permits before modifying or disabling life safety system including exit pathways.

- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 7 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, protect from damage due to subsequent construction, using substantial barricades if necessary.
 - 1. Utilities or ductwork to be permanently capped and abandoned, provide a permanent type tag (metal or plastic) attached to the duct, pipe, conduit, etc. near the cap and containing the following information:
 - a. Utility carried (e.g. gas, hot water, return air, 240 V electrical, etc.)
 - b. Original source.
 - c. Original destination.
 - d. Note to which (if either) it is still connected.
 - e. Note whether the pipe, conduit or duct is active or contains anything.
 - f. Date capped.
 - 2. Utilities or ductwork to be temporarily capped may be tagged with less permanent tags (paper) but must carry the same information.
- G. Remove abandoned piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities where possible to do so, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- C. Remove existing work as indicated and as required to accomplish new work.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - 3. Verify that abandoned services serve only abandoned facilities before removal.
- E. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - a. See Section 01 73 29 "Cutting and patching" for additional requirements.
 - 3. Repair and patch adjacent construction and finishes damaged during removal work as necessary:
 - a. Surfaces or elements which are scheduled to be removed or remodeled in a later phase of this project must be patched as required to provide stable construction.

Patches may be temporary but must be of a nature which will serve until the finish construction scheduled for a later phase of this Project.

- b. Surfaces or elements not scheduled to be removed or remodeled or refinished in later phases of this project, must be patched and finished in a permanent manner to match existing finishes.
- c. See Section 01 73 29 "Cutting and Patching" for additional requirements.

3.05 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site and dispose of legally.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate placement of joint devices and embedded work with erection of concrete formwork and placement of form accessories

1.4 ACTION SUBMITTALS

- A. Product Data: For curing products and floor sealer products.
- B. Design Mixtures:
 - 1. In addition to any name assigned by the plant, label each mix to indicate where it will be used on this Project.
 - 2. Submit 10 ASTM C 39 strength tests from the last 12 months using this mix.
 - 3. Indicate all ingredients
 - 4. Indicate amounts of mixing water to be withheld for later addition at Project site.
 - 5. Indicate measures to be taken if weather, Project conditions, test results or other circumstance warrant adjustments.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Acquire cement from same source and aggregate from same source for entire project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. Comply with ACI 301 (ACI 301M) and ACI 117 (ACI 117M).

2.2 FORM-FACING MATERIALS

- A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- C. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Release agent that will not adversely affect concrete or interfere with application of specified coatings.
 - 2. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Wire: ASTM A 1064/A 1064M.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete.

2.5 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I.
 - 2. Fly Ash: ASTM C 618, Class F or C.
 - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
 - 4. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33/C 33M, grade size 5. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inches (19 mm) nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Chemical Admixtures:

1. Do not use calcium chloride or admixtures containing calcium chloride.
2. Use no chemical admixtures unless indicated in Contract Drawings or authorized in writing by the design professional.
3. If approved, use admixtures conforming to ASTM C494.

E. Water: ASTM C 94/C 94M and potable.

2.6 FLOOR TREATMENTS

A. Penetrating Sealer:

1. Breathable: Shall not reduce the moisture vapor transfer rate at the surface on which it is applied.
2. Must be low VOC: Less than 50 g/l.
3. Must increase the hardness of concrete by at least 20 percent when tested according to ASTM C779.
4. Slip Resistance: Wet Coefficient of Friction of 0.6 or greater when tested according to ASTM D 2047 for the specified concrete finish texture.
5. Where sealer is used over curing compound, verify that the curing compound is compatible with the sealer.

2.7 CURING MATERIALS

A. Provide one of the following:

1. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Applied Curing Agents: Compatible with schedule finishes. Where concrete will be exposed in final condition, agents must not stain, discolor, or interfere with scheduled coatings.

2.8 RELATED MATERIALS

A. Joint Filler: Non-asphaltic expansion joint filler with removal top strip for sealant reservoir; closed-cell polyolefin, complying with ASTM D 7174, 1/2 inch (13 mm) thick and 4 inches (200 mm) deep. Use of filler containing asphalt based products is not permitted.

1. Joint Caps: Provide preformed, removable joint caps to ensure that the top of the joint filler is at the proper depth for installation of sealant.

B. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Slag Cement: 50 percent.
 4. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal Weight Concrete: Where not indicated otherwise on the Drawing, provide the following:
1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: Where no other strength is indicated provide 4,000 psi (27.6 MPa).
 2. Water-Cement Ratio: Do not exceed values in ACI 211.1, Table 6.3.4(a).
 3. Maximum Slump: 3.5 inches (89 mm).

2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- B. Verify all items to be embedded in concrete are present and properly placed and secured.
- C. Verify that requirements for concrete cover of reinforcing will be met.

3.2 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

- C. Construct forms tight enough to prevent loss of concrete mortar.
- D. Construct forms for easy removal without hammering or prying against concrete surfaces.
- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. Chamfer exterior corners and edges of equipment pads.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" and ACI 301 for fabricating, placing, and supporting reinforcement.
 - 1. Where lapping bars will result in concrete cover that is less than that specified, use tension transferring end splice connectors in lieu of lapping bars.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Maintain concrete cover around reinforcing as follows:
 - 1. Footings and Concrete Formed Against Earth: 3 inch (75 mm).
 - 2. Slabs on Fill: 2 inch (50 mm).
 - 3. Slab not exposed to earth or weather: 1 inch (25 mm) or 1.5 times maximum size of coarse aggregate, whichever is greater.
 - 4. Where not otherwise noted: Not less than 1½ inch (38 mm) or 1.5 times maximum size of coarse aggregate, whichever is greater.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - 2. Cut joints not more than 12 hours after concrete is initially finished.
 - 3. At interior and exterior slabs and walks, locate contraction joints at not more than 24 to 36 times the thickness of the slab on center and with a width to length ratio of not more than 2 to 1. If joints are not located on drawings, submit a joint layout drawing for approval by the Architect.
- D. Isolation Joints in Slabs-on-Grade: Provide at all location where slab meets vertical surface, at other locations where slab must be able to move freely, and where indicated.
 - 1. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.

3.6 CONCRETE PLACEMENT

- A. Notify Architect and testing agency not less than 24 hours before commencement of placement operations.
- B. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
 - 1. Verify that forms are clean and that release agents are applied.
 - 2. Verify that reinforcement is securely in place and uncontaminated by release agents, dirt or other contaminants that affect bonding.
 - 3. Verify that all embedded items and accessories are in place.
 - 4. Verify placement of reinforcement will permit minimum required cover.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M).
- D. Place concrete in accordance with ACI 304R.
- E. Place concrete floor slabs in accordance with ACI 301.1R

- F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- G. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces indicated to be exposed.
- D. Levelness:
 - 1. At interior slabs: Flat with no more than 1/4 inch variation in 10 feet within the patch area. Permit no ponding of water.
 - 2. At equipment slabs, meet requirements indicated for the equipment.

