West Virginia Community &

Technical College System

Request for Proposal ("RFP")

RFP No. 27030

For more information about WVCTCS, please visit https://wvctcs.org.

TITLE: Construction Materials Testing and Special Inspections – Pierpont Community & Technical College's Aviation Maintenance Technology Facility (PCTC AMT) Project

PROPOSAL DUE DATE: August 21, 2026, 2:00pm ESDT

PROCUREMENT OFFICIAL: Connie Oswald, Procurement Specialist

cbid.receipt@wvhepc.edu

Any and all communication shall be held with the Procurement Specialist or Director of Procurement Official. Proposers shall not communicate with any other West Viginia Community & Technical College System, (WVCTCS), and Pierpont Community & Technical College, (PCTC), personnel or representative during the RFP process. If Proposers are found to have communicated with any other representative of WVCTCS, and/or PCTC during the RFP process, the Proposer may be disqualified, and the Proposal will not be accepted by WVCTC.

I. INTRODUCTION AND OVERVIEW OF SOLICITATION

A. OVERVIEW OF SOLICITATION

The Owner, West Viginia Community & Technical College System, (WVCTCS), is initiating this Request for Proposals ("RFP") to solicit Proposals from qualified firms or individuals ("Proposers") for the following: Construction Materials Testing (CMT) and Special Inspection firms during construction to provide independent third-party testing and inspection services during construction of a new Pierpont Community & Technical College Aviation Maintenance Technology Facility, (PCTC AMT). The new PCTC AMT facility is to be located at the Benedum Airport Authority's Aerotech Park off WV Route 279 in Bridgeport, WV. This 65,000 square-foot facility will feature two large high bay hangars to accommodate a multitude of aircraft training support. The Aviation-related specialty labs and shops include Avionics, Flight Control, Hydraulics, Composite Metals, Non-Destructive Testing, Sheet Metal, Wood, and Paint. The facility also includes an expanded welding lab for specialty training for students beyond the requirements of aeronautics. General classroom spaces adjoin the labs and hangars for a direct connection between instructional and practical learning. In addition to the administration area, support spaces include the Computer Lab, Learning Resource Center, Student Lounge, and Testing Center.

B. SOLICITATION SCHEDULE

The following is an anticipated Solicitation Schedule. The WVCTCS may, in its sole discretion change this schedule at any time. If WVCTCS changes dates in the schedule before the deadline for receipt of Proposals, it will do so by an addendum to this RFP. It is each prospective Proposer's responsibility to check the will be posted at the following URL:
https://wvctcs.org/purchasing-and-finance

It is the Bidder's obligation to check this website for current information regarding this RFP and its timelines.

RFP Publication	July 30, 2026
Question Deadline (see Exhibit A)	August 14, 2026, 2:00pm ESDT
Proposal Due Date ("Due Date")	August 21, 2:00pm ESDT
Anticipated Contract Start Date	Late September / October 2026

C. PRE-PROPOSAL MEETING:

See Exhibit A - Instructions To Bidders

II. SCOPE OF SERVICES

Proposer must be aware that the overall Project Schedule is paramount in this project, and a schedule extension is unacceptable. Proposers must take this into consideration in preparing the Proposal.

See Exhibit A – Instructions To Bidders
See Exhibit B – General Terms and Conditions
See Exhibit C – Guidelines For Vendors For Submissions Via Email
See Exhibit D – Bid Certification And Signature
See Exhibit E – Addendum Acknowledgement
See Exhibit F – WV Purchasing Affidavit
See Exhibit G – WV96 5.2026

III. RESPONSE REQUIREMENTS & EVALUATION CRITERIA

All proposals must be formatted with the items and in the sequence as presented in this Section of the RFP. Except as otherwise set forth herein, Section III outlines the minimum requirements for the preparation and presentation of a response. Failure to comply may result in rejection of the response. The Proposal should be specific and complete in every detail, prepared in a simple and straightforward manner.

Proposers are expected to examine the entire RFP, including all specifications, standard provisions and instructions. Failure to do so will be at the Proposers' risk. Each Proposer shall furnish the information required by the RFP.

Evaluation Criteria: The following evaluation factors will be used in determining the best-qualified Proposal:

Please provide a proposal as indicated below to perform the required quality control testing for soil compaction, bearing capacity, concrete testing, steel connections testing and reporting test results for Pierpont Community & Technical College's Aviation Maintenance Technology Facility (PCTC AMT) Project as per the specifications, construction documents, and other documents that are attached. Testing shall be coordinated with the general contractor's +/- 18-24 months construction schedule and test results and reports shall be submitted to the owner and architect. Reports of testing shall be provided to the Owner and the Architect.

All testing is to be specified in your submitted proposal to ensure that each proposal is a fair comparison of services per the attached documents.

SECTION 014000 - QUALITY REQUIREMENTS
SECTION 033000 - CAST-IN-PLACE CONCRETE
SECTION 042900 - ENGINEERD UNIT MASONRY
SECTION 051200 - STRUCTURAL STEEL FRAMING
SECTION 052100 - STEEL JOIST FRAMING
SECTION 053100 - STEEL DECKING
SECTION 312000 - EARTH MOVING
SECTION 321216 - ASPHALT PAVING
SECTION 321313 - CONCRETE PAVING
SECTION 330500 - COMMON WORK REULTS FOR UTILITIES

CIVIL DRAWINGS 2026-06-02 GMP PRICING SET
ARCHITECTURAL DRAWINGS 2026-06-02 GMP PRICING SET
STRUCTURAL DRAWINGS 2026-06-02 GMP PRICING SET

EXHIBIT A INSTRUCTIONS TO BIDDERS
EXHIBIT B GENERAL TERMS AND CONDITIONS
EXHIBIT C GUIDELINES FOR EMAIL SUBMISSIONS
EXHIBIT D BID CERTIFICATION AND SIGNATURE
EXHIBIT E ADDENDUM ACKNOWLEDGEMENT
EXHIBIT F STATE OF WEST VIRGINIA AGREEMENT ADDENDUM (WV 96 5.2026)
EXHIBIT G STATE OF WEST VIRGINIA PURCHASING AFFIDAVIT

For the drawings listed above, Proposers only may contact Omni Associates-Architects, Inc., Attn: Shelly Snider: smclaughlin@omniassociates.com and request information to access the firm's online ShareFile site for the Construction Materials Testing and Special Inspections – Pierpont Community & Technical College's Aviation Maintenance Technology Facility (PCTC AMT) Project. Once access is gained, Bidders can download Bidding Documents in the form of PDF files at no charge. Requests for access to documents must be made by email, and those requests received through mail, telephone, fax transmission, or other online communications will not receive a response.

Proposal format should include the following:

Concrete Technician	$_____ per hour
Soils Technician	$_____ per hour
Steel Connection Testing Technician (includes testing equipment)	$_____ per hour
Steel Weld Testing Technician (includes testing equipment)	$_____ per hour
Engineering Supervision/Review (if required)	$_____ per hour
Clerical (if required)	$_____ per hour
Concrete Cylinder Breaks	$_____ per break
Concrete Cylinders (if not provided by contractor)	$_____ each
Grout Testing	$_____ each

Mileage (if charged) shall be reimbursed at $0.76 per mile.

Will charge for mileage ___(yes) ____(no). Estimated miles per round trip _____.

The Owner reserves the right to negotiate a lump (stipulated) sum fee for certain testing services.

The selected firm will serve as the Owner's representative for quality assurance testing and inspections and shall verify that construction materials, workmanship, and installed systems comply with the Contract Documents, applicable building codes, industry standards, and regulatory requirements.

The testing agency shall be completely independent of the General Contractor, subcontractors, suppliers, manufacturers, and material vendors.

IV. RFP RULES AND GUIDELINES

A. COMMUNICATIONS

Throughout the procurement process, all communication, outside of those submitted under “Explanations and Clarifications” as described herein, between the Proposer and the WVCTCS shall be with the Procurement Official identified above. “Proposers” includes subcontractors at all levels and joint venture members, where applicable. Discussions or communications regarding this solicitation with any other individuals associated in any capacity with the WVCTCS, its consultants, contractors or members of its Board of Governors, or members of any Evaluation Committee are prohibited, unless

otherwise approved in writing by the Procurement Official. Discussions or communications with any other person, regardless of the format, could result in disclosure of proprietary or other competitive sensitive information or otherwise create the appearance of impropriety or unfair competition and, thereby, compromise the integrity of WVCTCS's procurement process.

Proposers shall provide immediate written notice to the Procurement Official any time contact has not been limited to the Procurement Official concerning this solicitation, whether initiated by the Proposer or by other WVCTCS employees, consultants, contractors or members of its Board of Governors. **Any violation of this prohibition may result in the disqualification of the Proposer from further participation in this solicitation, and from award of any contract or subcontract under this solicitation. By submitting, the Proposer certifies that it is in compliance with the above.**

B. REVISIONS, EXPLANATION, AND CLARIFICATIONS TO THE RFP

Any explanation or clarification desired by a Proposer regarding the meaning or interpretation of any part of this solicitation must be submitted in writing by an authorized representative of the Proposer through the e-mail address listed in Exhibit A with a clear cross-reference to the relevant RFP section. Requests for explanations or clarifications must be submitted on or before the deadline for questions. Requests for clarification received after this deadline may not be considered and the WVCTCS is under no obligation to address them.

Written explanations or clarifications provided to a Proposer concerning an interpretation of the solicitation shall be furnished to all Proposers if such information is necessary in submitting Proposals or if the lack of such information would be prejudicial to uninformed Proposers. The Proposer must check the Q&A Board throughout the procurement process to view all applicable information. The WVCTCS is under no further obligation to ensure that Proposers receive explanations or clarifications.

Oral explanations or clarifications given before the award of any contract, at any pre-proposal conferences or otherwise, do not serve to modify the solicitation and will not be binding on the WVCTCS. Suggestions for RFP revision may be submitted to the Procurement Official by emailing Connie Oswald Procurement Specialist at cbid.receipt@wvhepc.edu. This is an opportunity for prospective Proposers, prospective partnership members, and others to provide feedback to inform RFP revisions if needed.

The WVCTCS also reserves the right to cancel or to reissue the RFP, in whole or in part, prior to execution of a contract.

C. MODIFICATION/ACKNOWLEDGMENT OF SOLICITATION ADDENDA

The WVCTCS reserves the right to modify or amend the solicitation. If it is amended, then all terms and conditions which are not modified remain unchanged.
When the solicitation is modified or amended, the Procurement Official shall post a solicitation addendum on the following URL:

https://wvctcs.org/purchasing-and-finance. The WVCTCS is under no further obligation to ensure that Proposers receive addenda.

An Addendum may be issued for many reasons including, but not limited to, (a) making changes or corrections to the RFP; (b) clarifications, revisions, additions or deletions to the goods or services specifications; (c) providing information necessary to ensure fair and competitive solicitation (i.e. used in cases where one Proposer has received information that other Proposers have not); (d) extension or postponement of the Due Date, or other RFP date, due to WVCTCS need or Proposer request; or (e) any other reason determined by the Procurement Official to be necessary or advantageous to the University.

The CPO or designee may extend the Proposal Due Date, if doing so is in the best interest of the WVCTCS. Additionally, Proposers who contact the Procurement Official prior to the Due Date, may request to extend the Due Date, such issuance of an extension is at the WVCTC's sole discretion. Such postponement shall be accomplished through an Addendum to the RFP, which shall be published and distributed through the WVCTC's Public URL Site.

D. PREPARATION OF PROPOSALS – GENERAL

1. Examine the Entire Solicitation. Prior to submission of Proposals, Proposers are expected to thoroughly examine all provisions of and Attachments, Appendices, and/or Addendums to the solicitation, whether incorporated by reference or otherwise. Failure to do so will be at the Proposer's risk and will not be a basis for the Proposer to request relief of any kind prior to or after contract award.

2. Exceptions to Solicitation. If the Proposer cannot accept WVCTCS's terms, conditions or requirements, the Proposer shall raise their exceptions in their Proposals. It is the WVCTC's sole discretion as to whether or not it will accept or deny any exceptions raised by Proposers.

3. Furnish Information. Proposers shall furnish all information required by the Solicitation. Unnecessarily elaborate Proposals or lengthy presentations are not desired or required; however, Proposals should be clear, concise, and include sufficient detail for effective evaluation. The Proposer is cautioned that it is the Proposer's sole responsibility to submit information related to the evaluation categories, and that WVCTCS is under no obligation to solicit such information if it is not included in its Proposal. Failure by the Proposer to submit such information may cause an adverse impact on the evaluation of its Proposal.

4. General Format. To provide uniformity and to facilitate comparison of Proposals, all information submitted should clearly refer to the page number, section, or other identifying reference in this RFP. All information submitted must be noted in the same sequence as its appearance in this RFP. If a pricing document is provided to Proposers, all pricing must be completed within that document. Failure to utilize supplied pricing documents may result in disqualification from the RFP process.

5. Required Signatures. All Proposals must be submitted by an individual authorized to extend a formal Proposal. The University accepts electronic signatures. By submitting the Proposal, the Proposer certifies compliance with the signature authority required.

6. Alternate Proposals. Proposers may submit more than one Proposal. All Proposals must comply with the requirements of the RFP except that additional Proposals may incorporate, by reference, repetitive information which is provided in the original Proposal. Such alternative proposals should be clearly marked as an alternate to clearly delineate from proposer's official proposal.

7. Proprietary Information or Other Confidential Information. Proposals submitted in response to this solicitation shall become the property of WVCTCS. All Proposals received shall remain confidential until the contract(s), if any, resulting from this RFP are signed by an authorized representative of the WVCTCS and the Apparent Successful Proposer; thereafter, the Proposals shall be deemed public records as defined in W. Va. Code § 29B-1-1, *et seq*. commonly referred to as the West Virginia Freedom of Information Act.

   Proposer must clearly designate any information in the Proposal that the Proposer desires to claim as proprietary and exempt from disclosure under the provisions of W. Va. Code § 29B-1-1 et seq. or other state or federal law that provides for the nondisclosure of your document. The page must be identified, as well as the particular exception from disclosure upon which the Proposer is making the claim. Each page claimed to be exempt from disclosure must be clearly identified by the word "Confidential" printed on the lower right-hand corner of the page.

   The WVCTCS will consider a Proposer's request for exemption from disclosure; however, the WVCTCS will make a decision predicated upon W. Va. Code § 29B-1-1 et seq. Designating the entire Proposal exempt from disclosure will not be honored. The Proposer must be reasonable in designating information as confidential. If any information is designated as proprietary in the Proposal, such information will not be made available until the affected Proposer has been given an opportunity to seek a court injunction against the requested disclosure if such time can be provided without violation of complying with W. Va. Code § 29B-1-1 et seq.