3.8 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-

place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4 inches (100 mm)) high unless otherwise indicated, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days, unless otherwise indicated.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
5. Reinforce with #4 bars at 12" O.C each direction, unless noted otherwise.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing.
 2. Moisture-Retaining-Cover Curing.
 3. Curing Compound. Curing compound shall not interfere with application of finish material or scheduled sealer.

3.10 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment:

B. General:

1. Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
2. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

C. New Concrete:

1. Apply as recommended by treatment manufacturer, but not less than two coats. Apply at the earliest time after placing that is recommended by the manufacturer.
2. Apply to all interior concrete left exposed in the final Project, unless noted otherwise.

D. Existing Concrete:

1. Where indicated, apply sealer to existing floors in the vicinity of the Work.
2. Prepare existing concrete surfaced as recommended by the sealer manufacturer.
3. Apply as recommended by treatment manufacturer, but not less than one coat. Coordinate application with coating of nearby new concrete.

3.11 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements or concrete which fails to result in the specified appearance.
- B. Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.12 FIELD QUALITY CONTROL

- A. Special Inspections: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections (required for "footing walls" at MDP room):
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain one sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each sample.
 4. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each sample, but not less than one test for each day's pour of each concrete mixture.
 5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure three standard cylinder specimens for each sample.
 - b. Cast and field cure (1) one standard cylinder specimens for each sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimens at 7 days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same sample and tested at age indicated.

3.13 PROTECTION OF LIQUID FLOOR TREATMENTS

- A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Mortar and grout.
 - 3. Reinforcement.
 - 4. Anchorage.
 - 5. Miscellaneous masonry accessories.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Field Quality Control Proposal: Submit proposed plan to ensure mix proportions and compressive strength of mortar meet the requirements of this section.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include data on material properties.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - 2. Cementitious materials. Include name of manufacturer, brand name, and type.
 - 3. Mortar admixtures.
 - 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 5. Grout mixes. Include description of type and proportions of ingredients.
 - 6. Reinforcing bars.
 - 7. Joint reinforcement.

8. Anchors, ties, and metal accessories.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

1.6 QUALITY ASSURANCE

- A. Comply with provisions of TMS 602/ACI 530.1/ASCE, except where exceeded by requirements of the contract documents.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90
1. Density Classification: Normal weight.
 2. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.
- C. Concrete Building Brick: ASTM C 55.

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Preblended Dry Mortar Mix: ASTM C 1714/C 1714M.
- E. Mortar Cement: ASTM C 1329/C 1329M.
- F. Aggregate for Mortar: ASTM C 144.
1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
- G. Aggregate for Grout: ASTM C 404.
- H. Cold-Weather Admixture: Not permitted without written permission from the Architect.
- I. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units to be formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
1. All Walls: Hot-dip galvanized carbon steel.

2. Wire Size for All Rods: 0.148-inch (3.77-mm) diameter.
 3. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 4. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.
- E. Width: As required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage at interior exposure and not less than 3/4 inch at exterior exposure

2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
 2. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Adjustable Masonry Wall Tie Anchors:
1. For use where existing and new masonry walls meets existing masonry wall.
 2. At each course of horizontal reinforcement provide:
 - a. Adjustable wall mounted bracket similar to Hohmann & Barnard, DW10HS that permits minimum 2-inches (51 mm) of vertical adjustment.
 - b. Anchor to existing masonry wall with 1/2" anchors to engage both faces of the existing concrete block and provide epoxy fill in the core similar to Hilti HIT HY 70 or grout block cores solid for two course above and below anchor.
 - c. Provide wire loop anchor minimum 10 inches into new wall similar to Hohmann & Barnard 302W, 3/16 inch (4.76 mm) diameter.
 - d. All parts hot dip galvanized.
 - e. Provide at courses with horizontal reinforcing .

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime or mortar cement mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For all walls unless noted otherwise, use Type S.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Mix as required to produce 3,000 psi (21 MPa) strength at 28 days, unless noted otherwise.
 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.
- E. Mixing:
1. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
 2. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
 3. Maintain sand uniformly damp immediately before the mixing process.
 4. If water is lost by evaporation, re-temper mortar only within two hours of mixing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Verify that reinforcing dowels are properly placed.
 2. Verify that substrates are free of substances that impair mortar bond.
 3. If conditions are found that may detrimental to performance of work, provide written report describing detrimental conditions and remedy where possible.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Hot and Cold Weather:

1. Make provision as necessary to comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

3.3 INSTALLATION, GENERAL

- A. Thickness: Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.4 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 12-mm (1/2-inch) maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1.5 mm (1/16 inch) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 3 mm (1/8 inch), with a maximum thickness limited to 12 mm (1/2 inch).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 3 mm (1/8 inch).
3. For head and collar joints, do not vary from thickness indicated by more than plus 9 mm (3/8 inch) or minus 6 mm (1/4 inch).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 3 mm (1/8 inch).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1.5 mm (1/16 inch) from one masonry unit to the next.

3.5 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 100-mm (4-inch) horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar and remove loose masonry units and mortar before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 600 mm (24 inches) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- H. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Anchor partition to structure above by means that permit differential movement as shown on Drawings.

3.6 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 - 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.7 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 19 mm (3/4 inch) on exterior side of walls, 13 mm (1/2 inch) elsewhere. Lap reinforcement a minimum of 150 mm (6 inches).
 - 1. Space reinforcement not more than 406 mm (16 inches) o.c.
 - 2. Provide reinforcement in first two joints above and below wall openings and extending 305 mm (12 inches) beyond openings in addition to continuous reinforcement.
 - 3. Place continuous joint reinforcement in first and second joint below top of walls.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 VERTICAL REINFORCING

- A. Place vertical reinforcing as shown on the drawings.
- B. Whether noted or not, provide at least one vertical bar in a solid grouted core adjacent to all masonry openings.
- C. Lap splices minimum 24 bar diameters.
- D. Where it is necessary to splice reinforcing bars inside cores of concrete block, use mechanical end splice connectors unless overlapping splice will result in at least 3/4 inch clear on all sides of the resulting spliced bars.

3.9 LINTELS

- A. Provide lintels at all openings 190 mm (7-1/2 inches) or greater whether shown on Drawings or not.
- B. At opening less than 1.22 m (48 inches), where no lintel type is called out, Contractor may use masonry lintels consisting of bond beam block or lintel block, steel reinforcing, and grout.
 - 1. Reinforcing: Place minimum one, No. 4 (M13) reinforcing bar 25 mm (1 inches) from bottom web, unless noted otherwise.
- C. Provide minimum bearing of 200 mm (8 inches) at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Place and consolidate grout fill without displacing reinforcing.
 - 3. Limit height of vertical grout pours to not more than 1520 mm (60 inches)] 3.86 m (12.67 ft.).
- D. Bond Beams
 - 1. Form bond beams using bond beam block or lintel block.
 - 2. Provide continuous bond beam where indicated and at the top course of free standing walls, whether noted or not.
 - 3. Reinforcing: Place minimum one, #4 (M13) reinforcing bars 25 mm (1 inches), from bottom web, unless noted otherwise.

3.11 FIELD QUALITY CONTROL

- A. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- B. Testing Prior to Construction: One set of tests.
- C. Testing Frequency: One set of tests for each 464 sq. m (5000 sq. ft.) of wall area or portion thereof, but not less than once per day when masonry work is being done.
- D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- E. Mortar Evaluation: Conform to approved Field Quality Control Proposal.
- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 4. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
 5. Collect and properly dispose of cleaning run-off.

3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product certificates.

C. Evaluation reports.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 - 1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade **33 (230)**, **G60 (Z180)** zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Manufacturer's standard.
 - 2. Deck Profile: Type B.
 - 3. Profile Depth: **1-1/2 inches (38 mm)**.
 - 4. Design Uncoated-Steel Thickness: **0.0598 inch (1.52 mm)**.

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of **33,000 psi (230 MPa)**, not less than **0.0359-inch (0.91-mm)** design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- D. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
- E. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.2 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous steel framing and supports.
 - 2. Loose bearing and leveling plates.

1.2 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details.

PART 2 - PRODUCTS

2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- C. Post-Installed Anchors: Chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 90 00 "Painting and Coating."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
- C. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.
- E. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than **8 inches (200 mm)** from ends and corners of units and **24 inches (600 mm)** o.c.

2.5 STEEL PIPE RAILING

- A. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- B. Form changes in direction by bending or by inserting prefabricated elbow fittings.
- C. Provide all welded connections. Grind smooth.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.7 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.8 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.

2.9 STEEL AND IRON FINISHES

- A. All steel to be galvanized and prime painted.
- B. Galvanizing: Hot-dip galvanize all carbon steel items unless noted otherwise to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
- C. Shop prime iron and steel items including those indicated to be galvanized unless they are to be embedded in or in bonding contact with concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer, compatible with galvanized substrate, unless indicated.
 - 2. Verify compatibility of primer with finish coat where specified.
- D. Prepare for shop priming as recommended by primer manufacturer for substrate.
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING RAILINGS

- A. Set posts plumb and anchor to concrete with post-installed chemical anchors or anchors embedded during concrete casting.
 1. Set posts plumb within a tolerance of **1/16 inch in 3 feet (2 mm in 1 m)**.
 2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet (6 mm in 3.5 m)**.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Wood blocking, nailers, grounds and similar.
 2. Interior "roof" deck sheathing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements
 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

- D. Application: All wood to be installed in exterior walls, parapets, wet walls, embedded in masonry or concrete, exposed on the exterior or exposed to significant humidity or condensation shall be preservative treated.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
 - 1. Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat all wood in fire rated walls or exposed in the interior of the building.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including blocking, nailers, grounds and miscellaneous supports.
- B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber of any species.

2.5 INTERIOR "ROOF" DECK SHEATHING

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exterior, Structural I sheathing, fire retardant treated.

2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than **1/2-inch (13-mm)** nominal thickness.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Bolts: Steel bolts complying with **ASTM A 307, Grade A** (ASTM F 568M, Property Class 4.6); with **ASTM A 563** (ASTM A 563M) hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.2 DECK SHEATHING

- A. Anchor to steel deck at not less than 16 inches (400 mm) on center.
- B. Anchor to edge blocking at 12 inches (300 mm) on center)

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.4 CLEANING

- A. Comply with applicable regulations.
- B. Do not burn scrap on project site.
- C. Do not burn scraps that have been pressure treated.

- D. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.
- E. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- F. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 74 13

FIBERGLASS REINFORCED GRATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes glass-fiber-reinforced-plastic gratings.

1.2 ACTION SUBMITTALS

- A. Product Data: For glass-fiber-reinforced-plastic gratings.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Delegated-Design Submittal: For gratings, including manufacturer's published load tables.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. Floors: Uniform load of 125 lbf/sq. ft. (6.00 kN/sq. m) or concentrated load of 2000 lbf (8.90 kN), whichever produces the greater stress.
 - 2. Limit deflection to L/360 or 1/4 inch (6.4 mm), whichever is less.
 - 3. Certify by submitting manufacturer's standard load tables showing compliance or provide calculation prepared and signed by a professional engineer.

2.2 GLASS-FIBER-REINFORCED-PLASTIC GRATINGS

- A. Pultruded Glass-Fiber-Reinforced Gratings: Bar gratings assembled from components made by simultaneously pulling glass fibers and extruding thermosetting plastic resin through a heated die under pressure to produce a product without voids and with a high glass-fiber content.
 - 1. Configuration: I4015; 1-1/2-inch (38-mm) I-bars spaced 1 inch (25 mm) on center (40 percent open). NOTE: Depth is design basis. If structural requirement indicate greater depth is required, verify acceptability of increased depth with the Architect.
 - 2. Traffic Surface: Applied abrasive finish.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

2.4 FABRICATION

- A. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form gratings from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- C. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Verify location of conduits and other penetrations and provide for cutouts whether specifically indicated on drawing or not.
- B. Fit exposed connections accurately together to form hairline joints.

3.2 INSTALLING GLASS-FIBER-REINFORCED-PLASTIC GRATINGS

- A. Comply with manufacturer's written instructions for installing gratings. Use manufacturer's standard stainless-steel anchor clips and hold-down devices for bolted connections.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal work.
- B. Related Requirements:
 - 1. Section 08 71 11 "Door Hardware" for door hardware for hollow-metal doors.
 - 2. Section 09 90 00 "Painting and Coating" for field painting and varnishing.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, and finishes. Include data on thermal performance.
- B. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Include wood doors in the schedule. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Certifications: Certify the products meet or exceed the performance requirements of this section.