8. Use of Subcontractors. If the Proposer intends to use subcontractors to perform any portion of the work or to provide any of the parts or equipment described in this RFP, this must be clearly stated in the Proposal. The Proposer's response must include a description of which portion(s) of the work that will be sub-contracted and the names and addresses of potential subcontractors under the contract. The WVCTCS reserves the right to reject any proposed Subcontractor of the Proposer. Proposer may not change or revise any subcontractor after the Proposal is submitted without the written approval of WVCTCS.

9. Proposal Preparation Costs. The WVCTCS shall not be liable for any costs incurred by a Proposer in responding to this RFP, regardless of whether the University awards a contract through this process, cancels this RFP for any reason, or contracts through another RFP or another process.

10. Errors and Omissions. The Proposer is expected to comply with the true intent of this RFP taken as a whole and shall not avail itself of any errors or omissions to the detriment of the WVCTCS. Should the Proposer suspect any error, omission, or discrepancy in the scope of work or other portions of the RFP, the Proposer shall immediately notify the WVCTCS procurement officer. The Proposer is responsible for the contents of its Proposal and for satisfying the requirements set forth in the RFP.

11. Firm Offer Period. Offers must be kept firm for acceptance by the WVCTCS for at least one hundred twenty (120) days after the date that Proposals are due. Proposals with acceptance periods of less than one hundred twenty (120) days may be considered non-responsive. The Proposer may specify a longer period than indicated here. If the Proposer indicates no time period for acceptance, the Proposal will be considered firm for one hundred twenty (120) days and thereafter until written notice to the contrary is received.

E. PROPOSAL SUBMISSION & FORMAT

1. Proposal Submission.

   The Proposal must be submitted per s Section III ("Response Requirements and Evaluation Criteria").

2. Proposal Format for Submission. The Proposal response shall be set out in the format outlined in Section III ("Response Requirements and Evaluation Criteria") of this RFP. These sections represent the minimum amount of information required by the WVCTCS. Proposers are encouraged to add content if needed; however, unnecessarily elaborate Proposals are discouraged. The Proposal shall be submitted in the following formats: One single pdf file in 8.5"x11" format.

a. PROPOSAL MATERIALS

The Proposal material and accompanying documentation submitted in response to the RFP becomes the property of the WVCTCS upon submission to the WVCTCS and may be appended, if necessary, to any formal document which would further define or expand the contractual relationship between the WVCTCS and the Proposer. All of the material will be considered as part of this RFP.

b. WITHDRAWAL AND MODIFICATION OF PROPOSALS

Proposal withdrawals shall be submitted through the WVCTCS Director of Procurement Officer prior to the Due Date and Time set forth in the RFP. Withdrawals must be made on company letterhead and signed by an authorized representative of the Proposer. Once withdrawn, the Proposer may modify and resubmit their Proposal before the Due Date and Time.

Any modification of a Proposal should be prepared on company letterhead, signed by an

authorized representative, and state that the new document supersedes or modifies the prior Proposals, and submitted to the WVCTCS as required pursuant to this RFP.

c. REJECTION OF PROPOSALS

The WVCTCS reserves the right at its sole discretion to reject any and all Proposals received without penalty and not to issue a contract as a result of this RFP. If any Proposal is rejected, a written explanation prepared by the CPO, or designee, shall be noted in the Procurement File.

d. LATE SUBMISSIONS

Any Proposal, withdrawal, or modification received after the Due Date and Time will not be considered. The electronic clock on the National Institute of Standards and Technology Site, (nist.gov), shall be considered the official timepiece used to determine whether the Proposal, withdrawal, or modification was late.

e. PROPOSAL EVALUATION

1. Proposal Opening. Proposals, modifications, and withdrawals shall be opened by the WVCTCS. Upon receipt of Proposals, the Director of Procurement and the Director of Facilities and Capitol Project Management Officials will initiate the evaluation and selection process, to include a general review to determine if Proposals comply with the solicitation provisions and contain the required information and submittals. If they do not, the Director of Procurement Official may reject them.

2. Evaluation Committee. An Evaluation Committee will be appointed to evaluate Proposals. Appointments are at the sole discretion of the WVCTCS.

3. Substantiation of Proposals. The WVCTCS reserves the right to require each Proposer to substantiate any aspect of the Proposal, its own qualifications for providing the services required, and any other area of interest relative to the Proposal response.

4. Evaluation Criteria. The evaluation factors identified in Section III of this RFP will be used in determining the best qualified (3) Proposals that are most advantageous to the WVCTCS. The Evaluation Committee shall utilize the consensus scoring method as outlined in Section III of this RFP, unless otherwise approved by the Director of Procurement Official or designee.

5. Oral Presentations. The WVCTCS will, after evaluating the written Proposals, select (3) three RFP's to schedule oral presentations interviews with requested Proposers. The WVCTCS will contact the selected Proposers from the written evaluation to schedule a date, time, and location. Commitments made by the Proposer at the oral interview, if any, will be considered binding. The WVCTCS may update initial scoring based on Proposer interviews at its discretion.

6. Discussions/Negotiations. If discussions or negotiations occur, they may include both the technical and financial aspects of the Proposals.

7. Best and Final Offers. The WVCTCS may initiate a best and final offer as part of the solicitation process between Proposers who the WVCTCS believes are in a competitive range. In addition, when Proposals are evaluated and two or more Proposers receive the same Consensus Score, the tie shall be broken, and an award made by allowing the tied Proposers to make a best and final offer. If a tie is not broken by a "best and final offer," then the tie may be broken by a flip of a coin, or any other impartial method deemed prudent by the CPO.

8. Final Negotiations of Terms/Conditions with Best Proposer. Following the selection of the best Proposal, the WVCTCS and selected Proposer may enter into negotiations to arrive at mutually agreeable terms and conditions. The contents of the selected Proposal may become contractual obligations of the contract. Failure of the Proposer to accept or negotiate, in good faith, the Proposal obligations into a contract may result in rejection of the Proposal. If the WVCTCS is unable to negotiate a mutually satisfactory contract with the best Proposer, negotiations shall be formally ended with the Proposer and begun with the next best Proposer. Negotiations shall be undertaken in this manner until a mutually satisfactory contract has been negotiated or the solicitation is canceled. The WVCTCS will demonstrate "good faith" in reaching a mutually acceptable contractual agreement. Notwithstanding this, there are certain conditions that are unacceptable to the WVCTCS. See Section V of this RFP for a non-exhaustive list of provisions that are unacceptable to the WVCTCS.

f. AWARD OF CONTRACT

1. Basis of Award. The WVCTCS will award a contract based upon the evaluation of (3) three selected Proposers interviews. Accordingly, initial Proposals should be submitted on the most favorable terms from both a technical and price standpoint.

2. Determination of Responsibility. A responsible Proposer is one who affirmatively demonstrates to the WVCTCS that it has adequate financial resources and the requisite capacity, capability, and facilities to perform the contract, has a satisfactory record of performance on other comparable projects, has a satisfactory record of integrity and business ethics, and is otherwise qualified and eligible to receive award under the solicitation and laws or regulations applicable to the procurement. The WVCTCS reserves the right to investigate the capabilities of Proposers, confirm any part of the information furnished by a Proposer, and require other evidence to determine that the Proposer is responsible.

3. Rejection of Proposals & Waiver of Minor Information/Irregularities. The WVCTCS reserves the right to reject any or all Proposals in part or in total for any reason, to accept any Proposal if considered best for its interest, and to waive informalities and minor irregularities in Proposals received, commensurate with best public procurement practices.

4. Notice of Award. Any award of a contract resulting from this RFP will be made only

by an authorized WVCTCS Employee.

g. CANCELLATION OF SOLICITATION

The WVCTCS may cancel this solicitation at any time before or after receipt of Proposals.

h. COMPLAINTS OR PROTESTS

Complaints or protests associated with this solicitation must be submitted in accordance with the WVCTCS's Procurement Manual.

E. REQUIREMENTS FOR FINAL CONTRACT

The WVCTCS may provide a sample contract and its terms and conditions as an Attachment to this RFP. If the WVCTCS provides a sample contract, the Apparent Successful Proposer will be expected to enter into a contract that is substantially the same as the sample contract and its terms and conditions. If no sample contract is provided, the WVCTCS and the Apparent Successful Proposer shall enter negotiations, in good faith, to mutually agree on a bi-lateral contract for such services related to this RFP. In no event is a Proposer to submit its own standard contract terms and conditions in response to this solicitation, unless specifically requested by the WVCTCS. The Proposer may submit questions or exceptions to any terms and conditions of a provided sample contract or pertaining to the "Prohibited State Terms" listed below to this solicitation. All exceptions to the contract terms and conditions or "Prohibited State Terms" must be submitted through the WVCTCS Public Bid Site. The WVCTCS will review requested exceptions and accept or reject the same at its sole discretion.

a. PROHIBITED TERMS

WVCTCS's status as a state agency imposes certain restrictions on its contracting activities that a private university or company does not face. Many standard clauses typically found in commercial contracts cannot be accepted by WVCTCS. The restrictions are based on constitutional and statutory prohibitions. The following provisions, without limitation, are some of the most common provisions that we must strike when negotiating an agreement or contract.

1. Indemnification and/or Hold Harmless. State agencies are constitutionally prohibited from agreeing to indemnify third parties.

2. Limitation of Liability. WVCTCS does not have the authority to prejudice the rights of the State of West Virginia to sue or otherwise enforce a contract by agreeing to a limit on or a waiver of liability.

3. Governing Law of or Venue in a State Other than West Virginia. West Virginia CTCS does not have statutory authority to accept the governing laws of or venue in another state. As an alternative, the WVCTCS may agree to be silent on such issues.

4. Confidentiality. WVCTCS is subject to the West Virginia Freedom of Information Act (W. Va. Code §29B-1-1 et. seq.). Thus, WVCTCS cannot agree to keep the terms and conditions of a contract or agreement confidential.

5. Attorney Fees. As a public institution, the WVCTCS cannot agree to pay attorney's fees, court costs, or other litigation expenses in the event of a dispute as that would be a violation of the constitutional gratuities clause.

6. Damage Clauses. Damage clauses that include indirect or incidental damages as additional types of damages payable by WVCTCS is not acceptable.

7. Late Payment/Cancellation Charges/Interest Charges. State agencies are prohibited from agreeing to pay late payments or cancellation charges.
8. Taxes. The State is exempt from most taxes and generally will not agree to contract language which requires the payment of taxes. The WVCTCS will not agree to reimburse the vendor for the payment of taxes.

9. Binding Arbitration. The WVCTCS has no statutory authority to agree to binding arbitration and the State Attorney General has exclusive authority and control over all matters of litigation or potential litigation involving State agencies. Thus, WVCTCS has no authority to limit the type or scope of judicial action.

10. Interest. The WVCTCS lacks statutory authority to agree to the payment of interest.

11. Funding Clause. The WVCTCS cannot commit funds on multi-year contracts across Fiscal Years. All contracts across Fiscal Years are subject to fund availability and legislative appropriation. The WVCTCS has a right to terminate due to non-funding outside the current Fiscal Year. Such termination shall not be an event of default.

b. ELECTRONIC PAYMENT

The WVCTCS strongly prefers to utilize electronic payments in its transactions. The successful Proposer will be provided a form to complete with the contract to authorize such payment method.

c. INSURANCE COVERAGE

i.Proposer shall be subject to the standard insurance provisions in this Section.

OR

☒Proposer shall be subject to the insurance provisions in Exhibit B

The successful Proposer shall, at its own expense, obtain and keep in force insurance coverage which shall be maintained in full force and effect during the term of the contract. The Proposer shall furnish evidence in the form of a Certificate of Insurance that insurance shall be provided, and a copy shall be forwarded to the WVCTCS prior to

the contract effective date. Additionally, the Proposer is responsible for ensuring that any subcontractors provide adequate insurance coverage for the activities arising out of subcontracts.

The successful Proposer shall procure, at its own expense, and maintain for the duration of the PO/contract, the following insurance coverage from insurers licensed or registered to do business in the State of West Virginia: (a) Commercial general liability insurance of not less than $1,000,000 per occurrence and $2,000,000 general aggregate; (b) Worker's Compensation insurance in accordance with applicable statutory limits (c) Commercial Automobile insurance in the amount of $1,000,000 per occurrence for all owned, non-owned, hired. leased, rented, and employee non-owned vehicles, (d) where applicable, professional liability insurance of $1,000,000 per claim/loss and $2,000,000 annual aggregate, with proof that coverage shall remain in effect for a minimum of three years from the date of completion of the project, Supplier shall provide such other insurance as may be required by law. All insurance carried by Supplier in connection with the Services shall list WVCTCS as an additional insured and such insurance shall be primary and not contributory as to any other insurance the WVCTCS may have in effect. The Supplier shall provide a certificate of insurance to the WVCTCS evidencing required coverage prior to commencement of the Services All policies shall provide a minimum of thirty (30) calendar days' written notice prior to cancellation or material change. The insurance company(ies) providing the above-described coverage shall have an AM Best Rating of no less than (A-) excellent.

Exhibit A

INSTRUCTIONS TO BIDDERS

1. REVIEW DOCUMENTS THOROUGHLY: The attached documents contain an RFP for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a vendor's bid. All RFPs must be submitted in accordance with the provisions contained in these instructions and the Request for Proposals (RFP). Failure to do so may result in disqualification of vendor's bid.

2. MANDATORY TERMS: The RFP may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the RFP will result in bid disqualification.

3. PREBID MEETING: The item identified below shall apply to this RFP.

[**X**] A pre-bid meeting will not be held prior to bid opening

[ ] A **MANDATORY PRE-BID** meeting will be held at the following place and time:

All vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-RFP meeting shall result in disqualification of the vendor's RFP. No one individual is permitted to represent more than one vendor at the pre-RFP meeting. Any individual that does attempt to represent two or more vendors will be required to select one vendor to which the individual's attendance will be attributed. The vendors not selected will be deemed to have not attended the pre-bid meeting unless another individual attended on their behalf.

4. VENDOR QUESTION DEADLINE: Vendors may submit questions relating to this RFP. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the e-mail address listed below to be considered. Submitted e-mails should have RFP number in the subject line.

A written response will be published in an RFP addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this RFP are preliminary in nature and are nonbinding.