1.7 CLOSEOUT SUBMITTALS

- A. Revised Data: Submit a revised schedule and product data as a part of Record Documents showing all corrections and modifications.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. Republic Doors and Frames.
 - 4. Steelcraft; an Ingersoll-Rand brand.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Doors:
 - 3. Type: As indicated in the Door and Frame Schedule.
 - a. Thickness: 1-3/4 inches (44.5 mm.)
 - b. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - c. Edge Construction: Model 2, Seamless.
 - d. Core: Manufacturer's option to meet requirements.
 - 4. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
 - b. Construction: Full profile welded.
 - 5. Exposed Finish: Prime for field painting.

2.3 FRAME ANCHORS

- A. Provide jamb and floor anchors as required for the specific application. Conform to SDI A250.8.

2.4 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 12G (04Z) coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Coating for Inside of Frames: For frames to be filled with cementitious grout, coat inside of frame as recommended by the frame manufacture and with materials as recommended by the frame manufacture.

2.5 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Steel-Stiffened Door Cores: Provide steel stiffeners as required to meet performance requirements.
 - 2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).
 - 3. Top Edge Closures: Close top edges of doors with inverted closures of same material as face sheets. Make flush with top of faces and edges. Provide on all doors.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. All joints fully welded and ground smooth.
 - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be filled.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.6 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
 2. If door or frame is indicated to be metallic coated, verify compatibility with metallic coating.
 3. Verify compatibility with factory or site applied finishes specified.
- B. Factory Finish: Finish coat(s) may be factory or site applied.
- C. Coat inside of all frames as necessary.

2.7 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.5-mm- (0.020-inch-) thick, cold-rolled steel sheet set into 0.8-mm- (0.032-inch-) thick steel frame.
 1. Verify that louvers will provide the required free area for ventilation. If additional area is required, request direction from Architect.
- B. Grout Guards: Formed from same material as frames, not less than 0.4 mm (0.016 inch) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.8 and A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set.
 - 2. Anchor frames in place with concealed anchors.
 - a. Where countersunk anchors must be used, fill, grind smooth and prime to match the rest of the frame.
 - 3. After wall construction is complete and frame is fully anchored, remove temporary braces, leaving surfaces smooth and undamaged.
 - 4. Installation Tolerances: Conform to Appendix A of SDI A250.11
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors: Conform to HMMA 840.
- D. Fill all frames after installation with cementitious grout.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
 - 1. Final adjustments are to be made after HVAC system testing and balancing is complete.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- D. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- E. Finish Coat: Touchup factory applied finish to match original coating. Apply field finished as indicated in Section 09 90 00.

END OF SECTION

SECTION 08 71 11

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Mechanical door hardware.

1.2 GENERAL

- A. Contractor shall provide hinges and install doors in opening.
- B. Contractor shall receive hardware templates for other items and coordinate preparation of doors for those items.
- C. Owner will supply and install hardware other than hinges.
- D. Owner will provide templates for hardware to the Contractor.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.
 - 1. Initiate and conduct with supplier, installer and related trades.
 - 2. Coordinate materials and techniques, and sequence hardware items and systems installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Door Hardware Schedule: Prepare detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Use same scheduling sequence and use same door numbers as in the Contract Documents.
 - 2. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.

- b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
- 3. Coordinate and submit with the Door and Frame Schedule required in Section 08 11 13 "Hollow Metal Doors and Frames".

1.5 INFORMATIONAL SUBMITTALS

- A. Certification: Submit name and proof of certification of the Architectural Hardware Consultant.

1.6 CLOSEOUT SUBMITTALS

- A. Schedule: Submit a Door Hardware Schedule modified to show actual hardware installed and location of concealed items.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Accessibility Requirements: Comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design and ICC A117.1 .

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Hinges: Life of Building

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by descriptive titles corresponding to requirements specified in Part 2.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
- B. Antifriction-Bearing Hinges:
 - 1. Mounting: Full mortise (butts).

2. Bearing Material: Ball bearing.
 3. Grade: Grade 1 (heavy weight).
 4. Base and Pin Metal: Stainless steel.
 5. Pins: Non-rising loose unless otherwise indicated.
 6. Tips: Flat button.
 7. Corners: Square.
- C. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- D. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that doors and frames are square and plumb.
- B. Verify that doors and frames are ready to receive work and that dimensions are as indicated on shop drawings.
- C. Verify that all door and frame reinforcing is properly installed.

3.2 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
- C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
 3. Use manufacturer's fasteners furnished with hardware items. Replace fasteners damaged during installation.
- D. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches (750 mm)** or part thereof of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- E. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended.

3.3 ADJUSTING, CLEANING AND ACCEPTANCE

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended.
- B. Clean operating items as necessary to restore proper function and finish of hardware and doors.
- C. Acceptance:
 - 1. After hinges and door are installed and swing and closure are verified, request inspection and acceptance by the DOT locksmith.
 - 2. Receive written documentation of acceptance.
 - 3. After door is accepted by the DOT, the responsibility for installation of other hardware and door function will be the responsibility of the DOT.

3.4 DOOR HARDWARE SCHEDULE

- A. Manufacturers/Products
 - 1. Products appearing in the hardware schedule are example products.
 - 2. Hardware by Owner is example only to establish basis for bidding. Actual hardware provided may vary.
 - 3. Abbreviations used for Manufacturers:

McK	McKinney Products
LCN	LCN
NGP	National Guard Products
VD	Von Duprin

Quantity	Item	Finish	BoD Product
HARDWARE SET 1			
1. By Contractor:			
3 EA	Hinges	629	McK T4A3386
2. By Owner			
1 EA	Exit Device: Type 1, Function 03 (storeroom)	625	VD 98 series
1 EA	Closer	628	LCN 4040
1 EA	Threshold	719	NPG 8425

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint and coating systems on interior and exterior substrates.

1.2 DEFINITIONS

- A. Conform to ASTM D 16 for interpretation of terms used in this section.
- B. Gloss Level: As defined by "MPI Architectural Painting Specification Manual".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Paint System Schedule: Provide a schedule listing each paint system, each paint to be used in the system (referring to product data sheets submitted), and where each system is to be used on the Project.
- C. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on heavy, non-absorbent cardstock, 8½ x 11 inch (216 x 280 mm) in size with at least one black line printed on a white background. List color formula on the label.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than one gallon of each material and color applied, unopened.
 - 2. In addition to the manufacturer's label, label each container with color formula and where used.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- C. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.3 PAINT SYSTEMS, GENERAL

- A. General Exterior Paint System Notes:
 - 1. Specific products listed (if any) are for reference only. Other similar products are also acceptable. Similar shall be understood to be paints of similar or greater solids content, similar depth of application (DFT) and similar in-service performance record.
 - 2. All paints are to be applied at the manufacturer's suggested depth (DFT) level for the substrate and type of application.
- B. Colors to be selected by the Owner to match existing Sherwin Williams paint colors in the facility.

2.4 PAINT SYSTEMS

- A. Paint WI-OP-2L - Wood, Opaque, Latex, 2 Coat:
 - 1. Primer: Latex primer for wood surfaces.
 - 2. Semi-Gloss: One coat of latex: ProMar 400 Interior Latex Semi-Glos, B31W4450 Series, by Sherwin Williams.
- B. Paint WI-OP-3A – Wood (Treated), Opaque, 100% Acrylic, 3 Coat:
 - 1. Primer: Verify compatibility with fire-retardant treatment and provide finish paint manufacturer's recommended primer/sealer.
 - 2. Semi-Gloss: Two coats of acrylic; Semi-Gloss, A76 Series, by Sherwin Williams.
- C. Paint CI-OP-3E – Concrete or Masonry, Opaque, Water-based Epoxy, 3 Coat:
 - 1. Primer/Block Filler: One coat latex block filler: Loxon Concrete & Masonry Primer Sealer, A24W8300 by Sherwin Williams.
 - 2. Semi-Gloss: Two coats of Water-based Epoxy; Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46 Series by Sherwin Williams.
- D. Paint CI-OP-3A – Concrete or Masonry, Opaque, 100% Acrylic, 3 Coat:
 - 1. Primer/Block Filler: One coat latex block filler: Loxon Concrete & Masonry Primer Sealer, A24W8300 by Sherwin Williams.
 - 2. Satin: Verify and match existing.
- E. Paint MI-OP-3A - Ferrous or Galvanized Metals, Opaque, 100% Acrylic, 3 Coat:
 - 1. Primer: If shop primed coordinate and verify primer compatibility. If unprimed, Pro-Cryl Universal Primer, B66-310 by Sherwin Williams or as recommended by the finish paint manufacturer.
 - 2. Semi-Gloss: Two coats of acrylic; Solo, Semi-Gloss, A76 Series, by Sherwin Williams.
- F. Paint X-OP-2LA – Existing Painted Surfaces, Opaque, Acrylic Latex, 2 Coat:
 - 1. Preparation: Prepare existing surface as recommended by finish paint manufacturer including provide a tie coat or primer, if recommended.
 - 2. Verify exiting paint and match.

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality. Comply with manufacturer's product data for product to be thinned or tinted.

- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent, measured in accordance with ASTM D4442.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Existing painted surfaces:
 - 1. Inspect entire surface.
 - 2. Remove all materials or coating that will interfere with the paint bond.
 - 3. Remove all loose paint.
 - 4. Fill / patch areas where loose paint is removed or other depressions as necessary to produce a continuous, even surface.
 - 5. Prime fill / patch areas before applying tie coat to the entire wall surface.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied and cured.
- D. Additional Coats: Regardless of number of coats specified, apply as many coats as necessary for completely hide imperfections and produce a uniform finish coat.
- E. Paint (or varnish) doors open or removed from frame; paint door edges and frames without sealing joints. Do not close doors until paint is dry.
- F. Paint (or varnish) bottoms of doors before they are installed.
- G. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. Paint interior surfaces of air ducts and convectors and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - c. Paint dampers exposed behind louvers, grilles, and convectors and baseboard cabinets to match face panels.
- H. Do Not Paint or Finish the Following Items:
 - 1. Required labels including: fire rating labels, equipment serial number and capacity labels.
 - 2. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 3. Items indicated to receive other finishes.
 - 4. Items indicated to remain unfinished.
 - 5. Finished metals including: Stainless steel, anodized aluminum, terne metal, chromium plated metals, copper, bronze, brass and similar items.
 - 6. Floors, unless specifically so indicated.
 - 7. Surfaces in concealed areas and inaccessible areas such as furred spaces, utility tunnels, pipe spaces, and duct shafts except where visible through grilles, registers or the like. Do not paint pipes, ducts or conduit located in such spaces.
 - 8. Ductwork, piping, conduits, hangers, equipment supports, and equipment in rooms devoted primarily to mechanical and electrical equipment.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
- C. As work progresses, promptly remove paint where spilled, splashed or spattered.
- D. During progress of work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris. Do not allow accumulation of empty containers or other excess items except in areas designated for that purpose.
- E. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 PROTECTION AND CORRECTION

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.
- C. Following completion of painting in each area, reinstall items which were removed for painting by the Contractor.
- D. Upon completion of this portion of work, visually inspect surfaces and remove paint from surfaces not scheduled to be painted.
- E. In event that system does not cover and achieve finish in accordance with manufacturer's claims, apply corrective material to achieve required finish.
- F. Spot painting to correct soiled or damaged paint surfaces will be allowed only when touch-up spot is blended into surrounding finish and is not visible to normal viewing. If not possible, re-coat entire surface to corners or visible stopping point.

3.6 PAINTING SCHEDULE

- A. Equipment Boards and similar items.
 - 1. System: WI-OP-2L (Latex).
 - 2. Gloss/Sheen: Semi-Gloss (35-70).
- B. Walls at Transformer Room:
 - 1. System: CI-OP-3A
 - 2. Gloss/Sheen: Satin (20-35).
- C. Walls at MPD Room:
 - 1. System: CI-OP-3E
 - 2. Gloss/Sheen: Semi-Gloss (35-70).

- D. Existing Walls:
 - 1. Prepare surfaces as recommended by finish paint manufacturer.
 - 2. Provide one coat of the same paint as the new walls in the same room.
 - 3. Provide a second coat, if required to obtain full color/texture coverage.

- E. For Plywood (Roof of Electrical Room):
 - 1. System: WI-OP-3A.
 - 2. Gloss/Sheen: Semi-Gloss (35-70).

- F. For Metal Doors and Frames.
 - 1. System: MI-OP-3A (Acrylic).
 - 2. Gloss/Sheen: Semi-Gloss (35-70).

END OF SECTION

SECTION 26 05 01

SELECTIVE ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes
 1. Extension of existing electrical systems.
 2. Maintaining electrical systems services.
 3. Electrical systems switchovers.
 4. Electrical demolition.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: Match existing unless otherwise specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation and existing record documents. Only items critical to performance of new systems and extensions to existing systems have been verified to extent practicable by field observations.
- D. Report discrepancies to Architect before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Coordinate utility service outages with Owner.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction when work is not complete during authorized work outages. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- C. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 1. Obtain permission from Owner at least two weeks before partially or completely disabling system(s) during normal work hours. Refer to Section 01 14 00..