Submit Questions by Deadline in Schedule of Events to: cbid.receipt@wvhepc.edu

5. VERBAL COMMUNICATION: Any verbal communication between the vendor and any Commission/Council/Institution personnel is not binding, including verbal communication at the mandatory pre-bid conference. Only information issued in writing and added to the RFP by an official written addendum is binding.

6. BID SUBMISSION: All bids must be submitted electronically to the e-mail address identified in the bid document **cbid.receipt@wvhepc.edu**.

7. RFP OPENING: Bids submitted in response to this RFP will be opened on the date and time listed below. Delivery of a RFP, after the RFP opening date and time will result in RFP disqualification.

RFP Opening Date and Time: August 21, 2026, @ 2:00 pm ESDT

8. ADDENDUM ACKNOWLEDGEMENT: Changes or revisions to this RFP will be made by an official written addendum. Vendor should acknowledge receipt of all addenda issued with this RFP by completing an Addendum Acknowledgment Form, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

9. BID FORMATTING: Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.

10. ALTERNATE MODEL OR BRAND: Any model, brand, or specification listed in this RFP establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the Commission/Council/Institution's sole discretion. Any vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a vendor's bid.

11. EXCEPTIONS AND CLARIFICATIONS: The RFP contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or other proposed modifications in its RFP. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the RFP may result in RFP disqualification.

12. COMMUNICATION LIMITATIONS: Communication with the Commission/ Institution or any of its employees regarding this RFP during the RFP, bid, evaluation, or award periods, except through the Director of Procurement, is strictly prohibited without prior approval.

13. REGISTRATION: Prior to award of any contract award in the amount of $25,000 or greater, the apparent successful vendor must be properly registered with the West Virginia Purchasing Division and must have paid the $125 fee, if applicable.

14. UNIT PRICE: Unit prices shall prevail in cases of a discrepancy in the vendor's RFP.

15. WAIVER OF MINOR IRREGULARITIES: The Commission/Council/Institution reserves the right to waive minor irregularities in bids or specifications.

16. NON-RESPONSIBLE: The Commission/Council/Institution reserves the right to reject the bid of any vendor as Non-Responsible in accordance with W. Va. Code of State Rules § 148-1- 5.3, when the Director determines that the vendor submitting the RFP does not have the capability to fully perform or lacks the integrity and reliability to assure good-faith performance."

17. ACCEPTANCE/REJECTION: The Commission/Council/Institution may accept or reject any RFP in whole, or in part if it is found to be in the best interest of the Commission/Council/Institution.

18. YOUR SUBMISSION IS A PUBLIC DOCUMENT: Vendor's entire response to the RFP and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the RFP/proposal opening or award of the contract, as required by the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.

Submission of any RFP, proposal, or other document to the Commission/Council/ Institution constitutes your explicit consent to the subsequent public disclosure of the RFP, proposal, or document. The Commission/Council/Institution will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

19. INTERESTED PARTY DISCLOSURE: West Virginia Code § 6D-1-4 requires that the vendor submit a disclosure of interested parties to the contract for all contracts with an actual or estimated value of at least $100 thousand. That disclosure must occur on the form prescribed prior to contract award.

A copy of that form will be provided to the successful bidder to complete before contract award. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

20. WITH THE BID REQUIREMENTS: In instances where these specifications require documentation or other information with the RFP, and a vendor fails to provide it with the bid, the Commission/Council/Institution reserves the right to request those items after RFP opening and prior to contract award

21. EMAIL NOTIFICATION OF AWARD: The Commission/Council/Institution will attempt to provide bidders with e-mail notification of contract award when an RFP that the bidder participated in has been awarded. For notification purposes, bidders must provide the Commission/Council/Institution with a valid email address in the RFP response. Bidders may also monitor Commission/Council/Institution's websites to determine when a contract has been awarded.

Exhibit B
GENERAL TERMS AND CONDITIONS:

1. CONTRACTUAL AGREEMENT: Issuance of a Purchase Order signed by the Commission/Institution's Chief Procurement Officer or Director of Purchasing, or their designee, and approved as to form by the Attorney General's Office constitutes acceptance by the Commission/Institution of this Contract made by and between the Commission/Institution and the Vendor. Vendor's signature on its bid, or on the Contract if the Contract is not the result of a bid RFP, signifies vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

2. DEFINITIONS: As used in this RFP/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this RFP/Contract.

2.1. "Agency" or **"Agencies"** means the agency, institution, board, commission, or other entity of the State of West Virginia that is identified on the first page of the RFP or any other public entity seeking to procure goods or services under this Contract.

2.2. "Proposal" or "Bidders" means the vendors submitted response to this RFP.

2.3. "Chief Procurement Officer" or **"Director of Purchasing"** means the individual authorized to sign Purchase Order/Contracts.

2.4. "Commission/Institution" means the entity identified on the first page of the RFP who is issuing the solicitation.

2.5. "Contract" or "Purchase Order" means the binding agreement that is entered into between the Commission /Institution and the vendor to provide the goods or services requested in the RFP.

2.6. "Award Document" means the document signed by the Commission/Institution and approved as to form by the Attorney General, that identifies the vendor as the contract holder.

2.7. "RFP" means the official notice of an opportunity to supply the Commission/ Institution with goods or services.

2.8. "State" means the State of West Virginia and/or any of its agencies, institutions, commissions, boards, institutions etc. as context requires.

2.9. "Vendor" or **"Vendors"** means any entity submitting a bid in response to the RFP, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. CONTRACT TERM; RENEWAL; EXTENSION: The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

[X] **Term Contract**

Initial Contract Term: The Initial Contract Term will be for a period of three (3) years. The Initial Contract Term becomes effective on the effective start date listed on the first page of this Contract and the Initial Contract Term ends on the effective end date also shown on the first page of this Contract.

Renewal Term: This Contract may be renewed upon the mutual written consent of the Commission/Institution, and the Vendor, with approval of the Attorney General's Office (Attorney General approval is as to form only) for 2 successive years. Any request for renewal should be delivered to the Commission/Institution thirty (30) days prior to the expiration date of the contract.

Automatic renewal of this Contract is prohibited.

Delivery Order Limitations: In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

[ ] **One-Time Purchase:** The term of this Contract shall run from the issuance of the Purchase Order until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

[ ] **Other:** Contract Term specified in _____

4. AUTHORITY TO PROCEED: Vendor is authorized to begin performance of this contract upon receipt of a signed Purchase Order.

5. QUANTITIES: The quantities required under this Contract shall be identified in the RFP/RFB/Purchase Order.

6. INSURANCE: The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the Commission/Institution as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies, vendor shall provide the Commission/Institution with proof that the insurance mandated herein has been continued. Vendor must also provide the Commission/Institution with immediate notice of any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award.

Vendor must maintain:

[**X**] **Commercial General Liability/Errors and Omissions Insurance** in at least an amount of: $1,000,000.00 per occurrence each. $2,000,000.00 general aggerate, and $2,000,000.00 aggerate for products-completed operations hazard, providing coverage for claims.

[**X**] **Automobile Liability Insurance** in at least an amount of: $1,000,000.00 per occurrence.

[ ] **Cyber Liability Insurance** in an amount of: _____ per occurrence.

[ ] **Builders Risk Insurance** in an amount equal to 100% of the amount of the Contract.

7. WORKERS' COMPENSATION INSURANCE: Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

8. ACCEPTANCE: Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the Commission/Institution that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the RFP for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the RFP unless otherwise indicated.

9. PRICING: The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this RFP/Contract by the Commission/Council/Institution. A vendor may request the inclusion of price adjustment provisions in its bid, but final approval of any price adjustments will be made by the Commission/Institution. Vendor must extend any publicly advertised sale price to the State and invoice at the lower of the contract price or the publicly advertised sale price.

10. PAYMENT IN ARREARS: Payments for goods/services will be made in arrears only upon receipt of a proper invoice, detailing the goods/services provided or receipt of the goods/services, whichever is later. Notwithstanding the foregoing, payments for software maintenance, licenses, or subscriptions may be paid annually in advance.

11. PAYMENT METHODS: Vendor must accept payment by electronic funds transfer and/or P-Card. (The State of West Virginia's Purchasing Card program, administered under contract by a banking institution, processes payment for goods and services through state designated credit cards.)

12. TAXES: The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

13. ADDITIONAL FEES: Vendor is not permitted to charge additional fees or assess additional charges that were not expressly provided for in the RFP.

14. FUNDING: This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available. If that occurs, the Commission/Institution may notify the vendor that an alternative source of funding has been obtained and thereby avoid the automatic termination. Non-appropriation or non-funding shall not be considered an event of default.

15. CANCELLATION: The Commission/Institution reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract.

16. APPLICABLE LAW: This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution or West Virginia Code, is void and of no effect.

17. COMPLIANCE WITH LAWS: Vendor or approved Subcontractor shall comply with all applicable federal, state, and local laws, regulations, and ordinances. By submitting a bid, vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances.

18. ARBITRATION: Any references made to arbitration contained in this Contract, vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

19. MODIFICATIONS: Any change to existing contracts that adds work or changes contract cost, and were not included in the original contract, must be approved by the Commission /Institution and the Attorney General's Office (as to form) prior to the implementation of the change or commencement of work affected by the change.

20. WAIVER: The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

21. SUBSEQUENT FORMS: The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by vendor to the Commission/Institution such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

22. ASSIGNMENT: Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the vendor without the express written consent of the Commission/ Institution and the Attorney General's Office (as to form only).

23. WARRANTY: The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Commission/Institution; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

24. STATE EMPLOYEES: State employees (including Commission/Institution employees)

are not permitted to utilize this Contract for personal use and the vendor is prohibited from permitting or facilitating the same.

25. PRIVACY, SECURITY, AND CONFIDENTIALITY: The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Commission/Institution, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Commission/Institution's policies, procedures, and rules.

26. LICENSING: Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, West Virginia Contractor Licensing Board, or any other state agency or political subdivision. Upon request, the vendor must provide all necessary releases to obtain information to enable the Commission/Institution to verify that the vendor is a licensed general contractor and in good standing with the above entities.

SUBCONTRACTOR COMPLIANCE: Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed general contractor, in good standing, and up to date on all state and local obligations as described in this section. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

27. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Purchase Order with the Commission or any Institution of the State of West Virginia, the vendor agrees to convey, sell, assign, or transfer to the institution all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the Commission/Institution. Such assignment shall be made and become effective at the time the Commission/Institution tenders the initial payment to vendor.

28. VENDOR CERTIFICATIONS: By signing its bid or entering into this Contract, vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this RFP in its entirety; understands the requirements, terms and conditions, and other information contained herein.

Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Commission/Institution. The individual signing this bid or offer on behalf of the vendor

certifies that he or she is authorized by the vendor to execute this bid or offer, or any documents related thereto on vendor's behalf; and that he or she is authorized to bind the vendor in a contractual relationship.

29. VENDOR RELATIONSHIP: The relationship of the vendor to the Commission/ Institution shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this RFP and resulting contract. Neither the vendor, nor any employees or subcontractors of the vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

Vendor shall hold harmless the Commission/Institution and shall provide the State and Commission/Institution with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

30. INDEMNIFICATION: The Vendor agrees to indemnify, defend, and hold harmless the State and the Commission/Institution, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

31. PURCHASING AFFIDAVIT: In accordance with West Virginia Code §5-22-1(i), the State is prohibited from awarding a contract to any bidder that owes a debt to the State or a political subdivision of the State, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Commission/Institution affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

32. CONFLICT OF INTEREST: Vendor, its officers, members, or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members, and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Commission/Institution.

33. BACKGROUND CHECK: In accordance with W. Va. Code §15-2D-3, the State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Commission/Institution based upon results addressed from a criminal background check.

34. INTERESTED PARTY SUPPLEMENTAL DISCLOSURE: W. Va. Code § 6D-1-4 requires that for contracts with an actual or estimated value of at least $100,000.00, the vendor must submit to the Commission/Institution a supplemental disclosure of interested parties reflecting any new or differing interested parties to the contract, which were not included in the original pre- award interested party disclosure, within 30 days following the completion or termination of the contract. A copy of that form will be provided to the successful bidder. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

35. PROHIBITION AGAINST USED OR REFURBISHED: Unless expressly permitted in the RFP published by the Commission/Institution, vendor must provide new, unused commodities, and is prohibited from supplying used or refurbished commodities, in fulfilling its responsibilities under this Contract.

36. VOID CONTRACT CLAUSES – The Commission/Institution is requiring the vendor to follow the provisions of West Virginia Code §5A-3-62, which automatically voids certain contract clauses that violate State Law

Exhibit C

GUIDELINES FOR VENDORS FOR BID SUBMISSIONS VIA EMAIL

NOTE: This document is specific to the competitive solicitation processes, where bid submissions must arrive at the closing location on time.

1. Purpose of These Guidelines

The Commission/Council may post opportunities that allow vendors to submit their bids / proposals / responses (known as submissions) electronically via email. This document is intended to assist vendors in understanding:

- the risks associated with submitting an emailed submission; and
- the pitfalls that should be avoided if emailing a submission.

NOTE: Vendors who deliver submissions via email do so at their own risk; the Commission/ Council does not take any responsibility for any emailed submission that:

- does not arrive on time;
- is rejected; or
- contains corrupted electronic files.

2. Risks

Although emails are sent every day without incident, there are a number of risks that could occur and delay the receipt of an email. An email submission is deemed to have been received once it arrives in the Commission/Council's Electronic Mail System. Emailed submissions that arrive late will not be considered, regardless of the reason, and vendors will not have the option to resubmit after the closing date and time.

Following are some of the reasons that may delay an email, or cause an email to be rejected by the Commission/Council's email system:

i. Delays can occur as an email moves from server to server between the sender and the recipient, meaning that the time when an email is received can be later – and sometimes considerably later – than the time when it was sent. The Commission/Council will consider the time that an email was received by the Commission/Council's email system as the official time for any emailed submission.

ii. The Commission/Council's email system has technical and security limitations on the size and type of files that will be accepted. Emails containing attachments that exceed 30 MB cannot be accepted.

iii. The Commission/Council's email system has protocols whereby an email may be investigated as potential spam or containing a virus / malware. Such protocols may result in an email being sent to the recipient's inbox late.

iv. The Commission/Council's email system has protocols whereby an email may be

investigated as having Personally Identifiable Information (PII). An email determined by the system to contain PII or data of a similar appearance of PII will not be delivered.

v. The Commission/Council's email system is designed to reject any email that is considered spam or that contains a virus or malware. On occasion, an email may be falsely flagged and rejected. Copies of rejected emails are not kept in the email system, and therefore no possibility exists to retrieve an emailed submission that has been rejected.

vi. In addition, it is possible that one or more attachments to an email to become corrupted and therefore inaccessible to the Commission/Council's email system. Vendor will not have the option to resubmit after closing if the attachments cannot be opened. Further, the Commission/Council cannot open any submission prior to closing to confirm whether or not the files have been corrupted.