2. Schedule outage detailing shutdown, disconnections/disassembly, installation/reconnections, and startup. Minimize outage duration.
3. Coordinate outage timing, and service details with utility company.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring.
- C. Disconnect and remove abandoned panelboards and distribution equipment.
- D. Repair adjacent construction and finishes damaged during demolition and extension work.
- E. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.
- F. Verify proper phase rotation on new service entrance and feeders prior to re-energizing loads. Ensure proper re-connection of all feeders.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION

SECTION 26 05 11

REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish and install electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings.
- B. Wiring ampacities specified, scheduled, or shown on the drawings are based on copper conductors unless otherwise noted, with the conduit and raceways accordingly sized.

1.2 MINIMUM REQUIREMENTS

- A. References to the International Building Code (IBC), National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL) and National Fire Protection Association (NFPA) are minimum installation requirement standards.
- B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

1.3 QUALIFICATIONS (PRODUCTS AND SERVICES)

- A. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.
- B. Product Qualification: Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.

1.4 MANUFACTURED PRODUCTS

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts shall be available.
- B. When more than one unit of the same class or type of equipment is required, such units shall be the product of a single manufacturer.
- C. Equipment Assemblies and Components:
 - 1. Components of an assembled unit need not be products of the same manufacturer.
 - 2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
 - 3. Components shall be compatible with each other and with the total assembly for the intended service.
 - 4. Constituent parts which are similar shall be the product of a single manufacturer.
- D. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.

1.5 EQUIPMENT PROTECTION

- A. Equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
 - 1. Store equipment indoors in clean dry space with uniform temperature to prevent condensation. Equipment shall include but not be limited to switchgear, switchboards, panelboards, transformers, motor control centers, motor controllers, uninterruptible power systems, enclosures, controllers, circuit protective devices, cables, wire, light fixtures, wiring devices, electronic equipment, and accessories.
 - 2. During installation, equipment shall be protected against entry of foreign matter; and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
 - 3. Damaged equipment shall be, as determined by the Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
 - 4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
 - 5. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.6 WORK PERFORMANCE

- A. All electrical work must comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by contract.
- B. Contractor shall be responsible for all permits and inspections required to complete the work.
- C. Job site safety and worker safety is the responsibility of the contractor.
- D. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:
 - 1. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E and Contractor's Safety Program.
 - 2. Electricians must wear personal protective equipment while working on energized systems in accordance with NFPA 70E.
 - 3. Before initiating any work, a job specific work plan must be developed by the contractor with a peer review conducted and documented. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used and exit pathways.
 - 4. Work on energized circuits or equipment cannot begin until prior written approval is obtained from the Owner.
- E. For work on existing buildings, arrange, phase and perform work to assure electrical service for other buildings at all times.
- F. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions. Existing installation conditions discovered or uncovered during the course of new work shall be reported to the Engineer as soon as practical and not later than the end of the day the condition is discovered.

- G. Coordinate location of all equipment and conduit with other trades to minimize interferences.

1.7 EQUIPMENT INSTALLATION AND REQUIREMENTS

- A. Equipment location shall be as close as practical to locations shown on the drawings.
- B. Working spaces shall not be less than specified in the NEC for all voltages specified.
- C. Inaccessible Equipment:
 - 1. Where the Engineer determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Owner.
 - 2. "Conveniently accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.

1.8 EQUIPMENT AND PATHWAY IDENTIFICATION

- A. As defined in Section 26 05 53 - Identification for Electrical Systems.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.2 SUBMITTALS

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

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2 and Type XHHW-2 .
- C. Minimum 90 degree C insulation rating.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.
- B. Wiring Connectors for Splices and Taps: Copper Conductors Sized #8 and larger: Use compression connectors.
- C. Do not use split bolt connectors or scotch lock type wire connectors.

2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage wire and cable has been completed.
- B. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- C. Verify that raceway installation is complete and supported.
- D. Verify that field measurements are as shown on the drawings.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper . Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger or to match existing installations requiring extension.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger or to match existing installations requiring extension.
- C. Use conductor not smaller than 12 AWG for power and lighting circuits.

3.3 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway .
- D. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Code:
 - a. In existing buildings, verify consistency of listed color code with installed conditions.
 - b. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.

- c. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
- d. Equipment Ground, All Systems: Green.

3.4 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables. All conductors and cables to be installed in conduit unless otherwise noted.
- C. 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.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.5 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. As-Built Data: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Ground rods. Grounding arrangements and connections for separately derived systems.
- B. Qualification Data: For testing agency and testing agency's field supervisor.
- C. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Tinned Conductors: ASTM B 33.
 - 2. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.

2.3 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression -type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 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. Underground Grounding Conductors: Install bare tinned-copper conductor, to match existing installation.
 1. Bury at least 24 inches (600 mm) below grade.
- C. Conductor Terminations and Connections:
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated. Connections to Structural Steel: Welded connectors.
 3. When making ground bonding connections, apply a corrosion inhibitor to all contact surfaces. Use corrosion inhibitor appropriate for protecting a connection between the metals used.
- D. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 26 05 53.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

- B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
 1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
 2. Provide supplemental ground electrode(s) and bond to the grounding electrode system as required to attain specified resistance levels to ground.

3.3 EQUIPMENT AND PATHWAY GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Conduit Systems:
 1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
 2. Non-metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
 3. Conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.
- C. Boxes, Cabinets, Enclosures, and Panelboards:
 1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).
 2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
 3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- D. Bond access floor framing to the service entrance ground.

3.4 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. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- 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; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by 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.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level at service disconnect enclosure grounding terminal,
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values: Service Entrance Ground Bus: 25 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.3 ACTION SUBMITTALS

- A. Product Data: Provide manufacturer's catalog data for fastening and support systems.

1.4 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.5 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

PART 2 - PRODUCTS

2.1 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. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 4. Channel Dimensions: Selected for applicable load criteria.

5. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 6. Fitting and Accessory Materials: Same as channels and angles.
 7. Rated Strength: Selected to suit 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. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 6. Toggle Bolts: All-steel springhead type.
 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 05 50 00 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 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 scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other 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 two-bolt conduit clamps or single-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, 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. 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. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 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.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal conduits, tubing, and fittings.
 - 2. Metal wireways and auxiliary gutters.
 - 3. Boxes, enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. ARC: Comply with ANSI C80.5 and UL 6A.
- D. IMC: Comply with ANSI C80.6 and UL 1242.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- F. EMT: Comply with ANSI C80.3 and UL 797.
- G. FMC: Comply with UL 1; zinc-coated steel or aluminum.
- H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Fittings for EMT:
 - a. Material: Steel .
 - b. Type: compression.
 - 2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- E. Metal Floor Boxes:
 - 1. Material: Cast metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Nonmetallic Floor Boxes: Nonadjustable, rectangular.
 - 1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- J. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- K. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
- L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Fiberglass.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- M. Cabinets:
 - 1. NEMA 250, Type 1 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 panelboards.

4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 1. Exposed Conduit: IMC.
 2. Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.
 3. Underground Conduit: RNC, Type EPC-40-PVC.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.

- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
 1. Exposed, Not Subject to Physical Damage: EMT .
 2. Exposed and Subject to Severe Physical Damage: IMC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT .
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 5. Damp or Wet Locations: IMC.
 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and 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. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Install surface raceways only where indicated on Drawings.
- H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- 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. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Metal Clad cable is prohibited unless otherwise indicated. Comply with Section 26 05 19 for allowed power conductors in conduit.
- I. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- J. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to IMC before rising above floor.
- K. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- W. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

- X. 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. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- Z. Locate boxes so that cover or plate will not span different building finishes.
- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.
- DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Conduit markers.
- E. Warning signs and labels.

1.2 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2007.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2007.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide catalog data for nameplates, labels, and markers.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

PART 2 - PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate, labels, and markers to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
 - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or

branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.2 NAMEPLATES

- A. Nameplates shall be laminated black phenolic resin with a white core with engraved lettering for normal power system.
- B. Nameplates shall be laminated red phenolic resin with white core with engraved lettering for emergency power system.
- C. Nameplates shall identify the following:
 - 1. Equipment ID.
 - 2. Voltage/Phase/# of Wires
 - 3. Wire Size
 - 4. Where the equipment is Fed From
- D. Locations:
 - 1. All disconnect switches, panelboards, switchboards.
 - 2. Circuit breakers, contactors, and relays in separate enclosures.
- E. Secure Nameplates with screws.
- F. Letter Size:
 - 1. Use 1/2 inch high letters.

2.3 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.
- G. Description: Vinyl cloth or Nylon type self-adhesive wire markers.
- H. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.

2.4 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Minimum Size: 7 by 10 inches unless otherwise indicated.

- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester, or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Flush-Mounted Equipment: Inside of equipment door.
 - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 4. Elevated Equipment: Legible from the floor or working platform.
 - 5. Interior Components: Legible from the point of access.
 - 6. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- E. Install Nameplates, Labels, and Markers on all equipment, boxes, wire, conduit, and devices identified in Part 2 Products of this Section.

END OF SECTION

SECTION 26 22 00

LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Distribution, dry-type transformers rated 600 V and less.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
 - 2. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.
- B. Shop Drawings:
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.
 - 3. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Square D; by Schneider Electric.
- B. General Electric.
- C. Siemens.
- D. Source Limitations: Obtain each transformer type from single source from single manufacturer.

2.2 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Transformers Rated 15 kVA and Larger: Comply with NEMA TP 1 energy-efficiency levels as verified by testing according to NEMA TP 2.
- D. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.
- E. Coils: Continuous windings without splices except for taps.
 - 1. Internal Coil Connections: Brazed or pressure type.
 - 2. Coil Material: Copper.
- F. Encapsulation: Transformers smaller than 30 kVA shall have core and coils completely resin encapsulated.
- G. Shipping Restraints: Paint or otherwise color code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside the transformer enclosure.

2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NFPA 70 and list and label as complying with UL 1561.
- B. Cores: One leg per phase.
- C. Enclosure: Ventilated.
 - 1. NEMA 250: Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
- D. Transformer Enclosure Finish: Comply with NEMA 250.
 - 1. Finish Color: Gray.
- E. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- F. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with a maximum of 115deg C rise above 40-deg C ambient temperature.
- G. Low-Sound-Level Requirements: Maximum sound levels when factory tested according to IEEE C57.12.91, as follows:
 - 1. 151 to 300 kVA: 55 dBA.

2.4 IDENTIFICATION DEVICES

- A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 26 05 53 "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

- A. Test and inspect transformers according to IEEE C57.12.01 and IEEE C57.12.91.
 - 1. Resistance measurements of all windings at the rated voltage connections and at all tap connections.
 - 2. Ratio tests at the rated voltage connections and at all tap connections.
 - 3. Phase relation and polarity tests at the rated voltage connections.
 - 4. No load losses, and excitation current and rated voltage at the rated voltage connections.
 - 5. Impedance and load losses at rated current and rated frequency at the rated voltage connections.
 - 6. Applied and induced tensile tests.
 - 7. Regulation and efficiency at rated load and voltage.
 - 8. Insulation Resistance Tests:
 - a. High-voltage to ground.
 - b. Low-voltage to ground.
 - c. High-voltage to low-voltage.
 - 9. Temperature tests.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.
- E. Environment: Enclosures shall be rated for the environment in which they are located.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install transformers level and plumb on a concrete base.
- B. Construct concrete bases according to Section 03 30 00 "Cast-in-Place Concrete" and anchor floor-mounted transformers according to manufacturer's written instructions and requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems."
 - 1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- C. Secure transformer to concrete base according to manufacturer's written instructions.

- D. Secure covers to enclosure and tighten all bolts to manufacturer-recommended torques to reduce noise generation.
- E. Provide flexible liquid tight metal conduit at transformer primary and secondary connections.
- F. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

- A. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- D. Provide flexible connections at all conduit and conductor terminations and supports to eliminate sound and vibration transmission to the building structure.

3.4 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 5 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.5 CLEANING

- A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. VPR: Voltage protection rating.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
 - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
 - 3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
 - 4. Detail bus configuration, current, and voltage ratings.
 - 5. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 7. Include wiring diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
 - 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- 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: Two spares for each type of panelboard cabinet lock.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or 9002 certified.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.8 FIELD CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards 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. Altitude: Not exceeding 6600 feet (2000 m).
- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
 - 1. Ambient temperatures within limits specified.
 - 2. Altitude not exceeding 6600 feet (2000 m).

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 12 months from date of Substantial Completion.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
 1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Flush and Surface-mounted, dead-front cabinets. As identified on schedule.
 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Kitchen Wash-Down Areas: NEMA 250, Type 4X , stainless steel.
 - d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
 2. Height: 84 inches (2.13 m) maximum.
 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
 4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
 5. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
 6. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
 7. 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.
- F. Incoming Mains:
 1. Location: Convertible between top and bottom.

2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

G. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
 - a. Plating shall run entire length of bus.
 - b. Bus shall be fully rated the entire length.
2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Terminations shall allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
4. Main and Neutral Lugs: Compression type, with a lug on the neutral bar for each pole in the panelboard.
5. Ground Lugs and Bus-Configured Terminators: Compression type, with a lug on the bar for each pole in the panelboard.
6. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

I. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices.

J. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices as identified on schedules.

K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 POWER PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Sector; Eaton Corporation.
2. General Electric Company; GE Energy Management - Electrical Distribution.

3. Siemens Energy.
 4. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1, distribution type.
- C. 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.
- D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers:
1. Square D.
 2. Eaton Electric.
 3. Siemens Energy.
 4. General Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: As identified on schedules.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- F. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 3. Electronic Trip Circuit Breakers:
 - a. Required for 400 amp and larger breakers.
 - b. RMS sensing.

- c. Field-replaceable rating plug or electronic trip.
 - d. Digital display of settings, trip targets, and indicated metering displays.
 - e. Multi-button keypad to access programmable functions and monitored data.
 - f. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
 - g. Integral test jack for connection to portable test set or laptop computer.
 - h. Field-Adjustable Settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.
 - 3) Long and short time adjustments.
 - 4) Ground-fault pickup level, time delay, and I squared T response.
4. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
5. Subfeed Circuit Breakers: Vertically mounted.
6. MCCB Features and Accessories:
- a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
 - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
 - f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
 - h. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.
- B. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- C. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- D. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
- 1. Circuit directory shall identify as shown on panelboard schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NECA 407.

- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards 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.
- B. Comply with NECA 1.
- C. Install panelboards and accessories according to NECA 407.
- D. Equipment Mounting:
 - 1. Attach panelboard to the vertical finished or structural surface behind the panelboard.
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- F. Mount top of trim 84 inches above finished floor unless otherwise indicated.
- G. Mount panelboard cabinet plumb and rigid without distortion of box.
- H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- I. Mounting panelboards with space behind is recommended for damp, wet, or dirty locations. The steel slotted supports in the following paragraph provide an even mounting surface and the recommended space behind to prevent moisture or dirt collection.
- J. Mount surface-mounted panelboards to steel slotted supports 5/8 inch (16 mm) in depth. Orient steel slotted supports vertically.
- K. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
 - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- L. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- M. Install filler plates in unused spaces.
- N. Stub four 1-inch (25 mm)-empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems" identifying source of remote circuit.

3.4 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Panelboards will be considered defective if they do not pass tests and inspections.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.6 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION

SECTION 26 27 13
ELECTRICITY METERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes equipment for electricity metering by Owner.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For electricity-metering equipment.
 - 1. Dimensioned plans and sections or elevation layouts.
 - 2. Wiring Diagrams: For power, signal, and control wiring. Identify terminals and wiring designations and color-codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data. In addition to items specified in Section 01 14 00 "Operation and Maintenance Data," include the following:
 - 1. Application and operating software documentation.
 - 2. List of Modbus registers and characteristics.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, store, and handle modular meter center according to NECA 400.

PART 2 - PRODUCTS

2.1 EQUIPMENT FOR ELECTRICITY METERING BY OWNER

- A. Provide metering by same manufacturer providing Panelboards under Section 26 24 16.
- B. General Requirements for Owner's Meters:
 - 1. Comply with UL 1244.

2. Meters shall have a minimum active energy accuracy of 0.5 percent of reading, complying with requirements in ANSI C12.20.
3. Capable of displaying:
 - a. Current.
 - b. Voltage.
 - c. Frequency.
 - d. Power factor.
 - e. Active, reactive and apparent power.
 - f. Min/Max instantaneous values.
4. Enclosure: NEMA 250, Type 1 minimum, with hasp for padlocking or sealing.
5. Meter with integrated or remote LCD display.
6. Identification: Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."
7. Memory Backup: Self-contained to maintain memory throughout power outages of 72 hours, minimum.
8. Sensors: Current-sensing type, with current or voltage output, selected for optimum range and accuracy for meters indicated for this application.
 - a. Provide protection for voltage monitoring connections.
 - b. Provide shorting block for current transformer connections.
9. With RS-485/232 Modbus RTU and RJ-45 Ethernet Modbus TCP/IP connections for remote monitoring by other systems.
10. Interface with DDC System for HVAC: One digital KY pulse to a user-definable increment of energy measurement. Arrange to convey the instantaneous, integrated, demand level measured by meter to provide data for processing and possible programmed demand control action by Owner's Building Automation System.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with equipment installation requirements in NECA 1.

3.2 IDENTIFICATION

- A. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
 1. Series Combination Warning Label: Self-adhesive type, with text as required by NFPA 70.

END OF SECTION

SECTION 26 43 13

SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment.

1.2 DEFINITIONS

- A. Inominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. OCPD: Overcurrent protective device.
- F. SCCR: Short-circuit current rating.
- G. SPD: Surge protective device.
- H. VPR: Voltage protection rating.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, Inominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.

1.4 INFORMATIONAL SUBMITTALS

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

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For SPDs to include in maintenance manuals.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to replace or replace SPDs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL SPD REQUIREMENTS

- A. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Comply with UL 1449.
- D. MCOV of the SPD shall be the nominal system voltage.

2.2 SERVICE ENTRANCE SUPPRESSOR

- A. SPDs: Comply with UL 1449, Type 2.
- B. SPDs: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 2.
 - 1. SPDs with the following features and accessories:
 - a. Integral disconnect switch.
 - b. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - c. Indicator light display for protection status.
 - d. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
 - e. Surge counter.
- C. Comply with UL 1283.
- D. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 240kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.
- E. Protection modes and UL 1449 VPR for grounded wye circuits with three-phase, four-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 1200 V for 480Y/277 V.
 - 2. Line to Ground: 1200 V for 480Y/277 V.
 - 3. Line to Line: 2000 V for 480Y/277 V.

- F. SCCR: Equal or exceed 100 kA.
- G. Inominal Rating: 20 kA.
- H. Enclosures: Indoor: NEMA 250, Type 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.
- C. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible, and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
- D. Use crimped connectors and splices only. Wire nuts are unacceptable.
- E. Wiring:
 - 1. Power Wiring: Comply with wiring methods in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
 - 2. Controls: Comply with wiring methods in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
 - 1. Compare equipment nameplate data for compliance with Drawings and Specifications.
 - 2. Inspect anchorage, alignment, grounding, and clearances.
 - 3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. An SPD will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.3 STARTUP SERVICE

- A. Complete startup checks according to manufacturer's written instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests, and reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION

Bidder _____

SEALED BID

LETTING DATE: November 18, 2015
PROPOSAL NO: 15324
PROPOSAL DESCRIPTION: Materials Lab MDP Replacement.

**Iowa Department of Transportation
PURCHASING - SEALED BID PROPOSAL
800 Lincoln Way
Ames, IA 50010**