3. Vendor Guidance for Emailed Submissions

1. Never assume that a solicitation allows for emailed submissions. Emails should only be used as a delivery mechanism when the opportunity expressly allows for it.

2. Never assume which email address is being used for submissions, when emailed submissions are permitted. Carefully read the instructions and ask questions well in advance of closing if the email address for submissions is not clear. Submissions that are emailed to any address other than the one expressly stated for the purpose may be rejected as missing a mandatory requirement of the solicitation.

3. Avoid using generic subject lines in the emailed submissions that do not clearly identify the solicitation name and / or number as well as the vendor organization name. The subject line of the email should be: BID FOR xxxxxxxxx DUE WEDNESDAY xxxxxxxxxx AT 3:00PM. A sample email subject line for an open bid might be: BID FOR 21001 DUE WEDNESDAY, APRIL 7, 2021 AT 3:00PM.

4. Avoid multiple emails from the same vendor for the same opportunity wherever possible. If multiple emails cannot be avoided (e.g., the collective size of the emails exceeds the maximum size allowed), identify how many emails constitute the full submission and provide clear instructions on how to assemble the submission. Multiple submissions from the same vendor for the same opportunity may result in rejection if these instructions are unclear.

5. Vendors may update, change, or withdraw their submission at any time prior to the closing date and time. If emailing updates or changes, do not submit only the changes that then require collation with the previous submission. Instead, a complete revised package with clear instructions that it replaces the earlier submission should be sent. This will help to avoid any confusion as to what constitutes the complete submission.

6. Avoid emailing submissions in the last 60 minutes that the solicitation is open. Sufficient time should be left prior to closing to ensure that the email was received, and to resubmit before closing if a problem occurs.

7. Do not assume that the email has been received. If a confirmation email is not received shortly after sending the email, contact the named Contact on the solicitation to confirm whether or not their submission was received. In addition, send the emailed submission with a delivery receipt request. If unsure how to send an email with a delivery receipt request, contact the vendor's own system support personnel or search online for instructions specific to the vendor's email system (e.g., Outlook, Gmail, etc.)

8. If the confirmation email is not received, do not resubmit without first contacting the named Contact. Resending a submission should only occur once confirmation is received that the original email was not received, and enough time is left for receipt of the submission prior to the closing date and time.

9. Do not ignore any message from the Commission/Council regarding rejection of an emailed submission. If such a message is received prior to closing, contact the named Contact on the opportunity immediately.

10. If time permits prior to closing, possible remedies for a rejected or missing emailed submission include:
    i. If the collective size of the emailed attachments exceeds 30 MB, resubmit it over multiple emails, clearly identify how many emails constitute the full submission and how to collate the files.
    ii. If the emailed submission included zipped or executable files, unzip or remove the executable the files and resubmit over one or more emails (see previous bullet if the files collectively exceed 30 MB).
    iii. Resend the submission from a different email account.
    iv. If permitted in the opportunity, use an alternative method to deliver the submission (e.g., mailed or hand delivered).

Note: None of these remedies are applicable after the closing date and time.

EXHIBIT D

RFP# 27030

CONSTRUCTION MATERIALS TESTING AND SPECIAL INSPECTIONS
PIERPONT COMMUNITY & TECHNICAL COLLEGE'S
AVIATION MAINTENANCE TECHNOLOGY FACILITY (PCTC AMT) PROJECT
BID CERTIFICATION/SIGNATURE/ADDENDUM ACKNOWLEDGEMENT

1. DESIGNATED CONTACT: Vendor appoints the individual identified as the Contract Administrator and the initial point of contact for matters relating to this Contract.

_____
(Name, Title)

_____
(Printed Name and Title) (Address)

_____
(Phone Number)

_____
(email address)

2. CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through e-mail, I certify that: I have reviewed this RFP in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this RFP, offer or proposal constitutes an offer to the Commission/Institution that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the RFP for that product or service, unless otherwise stated herein; that the vendor accepts the terms and conditions contained in the RFP, unless otherwise stated herein; that I am submitting this RFP, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this RFP, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

By signing below, I further certify that I understand the Commission/Institution is requiring the vendor to follow the provisions of WV State Code 5A-3-62 which automatically voids certain contract clauses that violate State law.

_____
(Company)

_____
(Authorized Signature) (Representative Name, Title) (Printed

_____
Name and Title of Authorized Representative) (Date)

_____
(Phone Number)

EXHIBIT E

RFP# 27030

ADDENDUM ACKNOWLEDGEMENT FORM

REQUEST FOR PROPOSALS/REQUEST FOR

CONSTRUCTION MATERIALS TESTING AND SPECIAL INSPECTIONS

PIERPONT COMMUNITY & TECHNICAL COLLEGE'S

AVIATION MAINTENANCE TECHNOLOGY FACILITY (PCTC AMT) PROJECT

Instructions: Please acknowledge receipt of all addenda issued with this RFP by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[ ] Addendum No. 1	[ ] Addendum No. 6
[ ] Addendum No. 2	[ ] Addendum No. 7
[ ] Addendum No. 3	[ ] Addendum No. 8
[ ] Addendum No. 4	[ ] Addendum No. 9
[ ] Addendum No. 5	[ ] Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this RFP. I further understand that any verbal representation made or assumed to be made during any oral discussion held between vendor's representatives and any Commission/Institution personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

_____

Company

_____

Authorized Signature

_____

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: _____

Authorized Signature: _____ Date: _____

State of _____

County of _____, to-wit:

Taken, subscribed, and sworn to before me this ___ day of _____, 20___.

My Commission expires _____, 20___.

AFFIX SEAL HERE **NOTARY PUBLIC** _____

STATE OF WEST VIRGINIA
ADDENDUM TO VENDOR'S STANDARD CONTRACTUAL FORMS

REQUIRED INFORMATION ABOUT THIS CONTRACT:

State Agency, Board, or Commission (the "State"): _____

Vendor: _____

Contract Name or Identifier/Lease Number ("Contract"): _____

Commodity/Service: _____

The State and the above-identified Vendor are entering into the above-referenced contract. The Contract or other materials incorporated into this Contract may contain provisions that are inconsistent with West Virginia law, regulations, or policy. THIS ADDENDUM SUPERSEDES, MODIFIES AND CONTROLS ANY CONFLICTING PROVISIONS CONTAINED IN THE CONTRACT REGARDLESS OF WHEN SUCH DOCUMENTS ARE SUBMITTED.

1. **PAYMENT** – The State will not make any advanced payments for goods or services unless the payment is (i) authorized by the policy of the West Virginia State Auditor (e.g., software/SaaS licenses, software support services, and the first year of a software subscription), or (ii) expressly authorized in a writing by the West Virginia State Auditor and that approval is made a part of this contract. Payments are made only after the (i) receipt of the goods and/or services and (ii) processing of all required invoice documentation to the State Auditor's satisfaction.

   The following provisions are deleted: (i) interest or penalties for late payment, (ii) payment of lost profits, termination fees, or liquidated damages upon termination, and (iii) acceleration of payments due to termination, default, or non-funding.

2. **FUNDING** –Payments under this Contract are contingent upon the availability of properly encumbered funds through legislative appropriation or other lawful funding sources. If funding becomes unavailable, then the State may terminate this Contract upon notice to the vendor. Non-appropriation or non-funding is not an event of default, and all work shall cease upon termination.

3. **TERMINATION FOR CONVENIENCE** – The State may terminate this Contract for convenience upon thirty (30) days written notice to the Vendor. The State will pay only for undisputed services rendered or goods delivered prior to termination. Any conflicting Vendor provision regarding termination is deleted.

4. **GOVERNING LAW** – The Contract shall be governed by the laws of the State of West Virginia or required federal law. Any provision requiring the application of any other state's laws is deleted.

5. **JURISDICTION/DISPUTES** – All claims for monetary damages must be filed with the West Virginia Legislative Claims Commission. Other legal actions must be brought in courts authorized under West Virginia laws to exercise jurisdiction.

6. **PRESERVATION OF STATE LEGAL RIGHTS -** Notwithstanding any provision contained in this Contract or other materials incorporated into this Contract, any term that limits, waives, or otherwise restricts the legal rights available to the State is deleted. Without limitation, the following provisions are deleted:

   a. Any requirement that the State agrees to (i) participate in binding arbitration or other extra-judicial dispute resolution process, (ii) waive a jury trial, or (iii) resolve disputes in any jurisdiction or venue other than the State of West Virginia.

   b. Any provision requiring the State to (i) indemnify, defend, or hold harmless the Vendor or any third party, or (ii) assume the Vendor's business or legal risks.

   c. Any provision limiting the Vendor's liability for direct damages arising from bodily injury, death, or damage to property (tangible or intangible) caused by the negligence or willful misconduct of the Vendor or its employees or agents. Any limitation of liability is enforceable only to the extent permitted by West Virginia Law.

   d. Any provision requiring the State to waive or limit its legal rights, claims or defenses.

   e. Any provision limiting the time within which the State may file a claim or initiate any legal action.

   f. Any provision permitting repossession of equipment without notice to the state. Repossession may occur only with appropriate notice.

   g. Any provisions requiring the State to pay Vendor's attorney fees, collection costs, or litigation expenses are deleted except in cases where they are ordered by a court of competent jurisdiction.

7. **TAXES** – The State is exempt from federal, state, and local taxes. Any provision requiring the State to pay taxes on behalf of the Vendor is deleted. The State will provide a tax-exempt certificate upon request.

8. **ASSIGNMENT** – No assignment of this contract is effective and binding until the State and Vendor execute a change order to this Contract. This Contract is automatically terminated if the assignment is to a person or entity with whom the State is prohibited from doing business. In that circumstance, Vendor agrees to pay the State a pro-rata refund equal to the cost paid for the unused portion of the commodity or service provided. The State may assign this Contract to another State agency, board or commission upon thirty (30) days written notice to the Vendor.

9. **RENEWAL/MODIFICATION** – This Contract may be renewed, extended, amended, or modified only by written agreement signed by both parties and approved, as to form, by the Attorney General. Any automatic renewal or modification provision is deleted.

10. I**NSURANCE** – Any provision requiring the State to maintain insurance for the benefit of the State, the Vendor or any third party is deleted.

11. **DELIVERY** – All deliveries under the Contract shall be FOB destination unless the State expressly and knowingly agrees otherwise in writing. Any contrary delivery term is deleted.

12. **PUBLIC RECORDS AND CONFIDENTIALITY** – This Contract and related records are subject to the West Virginia Freedom of Information Act ("W. Va. FOIA") (W. Va. Code §29B-1-1 et seq.) and applicable public procurement laws. Any provision requiring Vendor consent or notice prior to disclosure is deleted.

    All provisions requiring the non-disclosure of information must be (i) permitted by West Virginia law, (ii) incorporated through a separately signed writing, and (iii) approved, as to form, by the Attorney General.

13. **DATA OWNERSHIP**. During and after the term of this Contract, the State retains all ownership rights to information or data that the State provides to the Vendor, or which the Vendor collects or captures while providing its services (hereafter "Data"). The Vendor agrees to only use the Data to provide the procured services. Without limitation, the following provisions are deleted:

    a. Any provision granting the Vendor or any other person or entity: (i) rights to sell, license or otherwise exploit the Data, (ii) use rights (including without limitation the right to use the Data to train machine learning and/or artificial intelligence models) or (iii) any other proprietary interests in the Data.

    b. Any provision that defines "Data" in a manner that excludes from these protections: (i) transaction or system-based data, including metadata, (ii) Data once it has been de-identified, anonymized, or aggregated, or (iii) vendor analytics performed on the Data.

    Before contract termination, the Vendor agrees to coordinate with the State, to either (1) destroy the Data or (2) return it to the State in the format requested by the State. This shall be done without further conditions, costs, or delays.

14. **THIRD-PARTY SOFTWARE** – If this Contract contemplates or requires binding the State to third-party's end-users license agreement (EULA), the Vendor represents that none of the mandatory click-through, unsigned, or web-linked EULA terms and conditions conflict with any term of this Addendum or that it has the authority to modify such third-party software's terms and conditions to be subordinate to this Addendum The Vendor shall indemnify and defend the State against all claims resulting from a wrongful representation/assertion that the EULA's terms and conditions are in accord with, or subordinate to, this Addendum.

15. **AMENDMENTS** –All amendments, modifications, alterations or changes to this Contract shall be made by a (i) written change order, (ii) signed by all parties, and (iii) approved, as to form, by the Attorney General.

If legal circumstances require this Addendum to be amended, then those changes must be made in an OBVIOUS MANNER such as by using **bold** *Italics, or* underline to identify language being added and using bold ~~**strikethrough**~~ to identify language being deleted. Do not use track-changes. All changes to this WV-96 must be expressly approved by the Office of the Attorney General.

State: _____	Vendor: _____
By: _____	By: _____
Printed Name: Kelley Smith	Printed Name: _____
Title: Director of Procurement	Title: _____
Date: _____	Date: _____

Pierpont Community and Technical College
Aviation Maintenance Technology Facility

project address: 500 Galliher Drive
Fairmont, WV 26554

project manual

omni associates architects since 1980

QR CODE HERE SCAN

date of issue: 5/27/26 GMP Pricing Spec.

owner: **WV Council for Community and Technical College Education**
2001 Union Carbide Drive, Building 2000
South Charleston, WV 25303

STATE OF WEST VIRGINIA
RICHARD T. FORREN
No. 2230
REGISTERED ARCHITECT

SECTION 00030 – PROJECT PERSONNEL & EMERGENCY NOTIFICATIONS

Pierpont Community and Technical College
Aviation Maintenance Technology Facility

OWNER: WV Council for Community & Technical College Education
2001 Union Carbide Drive, Building 2000
South Charleston, WV 25303
Barrow Koslosky, Owner's Project Representative

ARCHITECT:
Omni Associates-Architects, Inc.

MECHANICAL, ELECTRICAL & PLUMBING
ENGINEER:
Tower Engineering

CIVIL ENGINNER:
Civil & Environmental Consultants

STRUCTURAL ENGINEER:
Allegheny Design Services

EMERGENCY NOTIFICATIONS

If an emergency occurs during a project, contact each of the following listed below simultaneously:

1. The Architect: Omni Associates-Architects, Inc.
2. The Owner: WV Council for Community & Technical College Education
3. The Engineers: Tower Engineering, Allegheny Design Services & Civil & Environmental Consultants

END OF SECTION 00030

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:

1. Section 012100 "Allowances" for testing and inspection allowances.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.

1. Mockups are used for one or more of the following:

   a. Verify selections made under Sample submittals.
   b. Demonstrate aesthetic effects.
   c. Demonstrate the qualities of products and workmanship.
   d. Demonstrate successful installation of interfaces between components and systems.
   e. Perform preconstruction testing to determine system performance.

2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 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 Statement: Submit a statement 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, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

A. Mockup Shop Drawings:

1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.7 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
3. Owner-performed tests and inspections indicated in the Contract Documents**.**

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.

1. Requirements of authorities having jurisdiction supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:

1. Provide test specimens representative of proposed products and construction.
2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
5. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
6. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

1.11 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.

1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
2. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.3 TESTING SCHEDULE

A. Moisture content of all lumber shall be tested at lumber yard prior to loading by supplier. Documentation to be provided to the Architect.

B. Moisture content of all lumber shall be tested prior to unloading at the jobsite by the General Contractor. Documentation to be provided to the Architect.

C. Moisture content of all sub floors and walls shall be tested by the Owner’s third-party testing agency prior to finish flooring or GWB installation. Documentation to be provided to the Architect.

D. All site testing and inspections shall be by the Owner’s third-party testing agency. Documentation to be provided to the architect. Site testing to include soils compaction, concrete, mortar, grout asphalt etc.

END OF SECTION 014000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete formwork.

B. Concrete for composite floor construction.

C. Floors and slabs on grade.

D. Concrete foundation walls.

E. Concrete reinforcement.

F. Joint devices associated with concrete work.

G. Miscellaneous concrete elements, including equipment pads and light pole bases.

H. Concrete curing.

1.2 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; 2016.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting; 2010.

G. ACI 306R - Guide to Cold Weather Concreting; 2016.

H. ACI 308R - Guide to External Curing of Concrete; 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2017).

J. ACI 347R - Guide to Formwork for Concrete; 2014.

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.

M. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).

N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2017b.

O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.

P. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.

Q. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

R. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.

S. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

T. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

U. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

V. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.

W. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

X. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.

Y. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2016.

Z. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.

AA. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

BB. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.

CC. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

DD. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

EE. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.

FF. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011 (Reapproved 2017).

GG. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

HH. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

II. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.3 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix design.

1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Test Reports: Submit report for each test or series of tests specified.

F. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.4 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

D. For slabs required to include moisture vapor reduction admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for first day of placement.

PART 2 PRODUCTS

2.1 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.

3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Type: Deformed billet-steel bars.

2. Finish: Unfinished, unless otherwise indicated.

B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.

1. Form: Flat Sheets.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

1. Acquire aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: 10 mil sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.

1. Installation: Comply with ASTM E1643.

2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

1. Grout: Comply with ASTM C1107/C1107M.

2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:

    a. Maximum: Plus 4 percent.

    b. Minimum: Plus 1 percent.

3. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.

4. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

5. Products:

6. Flowable Products:

    a. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

    b. Kaufman Products Inc; SureGrout: www.kaufmanproducts.net/#sle.

    c. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; DURAGROUT: www.laticrete.com/our-products/concrete-construction-chemicals/#sle.

7. Low-Slump, Dry Pack Products:

    a. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

    b. Dayton Superior Corporation; Turbo Grout HP 12: www.daytonsuperior.com/#sle.

    c. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; Duragrout: www.lmcc.com/#sle.

C. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.

1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.

    a. Maximum Height Change: Plus 4 percent.

    b. Minimum Height Change: Plus 1 percent.

2.6 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

1. Products:

    a. Euclid Chemical Company; AKKRO-7T: www.euclidchemical.com/#sle.

    b. Kaufman Products Inc; SureBond: www.kaufmanproducts.net/#sle.

c. Kaufman Products Inc; SureWeld: www.kaufmanproducts.net/#sle.

d. SpecChem, LLC; Strong Bond Acrylic Bonder: www.specchemllc.com/#sle.

e. W. R. Meadows, Inc; ACRY-LOK-: www.wrmeadows.com/#sle.

B. Epoxy Bonding System:

1. Complying with ASTM C881/C881M and of Type required for specific application.

2. Products:

a. Adhesives Technology Corporation: www.atcepoxy.com/#sle.

b. Euclid Chemical Company; DURAL FAST SET LV: www.euclidchemical.com/#sle.

c. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

d. Kaufman Products Inc; SurePoxy HM EPL: www.kaufmanproducts.net/#sle.

e. SpecChem, LLC; SpecPoxy 1000, SpecPoxy 2000, SpecPoxy 3000, or SpecPoxy 3000FS: www.specchemllc.com/#sle.

f. W. R. Meadows, Inc; Rezi-Weld Gel Paste, Rezi-Weld Gel Paste State, Rezi-Weld 1000: www.wrmeadows.com/#sle.

C. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.

2. Height: To suit slab thickness.

2.7 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

1. Products:

a. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

b. Euclid Chemical Company ; EUCOBAR: www.euclidchemical.com/#sle.

c. Kaufman Products Inc; VaporAid: www.kaufmanproducts.net/#sle.

d. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com/#sle.

e. W. R. Meadows, Inc ; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.

B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

1. Product dissipates within 4 to 6 weeks.

2. Products:

a. Dayton Superior Corporation: www.daytonsuperior.com/#sle.

b. Dayton Superior Corporation; Clear Resin Cure J11W: www.daytonsuperior.com/#sle.

c. Euclid Chemical Company; COLOR-CRETE CURE AND SEAL VOC: www.euclidchemical.com/#sle.

d. Kaufman Products Inc; Thinfilm 420 Resin Base: www.kaufmanproducts.net/#sle.

e. SpecChem, LLC; SpecRez: www.specchemllc.com/#sle.

f. W. R. Meadows, Inc; 1100-Clear: www.wrmeadows.com/#sle.

2.8 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.

2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.

3. Water-Cement Ratio: Maximum 45 percent by weight.

4. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.

5. Exterior Exposure 4.5% to 7.5%.

6. Maximum Slump: 3 inches. for floors, 4" for walls and foundations.

7. Maximum Aggregate Size: 1 inch.

2.9 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.

1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

2. Use latex bonding agent only for non-load-bearing applications.

E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.4 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Notify Architect not less than 24 hours prior to commencement of placement operations.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.5 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:

1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.6 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than seven days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

3.7 FIELD QUALITY CONTROL

A. An Owner supplied independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.8 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.9 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members.

B. Base plates, leveling plates.

C. Grouting under base plates.

1.2 RELATED REQUIREMENTS

A. Section 053100 - Steel Decking: Support framing for small openings in deck.

B. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2017.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.

C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.

D. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).

I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

J. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.

K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

L. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

M. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.

N. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.

O. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).

P. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).

Q. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.

R. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).

S. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film; 2017.

T. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.

U. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.

V. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.

W. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.

X. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2016.

Y. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2013.

Z. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.

AA. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2015, with Editorial Revision (2017).

BB. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

CC. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

DD. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

EE. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).

FF. UL (FRD) - Fire Resistance Directory; current edition.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Submit two (2) copies of producer/manufacturer's specifications and installation instructions for the following products. Include laboratory test reports/other data required to show compliance with test specifications. Indicate by transmittal form that a copy of each applicable instruction has been distributed to fabricators, installers and erectors:
    a. Structural steel (each type) including certified copies of mill reports covering chemical 'physical properties.
    b. High strength bolts (each type) including nuts and washers.
    c. Direct tension Indicators, if used.
    d. Unfinished bolts and nuts.
    e. Structural steel primer paint.
    f. Shrinkage-resistant grout.
    g. Headed shear connectors
2. Shop Drawings Submitted Without Complete Connection Design Calculations will not be reviewed.
3. Submit drawings including complete details/schedules for fabrication, shop assembly, and field erection of members, including details, schedules, procedures, and diagrams showing sequence of erection.
4. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size/length/type each weld. Provide setting drawings, templates, and other directions for installation of anchor bolts and other anchorages to be installed by others. Fabricator's erection drawings/shop details shall clearly show capacity of connections designed by fabricator. Fabricator's/Erector's shop drawings shall contain information and details developed in sufficient detail for field erection and assembly without the use of the Construction Documents.
5. Reproducible copies of contract documents shall not be used as shop drawings. Shop drawings shall be reviewed by Contractor prior to submission. Drawings shall bear Contractor’s approval stamp accepting responsibility for coordination of dimensions shown in the contract documents, quantities and coordination with other trades. Drawings not bearing Contractor’s stamp may be rejected at the discretion of the Architect or Structural Engineer.

6. Review and return of shop drawings shall be based on a MINIMUM of fifteen (15) working days in the Structural Engineer's office from receipt of submission to return to the next party for their action.
7. Shop drawings should be submitted incrementally as appropriate packages are prepared to equalize the workload for review of the drawings.
8. Submission of a large volume of shop drawings at one time may result in review times which will exceed those as noted above. Definition of a "large volume" of shop drawings is subject to interpretation.
9. Contractor shall provide in his schedule for the above noted time and for appropriate additional time for delivery (shipping) of drawings.
10. No claims may be made on the part of the Contractor for delay of the project due to shop drawing reviews which occur within the above stated time limits or for reviews which take greater time than noted above due to submission of a large volume of shop drawings at one time
11. Shop drawings rejected due to non-compliance with the structural documents shall be resubmitted with the same time requirements for review as noted above. No claims may be made on the part of the Contractor for delay of the project due to shop drawings rejected due to non-compliance with the structural documents.
12. Such delays, if they occur, shall be attributable entirely to the Contractor's Fabricator. Shop drawings submitted for more than two reviews due to fabricator's non-compliance shall result in time for additional engineering services being charged to the Contractor.

C. Changes and Deviations: After submittal review, neither products nor construction requirements indicated on the shop drawings may be changed or deviated from.

D. Structural Fasteners:

1. Submit complete manufacturer's specifications and test reports certifying that all structuralfasteners (bolts) comply with requirements for ASTM A325 or A490 and for DOMESTIC FASTENERS ONLY.
2. American or Canadian fasteners are permitted providing that BOTH the steel used in fastener AND the fabrication of the fastener were produced/manufactured completely in either the United States or Canada.

E. Calculations:

1. Submit complete calculations for each connection designed by Fabricator's CDE.
2. Calculations shall show details of the assembled joint with all bolts and welds indicated. All design calculations shall be sealed by the Fabricator's CDE.
3. Shop Drawings Submitted Without Complete Design Calculations will not be reviewed.
4. Calculations need not be performed for pre-designed connections taken from tables in AISC manuals and publications provided job conditions precisely match conditions presumed in the tables. Calculations shall be provided for all variations from conditions presumed in the tables. All information used from such tables shall be clearly identified with the table number and all such connections shall be indicated in the calculations submitted.

F. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

G. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

H. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Maintain one copy of document on site.

C. Comply with all applicable provisions of state and local building and safety codes and all other codes referenced therein, other federal (OSHA) safety requirements, and other codes and standards referenced in this specification, except where more stringent requirements are indicated or specified herein.

D. AISC “Code of Standard Practice for Steel Buildings and Bridges”. April 14, 2010 Edition. except where superseded herein.

E. If requested, furnish affidavit from manufacturer or fabricator certifying that materials or products delivered to job meet requirements specified. However, such certification shall not relieve Contractor from responsibility of complying with any added requirements specified herein.

F. Any material or operation specified by reference to published specification of a manufacturer shall comply with requirements of standards listed herein. In case of a conflict between referenced specifications and project specifications, shall govern.

G. AISC Code of Standard Practice: The following paragraphs are superseded as noted below to clearly affirm the responsibilities of the Contractor and Fabricator defined in these specifications. Where the AISC "Code of Standard Practice" (AISC Code) may be interpreted to relieve the Contractor or Fabricator of the responsibilities assigned or reasonably inferred as assigned to him/them in these specifications such sections or paragraphs of the AISC Code shall be superseded by the requirements of these Specifications.

1. Paragraph 3.3 shall be superseded by the following:
    a. All things which, in the opinion of the Contractor, appear to be deficiencies, omissions, contradictions, or ambiguities in Plans or Specifications shall be brought to the attention of Architect and Structural Engineer. Plans and Specifications will be corrected or written interpretation of alleged deficiency, omission, contradiction or ambiguity will be made by Architect and Structural Engineer before affected work proceeds.

2. Paragraph 4.2.1 shall be superseded by the following:

a. Substitute following: Indication of compliance by the Owner of shop drawings prepared by the fabricator indicates that the fabricator has correctly interpreted the contract requirements. Such indication does not relieve the fabricator of the responsibility assigned to him for the design and detailing of connections assigned to him,nor for the accuracy of dimensions on the shop drawings, nor for general fit up of parts to be assembled in field.

3. Paragraphs 7.2 through 7.6 shall be superseded as follows:
   a. All references to "Owner" shall be superseded as references to "Contractor".

H. Qualifications for Welding Work: Contractor shall retain testing laboratory to provide qualification of welding processes and welding operators in accordance with AWS "Standard Qualification Procedure". Provide certificationthat welders employed in work have as follows:

1. Satisfactorily passed AWS qualification tests based on most current AWS standards and procedures and have been continuously employed by the same Contractor since becoming certified.
2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within previous twelve (12) months.
3. Where a partial penetration or complete penetration weld is found defective or, in the opinion of the ITL, requires other than superficial repairs, the welder responsible shall be suspended from such work until recertification for such work and positions is achieved. If after recertification the welder’s work is again found other than superficially defective, the welder shall be dismissed from such work for the remainder of the project.
4. Where recertification of welders is required, both cost and retesting will be Contractor’s responsibility.

I. Structural Steel Fabricator Qualifications: Structural Steel shall be fabricated in a plant certified by the AISC as qualified to fabricate Category I Conventional Steel Structures" AND structural steel fabricator must provide a documented consistent record of at least five (5) successful projects over the preceding five (5) years each of a magnitude equal or greater than the total structural steel scope of this project. Without the AISC Certification, evidence of ten(10) projects must be submitted. The Contractor shall submit evidence within 48 hours of bid opening verifying one of the above required qualifications.

J. Structural Steel Erector Qualifications: Structural Steel shall be erected by an erector who must demonstrate a consistent record of at least ten (10) successful projects over the preceding five (5) years each of equal or greater magnitude than the total erection scope of this project. The Contractor shall submit evidence to the Architect within 48 hours of bid opening verifying one of the above required qualifications.

K. Bids From Contractors Including Fabricators Or Erectors Not Meeting The Above Requirements Will Be Disqualified And Rejected.

L. Responsibility For Connection Design: Fabricator shall be responsible for design of connections not designed or shown on contract documents. In fulfillment of this responsibility, Fabricator shall retain a professional engineer (Connection Design Engineer - CDE), registered in the state where the project is located, who shall be in responsible charge of the design, detailing, and proper implementation and coordination of all such connections as part of fabricator's preparation of shop drawings.

M. All shop drawings and connection design calculations submitted for review containing connections designed by fabricator shall be signed and sealed by fabricator's CDE.

N. Fabricator’s CDE shall include a statement with his seal indicating that his seal represents only the design detailing and proper implementation and coordination of the connections designed by him and shown on his drawings and that no responsibility nor liability is assumed by him with regard to the capacity or design of any members nor to the integrity or safety of the structure as a whole.

O. Fabricator's CDE shall be responsible only for the connection design work assigned to him. Structural Engineer of Record (SER) retains responsibility for the adequacy of the entire structure. SER'S review of submittals from fabricator will begin ONLY AFTER fabricator's compliance with this requirement.

1. Contractor shall submit evidence to the Architect within 48 hours of bid opening verifying Fabricator’s compliance or ability to comply with above requirements.
2. Failure to comply or failure of ability to comply shall disqualify fabricator’s bid and shall require termination of fabricator’s contract.

P. Responsibility For Errors: The Contractor shall be responsible for all errors of detailing and fabrication, for the correct fitting of structural members, and for correction of work which does not conform to specified requirements including, but not limited to, strength of material, fit up, conformance to tolerance requirements, conformance, conformance to connection requirements, painting, and all other items indicated in the specifications or referenced standards.

Q. The Contractor shall correct and/or replace all non-conforming work in manner and with materials approved by the Structural Engineer. If steel is damaged or does not fit, the Contractor shall prepare and submit drawings showing his proposed corrective measures to the Architect. No modifications shall be made to the steel until such drawings have been approved by the Architect and Structural Engineer. Contractor shall be responsible for cost of such corrective measures including architectural and engineering services.

R. The Contractor shall promptly notify the Architect/Engineer where questions about the intent or clarity of the Contract Documents arise. Where sizes of any elements, dimensions, or assembly are not indicated or are conflicting with other information, the Contractor shall notify the Architect/Engineer in ample time to provide the information or issue a correction without delaying the work. Neither the Contractor nor the Fabricator shall 'make assumptions regarding the intent of the Contract Documents where such

questions arise. No work shall proceed the respect to the affected portions of the structure until such questions are resolved.

S. Contract Drawings: The Contractor shall verify that all dimensions shown on shop drawings are coordinated with the Contract Drawings. Contractor shall make all measurements in the field necessary to verify or supplement dimensions shown on the dimensions and requirements of the Contract Drawings.

T. Quality Control: Contractor is responsible for quality control and compliance with requirements for materials, workmanship, fabrication, and erection of structural steel including that furnished by subcontractors and suppliers.

U. Contractor shall meet all requirements indicated in the specifications and shown on the drawings.

V. Inspections and tests performed by Owner as part of quality assurance program will not relieve Contractor of his responsibility to provide materials and workmanship in compliance with specified requirements.

W. Materials and fabrication procedures are subject to inspections and tests in mill, shop, and field. Such inspections and tests will be performed by an independent testing laboratory (ITL) employed by Owner.

1.6 INSPECTION AND TESTING:

A. Owner will employ, at his expense, a qualified independent testing laboratory (ITL) to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports. Reports shall be furnished directly to the Architect and Structural Engineer with copies forwarded to the Contractor.

1. ITL shall conduct and interpret tests and state in each report whether test specimens comply with requirements and specifically state any deviations there from.
2. Contractor(s) shall provide access for ITL to places where structural steel work is being fabricated or produced so required inspection and testing can be accomplished.
3. ITL may inspect structural steel at plant before shipment. However, Architect reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

B. Contractor/Fabricator shall correct deficiencies in structural steel work which inspections/laboratory test reports have indicated to be not in compliance with requirements. ITL shall perform additional tests to reconfirm any non-compliance of original work as may be necessary to show compliance. Such tests, including additional architectural/engineering services made necessary by such non-conformance, will be paid by Contractor.

C. Structural Steel Testing: Where steel is not or cannot be identified by mill test reports, heat or melt numbers, ITL will secure samples of structural steel in ample quantities to perform structural tests on 5% by weight of all unidentified steel. Perform tensile, bend and elongation test per ASTM A-370.

D. Shop Inspection Testing: Conduct shop inspections/tests as required during fabrication of structural steel with reports to include shop welder's certifications, type and location of all defects found during inspection, and measures required/performed to correct such defects, statements of final approval of all welding of shop connections and other fabrication data/information pertinent to safe/proper welding of shop connections. ITL shall obtain copies of all welder certifications of welders assigned to job.

E. Inspect and test during fabrication of structural steel assemblies in accordance with AWS DI.1 as following:

1. Perform visual inspections of all welds. Check for size, pinholes, undercut, and overlap. Any visual indication of cracks shall be checked further using magnetic particle testing methods.
2. Perform non-destructive test of welds as follows:
    a. Partial penetration welds - one (I) spot test per weld using magnetic testing techniques.

    b. Full penetration welds - test entire length of all welds; use radio- graphic or ultrasonic testing techniques.

3. All welds that fail shall be re-welded and re-tested until they pass. When spot testing is designated each spot shall cover at least 4” of weld length. When spot testing reveals indication of flaws requiring repair, two additional spots in that joint shall be tested. If indications of flaws requiring repair are revealed in either of two spot tests, entire length of weld in that welded joint shall be tested.

F. Field Inspection/Testing: Conduct field inspections/tests as required during erection and installation of structural steel assemblies in accordance with AWS DI.I.-90 for welding and AISC Specification for Structural Joints for high-strength bolted connections and as indicated below. Reports to include bolt, nut, and washer verification bolt torque verification where slip-critical connections are required, field welder's certifications, type and location of all defects found during inspection, and measures required/performed to correct such defects, statements of final approval of all welding of field connections, stud shear connector welding, metal decking weld attachment, and other erection data/information pertinent to safe/proper bolting and welding of field connections. ITL shall obtain copies of all welder certifications of welders assigned to job.

1. Certify welders and conduct inspection and tests as required. Record types/location of all defects found in work. Record work required and performed to correct deficiencies. Re-certify welders where required.
2. Perform visual inspection of all welds. Check for size, pinholes, undercut, and overlap. Any visual indication cracks shall be checked further using magnetic particle testing methods.

3. Perform non-destructive tests of welds as follows:
   a. Fillet welds - one (I) spot per member. Magnetic particle testing may be used.

   b. Partial penetration welds - one (I) spot test per weld using magnetic particle testing techniques.

   c. Full penetration welds - Test entire length of all field welds. Use radiographic or ultrasonic testing techniques.

4. Correction for complete weld rejection shall be same as described under shop inspection and testing.
5. Visually inspect all bolts for:
   a. Number, diameter, length. and head mark.

   b. Proper type of washers and nuts.

   c. “Snug tight” condition in ALL JOINTS.

   d. Flat hardened steel washers or common steel plate washers installed over all slotted hole conditions.

6. Test a minimum of ten percent (10%) of the bolts, but at least two bolts, in all “Slip-Critical” bolted connections for proper bolt tension and check for proper assembly with hardened washers. All bracing connections shall be slip-critical.
7. Calibrate impact wrenches during erection operations using three (3) bolts of each type, size, and thread of bolt which will require testing. Measure bolt tension to the proof load required for ASTM A325 or A490 bolts as required. For each day of inspection, repeat calibration before beginning work and at the mid-point of the days operations.
8. All bolted connections that fail shall be corrected and all bolts in that connection shall be re-tested. Cost of tests on connections that fail shall be borne by the Contractor.
9. Bolts in bearing connections Shall NOT be tensioned without the approval of the Structural Engineer. Bolts in bearing connections tensioned without approval may require removal and replacement at Contractors expense.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Angles, Plates, and Channels: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

E. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.

F. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade Aand galvanized in compliance with ASTM A153/A153M Class C.

G. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.

H. Headed Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers.

I. Anchor Bolts: ASTM A 307, Grade C.

J. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

M. Grout: Non-shrink, non-metallic aggregate type, complying with {\rs\#1} and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

N. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

O. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Shop fabricate to greatest extent possible. Fabricate items of structural steel in accordance with the AISC Specifications, the A1SC Code of Standard Practice, and as indicated on final shop drawings.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials. Fabricator shall coordinate fit-up procedures with erector.
2. Clearly mark grade of steel on each piece such it will be identifiable in the field from the viewpoint of the floor below or ground below for the purpose of field inspection and confirmation of steel grade.
3. All corners, copes, or other re-entrant cuts shall be smooth and rounded to a minimum 1/2” radius. No notches or overcuts are permitted - such members may be rejected at the discretion of the Structural Engineer.
4. Fitted stiffeners shall be fabricated to fit snugly between flanges. Ends of stiffeners shall be milled or ground to establish full bearing against abutting surfaces over their entire bearing length.

5. Ends of columns and truss members at splices and at other bearing connections shall be finished to establish full bearing against abutting surfaces over their entire bearing length. Filler plates used at finished surfaces shall be finished together with the member.
6. Where finishing is required, complete assembly. including weldjng of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
7. Dimensional tolerances shall conform to those specified in the referenced AISC standards or as indicated in the specifications or on the drawings.

B. Manual cutting shall only be done with a mechanically guided torch. An unguided torch may only be used where the cut is not within 1/8” of the finished edge and final finishing is done by chipping or grinding to produce a smooth surface free of notches or jagged edges.

C. Milled surfaces of built-up elements shall be completely assembled or welded prior to milling.

D. Refer to the architectural drawings for structural steel members designated as “Architecturally Exposed Structural Steel” (AESS). Contractor and Fabricator shall coordinate with Architect all exposed structural steel elements to determine if AESS classification is to apply and if test assemblies or components are required for architectural acceptance prior to start of shop drawings or fabrication.

E. Lifting and Erection Devices: Fabricator shall be responsible for designing, detailing, and furnishing all lifting and erection devices as required. All such devices shall be removed after erection where interfere nor trades.

F. Connections: Connections shall be designed to accommodate the following requirements, unless indicated otherwise on the drawings:

1. Shear connections, unless noted otherwise, shall be designed to support half the allowable load on beam, defined in the AISC “Allowable Loads on Beams” or reaction shown on drawings, or minimum 10 kips, whichever is greater. Reactions for composite members are shown on the drawings and connections for such members shall be designed for those reactions. Where connections are designed for loads taken from the AISC “Allowable Loads on Beams”, any loads or beam reactions located within ten (10) percent of a members length from a support connection and any vertical force components of bracing members occurring at a connection shall be added to the reaction for that connection.
2. Moment resisting connections not indicated and/or detailed on the drawings shall be designed for the moment capacity of the member based on the unbraced compression flange length of the member, unless design values for shear and moment have been indicated on plan.
3. Connections not indicated, shown or detailed otherwise on the drawings shall be designed as simple shear connections. All typical beam simple shear connections shall be standard double angle or single angle framed beam connections using either bolts or welds for the shop connection and bolts for the field connection.

4. Single plate “shear tab” connections may be used provided there is no axial force in the member. Such connections shall be designed in strict accordance with the AISC requirements for the grade of steel used. Short slotted holes shall be used in either the web of the beam or in the tab plate, not both, to accommodate beam end rotation. Bolts shall be snug tight and double nutted. Bolts shall be bearing type only. Slip-critical connections are not permitted in single plate “shear tab” connections. DO NOT tension bolts in shear tab connections.
5. Seated beam or stiffened seated beam connections shall not be used unless indicated on the drawings or unless Structural Engineer approves capacity of supporting member to resist the eccentric loads applied by such connections. Fabricator is responsible for verifying that such connections will not interfere with architectural or mechanical requirements.
6. Capacity of members affected by copes, blocks, holes or other reductions in the member section necessitated by details of connection shall be checked by the CDE. Where required, member capacity shall be restored or reinforced to accommodate required loads. Details required to restore or reinforce members shall be designed by the CDE.
7. Weld or bolt shop connections, as indicated. Bolt field connections, except where welded connections or other connections are indicated. Provide a minimum of two high-strength threaded fasteners for all bolted connections.
8. All groove butt welds are full penetration unless noted or detailed otherwise on the drawings. Provide necessary back-up extension, or over-run bars or plates as required.
9. High strength bolts used in bearing type connections shall not be used in combination with welds for load transmission across the same faying surface in any connection.

G. High-Strength Bolted Construction: Install and test high-strength threaded fasteners in accordance with these specifications and AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ). All bolts shall be new and shall not be re-used.

1. All bolted construction shall be AISC bearing type connections, except as below or unless indicated otherwise on the drawings. Connections shall use standard hole sizes for the bolt diameter employed and threads shall be assumed included in the shear planes.
2. Shear connections at simple span members shall accommodate unrestrained beam end rotations as indicated in the AISC Specification.
3. Shear connections for welded moment connected elements and for all brace elements shall be AISC slip-critical connections.
4. Dimensions and washer requirements for oversize, short slotted, and long slotted holes shall be in accordance with the AISC Specification requirements.

H. Tightening of bolts shall be in accordance with the following requirements and procedures:

1. Tighten high strength bolts in bearing connections to a snug tight condition. Snug tight condition is defined as that attained with an impact wrench providing 200 foot-pounds (±20 ft-lbs) of torque for each bolt. Do not over-torque bearing bolts in snug tight connections or removal of bolts may be required.

2. Tighten high strength bolts in slip-critical connections to required bolt tension in accordance with AISC Specifications.
3. Washers shall be used with all bolted connections in accordance with the AISC Specification.
4. All field tightening of high strength slip-critical bolts shall utilize load indicating washers or bolts in accordance with the manufacturer's requirements.
5. Shop tightening of high strength slip-critical bolts shall utilize either load indicator washers or load indicator bolts.

I. All bolts shall be well lubricated at the time of installation. Dry and/or rusty bolts are not permitted and shall be removed and replaced if used.

J. Where bolted connections are transferring axial forces, the connections shall develop the full capacity of the connecting member, considering the actual unbraced length for the specific condition, U.N.O.

K. Where bolted connections are transferring flexural forces (moment connections), the bolted tensile or compressive strength of the member, unless indicated otherwise on the drawings.

L. Connections shall develop the full flexural capacity of the member, unless indicated otherwise on the drawings.

M. Welded Construction: All shop and field welding shall comply with AWS Code D1.l for procedures, appearance, and quality of welds, and methods used in correcting welding work. For high-strength low-alloy steels, follow welding procedures recommended by steel producer for exposed/concealed connections.

1. Shop and field welders shall be certified according to AWS procedures for the welding process and position to be used.
2. Welding shall be done in strict accordance with the methods and procedures specified in the AWS code, the approved shop drawings, and the structural drawings. Before any welding is performed, attention shall be paid to surface preparation, fit-up, cleanliness of materials, and back-up materials or welds.
3. Minimum sizes and materials for welds shall be in accordance with AISC Specification Tables as noted below:
    a. 'Fillet welds per Table J2.4.

    b. Minimum effective throat thickness of partial-penetration and flare groove welds per Tables J2.l, J2.2, and J2.3.

    c. Filler weld metal shall be as specified in AISC Specification Table J2.5.

4. Welds not specified shall be continuous fillet welds, wherever possible. All welds shall be sound throughout. Welds shall exhibit no crack in any pass and shall be free from overlap. Craters shall be filled to the full cross section of the weld. Welds conforming to AWS requirements, as inspected by non-destructive testing, shall be considered sound.

5. Follow welding procedures recommended by steel producer for high-strength low-alloy steels.
6. Fabricator shall coordinate with erector the welding responsibilities at all field welded joints.
7. Built-up sections assembled by welding and other weldments shall be assembled in accordance with the following:
    a. Elements assembled by welding shall be free of warpage and all axes shall be in straight and true alignment. Assemble and weld built-up sections by methods which will produce required alignments without inducing warping.

    b. Welding procedures shall be developed considering steel toughness and notch sensitivity in order to prevent premature or brittle fracture during fabrication and erection. Minimum preheat and interpass temperatures shall be in accordance with AWS requirements, except that no welding shall be performed when ambient temperatures are below 0 deg. F. Temperature shall be measured opposite from the face on which preheating is performed.

    c. Heat, input, length of weld, and sequence of welding shall be controlled to prevent distortions. Surfaces to be welded and filler metals shall be subject to inspection prior to beginning welding.

    d. Field moment connections where beams are groove welded directly to columns or girders shall not be welded until after all erection bolts are installed and the members are drawn together. However, all welds shall be made before any shear connection bolts are tightened.

    e. All elements of weldments shall be welded together to develop the full strength for the elements using “V’ or “I” groove welding, except where otherwise indicated on the structural drawings. Welds shall be continuous complete penetration, except where fillet welds can develop the full strength of the elements. Welds made without back-up bars shall have their roots chipped, ground, or gouged out to sound metal on the second face before welding is begun on that face. Stiffeners and Web Doublers: Provide fitted bearing stiffeners and/or web doubler plates under all concentrated bearing loads, in all members framing over columns, at all moment transferring beam/column joints (as required per AISC Specifications), and at all locations indicated on the drawings.

N. Hanger and Kickers: Connections for all hangers and kickers not detailed on the drawings shall be designed for the full allowable tensile capacity of the member. Provide welded or bolted connections in accordance with the drawings where so indicated. Provide slotted holes in bolted components where necessary to accommodate field fit-up and erection tolerances. Where slotted holes are used, provide field welding after erection to prevent slip of components under supported loads.

O. Steel Shelf Angles: Steel angles indicated on the drawings supporting masonry veneer shall be detailed in lengths not exceeding thirty feet, but in no case in lengths less than the maximum shelf angle support spacing indicated on the drawings. Angles shall have a minimum of two supports and shall have joints located at the mid-point between supports. Shelf angles shall be complete penetration welded to be continuous around corners and at other joints. Do not extend continuous shelf angles across masonry or concrete joints, (expansion, control, or construction)

P. Embedded Plates: Plates shall be free of heavy rust, mill scale, dirt, grease, grime, and other foreign material which will interfere with welding of headed studs. Weld studs to plates using automatically timed stud welding equipment. Hot-dip galvanize plates and studs where exposed to exterior weather conditions.

Q. Steel Wall Framing: Select members that are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square, and true members in completed wall framing.

R. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws uniformly spaced not more than 10 inches n.e., unless indicated otherwise.

S. Holes for Other Work: Provide holes securing other work to structural steel framing, and passage of other work through steel framing members, as shown on final shop drawings; provide threaded nuts welded to framing, and other specialty items as indicated to receive other work. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

T. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

2.3 FINISH

A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

1. General: Surface preparation, paint, and painting procedures shall conform to the “Steel Structure Painting Manual”, volumes I and 2, by the Steel Structures Painting Council (SSPC).
2. After fabrication shop paint only all steel stairs, and all building cladding support steel not specified to be hot-dipped galvanized except as noted on the drawings or in the specifications.
3. Do not paint surfaces to be fireproofed with spray-on materials or embedded in concrete, mortar, or grout (paint initial 2” of embedment). Do not paint top flanges of composite beams, nor other surfaces to receive welded studs, nor within 2” of surfaces which will be welded, nor surfaces where bolting with slip-critical bolts, or where otherwise noted on the drawings.

4. Coordinate all shop painting of structural steel with Architect's painting requirements as indicated on the architectural drawings and in the specifications.
5. Surface preparation: After fabrication and inspection, clean steelwork to be painted. Remove loose rust, mill scale and spatter, and slag or flux deposits. Clean steel in accordance with paint manufacturer’s instructions using prescribed surface preparation and in accordance with Steel Structures Painting Council (SSPC) as follows:
    a. SP-l “Solvent Cleaning”
    b. SP-2 “Hand Tool Cleaning”
    c. SP-3 “Power Tool Cleaning”
    d. SP-5 “White Metal Blast Cleaning”
    e. SP-6 “Commercial Blast Cleaning”
    f. SP-7 “Brush-off Blast Cleaning”
    g. SP-8 “Pickling”
6. Surface preparation: After fabrication and inspection, clean steelwork to be painted. Remove loose rust, mill scale and spatter, and slag or flux deposits. Clean steel in accordance with paint manufacturer's instructions using prescribed surface preparation and in accordance with Steel Structures Painting Council (SSPC) as follows:
7. SP-l “Solvent Cleaning”
    a. SP-2 “Hand Tool Cleaning”
    b. SP-3 “Power Tool Cleaning”
    c. SP-5 “White Metal Blast Cleaning”
    d. SP-6 “Commercial Blast Cleaning”
    e. SP-7 “Brush-off Blast Cleaning”
    f. SP-8 “Pickling”
8. All structural steel that is not specified to be painted shall be cleaned of dirt and other foreign material by sweeping or brushing and shall be cleaned of oil, grease, and grime with solvent cleaners.
9. Prime Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer’s instructions and at a rate to provide dry film thickness of not less than 1.5 mils, except that for steel exposed to crawl spaces provide a dry film thickness of not less than 2.5 mils. Provide full coverage of joints, corners, edges, and exposed surfaces. Apply two (2) coats of paint to surfaces which will be inaccessible after assembly or erection. Change color of second coat to distinguish from initial coat.

10. Final Painting: Final paint coat, if any and color shall be selected and performed in accordance with Section 09900 of the Specification.

2.4 SOURCE QUALITY CONTROL

A. Welded Connections: Visually inspect all shop-welded connections and test at least 50 percent of welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94/E94M.
2. Ultrasonic testing performed in accordance with ASTM E164.
3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
4. Magnetic particle inspection performed in accordance with ASTM E709.

PART 3 EXECUTION

3.1 EXAMINATION

A. Erector shall examine site and work areas and conditions where steelwork is to be erected and shall notify the Contractor and Architect/Engineer in writing of conditions detrimental to proper, safe, and completion of the work.

B. Surveys: Contractor’s Surveyor shall conduct Pre-Erection and Post-Erection surveys.

C. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Structural Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Structural Engineer.

D. Erection tolerances of anchor bolts, embedded items, and all structural steel shall conform to the AISC Code of Standard Practice except where more stringent tolerances are indicated in the specifications or on the drawings.

3.2 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Temporary Shoring and Bracing: Provide temporary shoring/bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members/connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

1. Design and provide adequate shoring and bracing to safely withstand all loads which may occur during construction. Provide additional structural members and/or increased member sizes and connections as required to accommodate erection

methods and equipment. Design of all temporary shoring and bracing is the responsibility of the General Contractor.

2. Provide any temporary erection shoring, bracing, or supports required to secure structural steel in position until permanent bracing or other steel has been erected and concrete floor slabs have reached 75% of specified strength.
3. Where conflicts with other trades, finishes, or building performance will not permit temporary shoring, bracing, supports, or other erection devices or connections to be permanently left in place, the erector shall remove these items or devices as part of his work.

D. Field Assembly: Set structural frames accurately to lines/elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Work shall be assembled securely to resist all loads, erection stresses, and wind forces at all stages of construction process, following erection of steel columns. Provide planking/working platforms necessary to effectively complete work.

1. Clean bearing surfaces/other surfaces in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level/plumb individual members of structure within specified AISC tolerances. Splice members only where indicated and accepted on shop drawings.
2. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces. Comply with AISC for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
3. Gas Cutting: Do not use gas cutting torches, reamers, or other devices in field for unauthorized correcting of fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Structural Engineer. Finish gas-cut sections equal to a sheared appearance when permitted.
4. Errors in shop fabrication or shipping damage preventing proper erection or fit-up shall be reported to the Architect/Engineer and an approved correction shall be obtained prior to proceeding with affected work.
5. Provide miscellaneous supplemental framing for metal decking support where normal deck bearing is interrupted by columns, other framing members, or other openings whether or not indicated on the drawings or where minimum deck bearing is inadequate for construction purposes.

E. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop painted materials. Apply paint to exposed areas using same material as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils. Apply "ZRC Cold Galvanizing Compound, or approved equal, to all field welded galvanized connections or to galvanized members or connections where visible damage to hot-dipped galvanizing has occurred.

F. Field weld components and shear studs indicated on shop drawings.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. An Owner supplied independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 50 percent of bolts at each connection.

C. Welded Connections: Visually inspect all field-welded connections and test 100 percent of welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94/E94M.
2. Ultrasonic testing performed in accordance with ASTM E164.
3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

SECTION 052100 - STEEL JOIST FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Open web steel joists, with bridging, attached seats and anchors.

B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.

C. Supplementary framing for roof openings greater than 18 inches.

1.2 RELATED REQUIREMENTS

A. Section 051200 - Structural Steel Framing: Grouting base plates and bearing plates. Superstructure framing.

B. Section 051200 - Structural Steel Framing: Superstructure framing.

C. Section 053100 - Steel Decking: Bearing plates and angles.

D. Section 053100 - Steel Decking: Support framing for openings less than 18 inches in decking.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).

E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.

F. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.

G. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).

H. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).

I. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film; 2017.

J. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.

K. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.

L. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.

M. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2016.

N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

O. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

P. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

R. FM (AG) - FM Approval Guide; current edition.

S. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.

T. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.

U. SJI 100 - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.

V. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.

W. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

X. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

A. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in West Virginia.

B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI 100 Standard Specifications Load Tables and SJI Technical Digest No. 9.

C. Perform Work, including that for headers and other supplementary framing, in accordance with SJI (SPEC) Standard Specifications Load Tables and SJI Technical Digest No. 9.

D. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 10 years documented experience.

E. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and dated no more than 12 months before start of scheduled welding work.

F. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.

G. Erector Qualifications: Company specializing in performing the work of this section with minimum 10 years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Steel Joists:

1. Canam Group Inc: www.canam-steeljoists.ws
2. Nucor-Vulcraft Group: www.vulcraft.com/#sle.

2.2 MATERIALS

A. Open Web Joists: Types as indicated on drawings:

1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
2. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
3. Finish: Shop primed.

B. Open Web Joists: SJI (SPEC) Joist Girders:

1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standards.
2. Minimum End Bearing on Masonry or Concrete Supports: Comply with referenced SJI standards.
3. Finish: Shop primed.

C. Anchor Bolts, Nuts and Washers: ASTM A307 hot-dip galvanized per ASTM A153/A153M Class C.

D. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.

E. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 FINISH

A. Shop prime joists .

B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.

D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.

E. Install supplementary framing for roof openings greater than 18 inches.

F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

G. Do not field cut or alter structural members without approval of joist manufacturer.

H. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed , except surfaces specified not to be primed.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Welded Connections: Visually inspect all field-welded connections and test at least 100 percent of welds using one of the following:

1. Radiographic testing performed in accordance with ASTM E94/E94M.
2. Ultrasonic testing performed in accordance with ASTM E164.
3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

SECTION 053100 - STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof deck.

B. Composite floor deck.

C. Supplementary framing for openings up to and including 18 inches.

D. Bearing plates and angles.

E. Stud shear connectors.

1.2 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.

B. Section 042000 - Unit Masonry: Placement of anchors for bearing plates embedded in unit masonry assemblies.

C. Section 042900 - Engineered Unit Masonry: Placement of anchors for bearing plates embedded in reinforced unit masonry.

D. Section 051200 - Structural Steel Framing: Support framing for openings larger than 18 inches.

E. Section 051200 - Structural Steel Framing: Placement of embedded steel anchors for bearing plates in cast-in-place concrete.

F. Section 052100 - Steel Joist Framing: Support framing for openings larger than 18 inches.

G. Section 052100 - Steel Joist Framing: Placement of embedded steel anchors for bearing plates and joist seats in cast-in-place concrete.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.

C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2013.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

G. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2016.

H. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; 2016.

I. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; 2016.

J. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

D. Submit manufacturer's installation instructions.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Steel Deck:

1. Canam Steel Corporation: www.canam-steeljoists.ws.
2. Cordeck, Inc: www.cordeck.com.
3. Nucor-Vulcraft Group: www.vulcraft.com.

2.2 STEEL DECK

A. Roof Deck: Non-composite type, fluted steel sheet:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.

2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
3. Minimum Base Metal Thickness: 20 gauge, 0.0359 inch.
4. Nominal Height: 1-1/2 inch.
5. Profile: Fluted; SDI NR.
6. Formed Sheet Width: 24 inch.
7. Side Joints: Lock seam.
8. End Joints: Lapped, mechanically fastened.

B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
3. Span Design: Double.
4. Minimum Base Metal Thickness: 22 gauge, 0.0299 inch.
5. Nominal Height: 1-1/2 inches.
6. Profile: Fluted; SDI NR.
7. Formed Sheet Width: 24 inch.
8. Side Joints: Lock seam.
9. End Joints: Lapped, mechanically fastened.

2.3 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.

B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.

C. Welding Materials: AWS D1.1/D1.1M.

D. Fasteners: Galvanized hardened steel, self tapping.

E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.

1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
2. Material: Steel; ASTM A510/A510M.
    a. Hardness: Rockwell C 54.5, minimum.
    b. Tensile Strength: 285 kips per square inch, minimum.
    c. Shear Strength: 175 kips per square inch, minimum.
    d. Washers:
        1) Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.

2) Exposed Roof Deck Applications: 0.591 inch diameter, minimum.

F. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.

1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.4 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gauge, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.

B. Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

C. Floor Drain Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On concrete and masonry surfaces provide minimum 4 inch bearing.

C. On steel supports provide minimum 1-1/2 inch bearing.

D. Clinch lock seam side laps.

E. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.

F. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.

G. Weld deck in accordance with AWS D1.3/D1.3M.

H. At floor edges, install concrete light gage pour stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

I. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

J. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

K. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

L. Weld stud shear connectors through steel deck to structural members below.

M. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks and pavements.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized

excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

G. Fill: Soil materials or rock used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that requires 50 blows or more is to drive the sampling spoon 6 inches or less during SPT testing according to ASTM D1586.

I. Rock fill: Excavated bedrock that does not breakdown during excavation and placement, and ranges from 2 to 24 inches in dimensional size.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walkway.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.
3. Warning tapes.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.
2. Laboratory compaction curve according to ASTM D1557.

B. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Owner or Engineer.

C. Utility Locator Service: Notify utility locator service and "Miss Utility" for area where Project is located before beginning earth-moving operations.

D. Do not commence earth-moving operations until temporary site fencing, compost filter sock, inlet protection, and erosion- and sedimentation-control measures specified on the plans and in Section 311000 "Site Clearing" are in place.

E. Do not commence earth-moving operations until plant-protection measures are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material, fuel storage.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, GC, SW, SP, SM, SC, ML, or CL according to ASTM D2487 or a combination of these groups; free of rock or gravel larger than 6 inches in any dimensional size, debris, coal, waste, frozen materials, vegetation, and other deleterious matter. Clayey soils shall have liquid limit and plastic limit less than 45 and 25, respectively.

C. Unsatisfactory Soils: Soil Classification Groups OL, CH, MH, OH, and PT according to ASTM D2487 or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 3 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 8 sieve.

J. Sand: ASTM C33/C33M; fine aggregate.

K. Impervious Fill: Clay, gravel and sand mixture with 100 percent passing a 2-inch sieve and a minimum of 35 percent passing a No. 200 sieve.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.

2. Survivability: As follows:

   a. Grab Tensile Strength: 160 lbf; ASTM D4632.
   b. Trapezoid Tear Strength: 60 lbf; ASTM D4533.
   c. CBR Puncture Resistance: 400 lbf; ASTM D6241.

3. Apparent Opening Size: No. 70 sieve, maximum; ASTM D4751.

4. Permittivity: 1.5 per second, minimum; ASTM D4491.

5. UV Stability: 70 percent after 500 hours' exposure; ASTM D4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.

2. Survivability: As follows:

   a. Grab Tensile Strength: 247 lbf; ASTM D4632.
   b. Trapezoid Tear Strength: 90 lbf; ASTM D4533.
   c. Puncture Strength: 100 lbf; ASTM D4833.

3. Apparent Opening Size: No. 40 sieve, maximum; ASTM D4751.
4. Permittivity: 0.05 per second, minimum; ASTM D4491.
5. UV Stability: 70 percent after 500 hours' exposure; ASTM D4355.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Self-compacting, low-density, flowable concrete material produced from the following:

1. Portland Cement: ASTM C150/C150M, Type I.
2. Fly Ash: ASTM C618, Class C or F.
3. Normal-Weight Aggregate: ASTM C33/C33M, 3/8-inch nominal maximum aggregate size.

4. Water: ASTM C94/C94M.

5. Air-Entraining Admixture: ASTM C260/C260M.

B. Produce low-density, controlled low-strength material with the following physical properties:

1. As-Cast Unit Weight: 36 to 42 lb/cu. ft. at point of placement, when tested according to ASTM C138/C138M.
2. Compressive Strength: 140 psi, when tested according to ASTM C495/C495M.

C. Produce conventional-weight, controlled low-strength material with 140-psi compressive strength when tested according to ASTM C495/C495M.

2.4 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: As indicated.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots as necessary to preserve trees.

3.6 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs, pool, and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 20 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.

2. The designated areas to be proof rolled shall have two or more passes and the entire area shall by systematically covered.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2,500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust and to protect it from getting wet.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities including storm system and piping for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

2. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing. Install per this method only where specified on the plans.

E. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material. Utilize compaction keys to bond or notch new fills into existing residual soils.

B. Carbonaceous material shall not be used as fill below buildings, concrete slabs or pavement areas.

C. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.

5. Under footings and foundations, use engineered fill.

D. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 3 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.
3. Moisture condition fill soil with moisture content 3 percent or more below optimum moisture content.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Place rock fill in maximum 24 inches thick loose layers and compact to visual non-movement using a smooth-drum vibratory compaction equipment.

D. Spread rock fill out during placement by blading and dozing, working smaller rock into gaps and voids.

E. Compact soil materials to not less than the following percentages of maximum dry density according to ASTM D698:

1. Under structures, building slabs, steps, pool, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 98 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 98 percent.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.15 SUBSURFACE DRAINAGE

A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to visual non movement using a vibratory compaction equipment.

B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to visual non movement using a vibratory compaction equipment.

2. Place and compact impervious fill over drainage backfill in 6-inch-thick compacted layers to final subgrade.

3.16 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.

3. Shape subbase course and base course to required crown elevations and cross-slope grades.
4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry density according to ASTM D698.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified geotechnical engineering testing agency to perform tests and inspections. Contractor is responsible for providing quality control testing to confirm compaction is being achieved.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

D. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved, Pool, and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 10,000 sq. ft. or less of paved area or building slab but in no case fewer than two tests per lift.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 2000 feet or less of trench length but no fewer than two tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to the specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property. Disposal of these materials is the Contractor’s responsibility.

END OF SECTION 312000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cold milling of existing asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt overlay.
5. Asphalt surface treatments.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.

2. Job-Mix Designs: Certification, by West Virginia Department of Highways (WVDOH), of approval of each job mix proposed for the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each paving material.

B. Material Test Reports: For each paving material, by a qualified testing agency.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the WVDOH.

B. Testing Agency Qualifications: Qualified according to ASTM D3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of WVDOH 2017 Standard Specifications for Roads and Bridges and WVDOH 2017 Supplemental Standard Specifications for Roads and Bridges for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications noted above do not apply to this Section.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Slurry Coat: Comply with weather limitations in ASTM D3910.

4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D692/D692M, sound; angular crushed stone, or crushed gravel.

C. Fine Aggregate: ASTM D1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: ASTM D6373 or AASHTO M 320 binder designation PG 64-22.

B. Asphalt Cement: ASTM D3381/D3381M for viscosity-graded material and ASTM D946/D946M for penetration-graded material.

C. Tack Coat: ASTM D977 or AASHTO M 140 emulsified asphalt, or ASTM D2397/D2397M or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

2.3 AUXILIARY MATERIALS

A. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

B. Joint Sealant: ASTM D6690, Type II, hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by WVDOH and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

2. Base Course: WVDOH Marshall Hot Mix Asphalt Base Course, SG, Type II.
3. Surface Course: WVDOH Marshall Hot Mix Asphalt Wearing Course, SG, Type I.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.

2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

3.3 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of 1-1/2 inches unless specified elsewhere on the plans.
2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
3. Control rate of milling to prevent tearing of existing asphalt course.
4. Repair or replace curbs, driveway aprons, manholes, and other construction damaged during cold milling.
5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
6. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.

7. Handle milled asphalt material according to approved waste management plan or as required by local, state, and federal requirements.
8. Keep milled pavement surface free of loose material and dust.
9. Do not allow milled materials to accumulate on-site.

3.4 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Re-compact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

C. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.5 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.6 SURFACE PREPARATION

A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Cutback Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

C. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.7 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.

2. Spread mix at a minimum temperature of 250 deg F.
3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.9 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D6927, but not less than 94 percent or greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D2041/D2041M, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.10 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 3/8 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 3/8 inch.
2. Surface Course: 1/4 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Contract shall engage a qualified geotechnical engineering testing agency to perform third party tests and inspections. This service shall be included in the base bid. Owner may decide to engage a qualified geotechnical engineering testing agency to perform third party tests and inspections; however, contractor will still be responsible for ensuring the product installed meets the specification requirements.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D3549/D3549M.

C. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D979/D979M or AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041/D2041M, and compacted according to job-mix specifications.

D. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.12 WASTE HANDLING

A. General: Handle asphalt-paving waste according to approved waste management plan or as required by local, state, and federal requirements.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes Concrete Paving Including the Following:
   1. Parking lots.
   2. Curbs and gutters.
   3. Walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Fiber reinforcement.
   4. Admixtures.
   5. Curing compounds.
   6. Applied finish materials.
   7. Bonding agent or epoxy adhesive.
   8. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

B. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1.7 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, fabricated from galvanized-steel wire into flat sheets.

B. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

C. Epoxy-Coated Welded-Wire Reinforcement: ASTM A884/A884M, Class A, plain steel.

D. Reinforcing Bars: ASTM A615/A615M, Grade 60; deformed.

E. Galvanized Reinforcing Bars: ASTM A767/A767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A615/A615M, Grade 60 deformed bars.

F. Epoxy-Coated Reinforcing Bars: ASTM A775/A775M or ASTM A934/A934M; with ASTM A615/A615M, Grade 60 deformed bars.

G. Steel Bar Mats: ASTM A184/A184M; with ASTM A615/A615M, Grade 60 deformed bars; assembled with clips.

H. Plain-Steel Wire: ASTM A1064/A1064M, galvanized.

I. Deformed-Steel Wire: ASTM A1064/A1064M.

J. Epoxy-Coated-Steel Wire: ASTM A884/A884M, Class A; coated, plain.

K. Joint Dowel Bars: ASTM A615/A615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A767/A767M, Class I coating. Cut bars true to length with ends square and free of burrs.

L. Epoxy-Coated, Joint Dowel Bars: ASTM A775/A775M; with ASTM A615/A615M, Grade 60 plain-steel bars.

M. Tie Bars: ASTM A615/A615M, Grade 60; deformed.

N. Hook Bolts: ASTM A307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

O. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

P. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

Q. Zinc Repair Material: ASTM A780/A780M.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C150/C150M, gray portland cement Type I.

2. Fly Ash: ASTM C618, Class C or Class F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag Type IP, portland-pozzolan, or Type IL, Portland-limestone cement.

B. Normal-Weight Aggregates: ASTM C33/C33M, uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.

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

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

E. Color Pigment: ASTM C979/C979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
   1. Color: As selected by Owner, Architect, & Engineer from manufacturer's full range.

F. Water: Potable and complying with ASTM C94/C94M.

2.5 FIBER REINFORCEMENT

A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in decorative concrete paving, complying with ASTM C1116/C1116M, Type III, 1/2 to 1-1/2 inches long.

B. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in decorative concrete paving, complying with ASTM C1116/C1116M, Type III, 1/2 to 1-1/2 inches long.

2.6 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

2.7 RELATED MATERIALS

A. Joint Fillers: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork in preformed strips.

B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy-Bonding Adhesive: ASTM C881/C881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Pigmented Mineral Dry-Shake Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
1. Color: As selected by Engineer from manufacturer's full range.

F. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 5 percent plus or minus 1-1/2 percent for 3/4-inch nominal maximum aggregate size.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use high-range, water-reducing and retarding admixture in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

E. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd..

F. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

G. Concrete Mixtures:

Normal-weight concrete:

1. Compressive Strength (28 Days): 4000 psi.

2. Maximum W/C Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.

Lean fill concrete:

1. Compressive Strength (28 Days): 2500 psi.
2. See Section 312000 for additional information.

Flowable fill concrete:

1. Compressive Strength (28 Days): 100-200 psi.
2. See Section 330500 for additional information.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M and ASTM C1116/C1116M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D3963/D3963M.

G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.

3. Butt Joints: Use epoxy-bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 20 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

F. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

G. Screed paving surface with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface.

Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

I. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

J. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.

c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/2 inch. No vertical transitions greater than 1/4 inch per ADA requirement.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet-long; unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. or 10,000 sq. ft. or fraction thereof of each concrete mixture placed.

a. When frequency of testing will provide fewer than three compressive-strength tests for each concrete mixture, testing shall be conducted from at least two randomly selected batches or from each batch if fewer than three are used.

2. Slump: ASTM C143/C143M; one test at point of placement for each composite 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. Air Content: ASTM C231/C231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C39/C39M; test one specimen at seven days and two specimens at 28 days. Keep one specimen as a spare.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.

B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 330500 - COMMON WORK RESULTS FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping joining materials.
2. Transition fittings.
3. Sleeves.
4. Grout.
5. Flowable fill.
6. Piped utility demolition.
7. Piping system common requirements.

1.2 DEFINITIONS

A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.

B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

C. ABS: Acrylonitrile-butadiene-styrene plastic.

D. CPVC: Chlorinated polyvinyl chloride plastic.

E. PE: Polyethylene plastic.

F. PVC: Polyvinyl chloride plastic.

1.3 QUALITY ASSURANCE

A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.5 COORDINATION

A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

B. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements as specified in other specification sections.

PART 2 - PRODUCTS

2.1 PIPING JOINING MATERIALS

A. Solvent Cements for Joining Plastic Piping:

1. ABS Piping: ASTM D2235.
2. CPVC Piping: ASTM F493.
3. PVC Piping: ASTM D2564. Include primer according to ASTM F656.
4. PVC to ABS Piping Transition: ASTM D3138.

2.2 TRANSITION FITTINGS

A. Transition Fittings, General: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

B. Transition Couplings NPS 1-1/2 and Smaller:

1. Underground Piping: Manufactured piping coupling or specified piping system fitting.
2. Aboveground Piping: Specified piping system fitting.

C. AWWA Transition Couplings NPS 2 and Larger:

1. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.

D. Plastic-to-Metal Transition Fittings:

1. Description: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint or threaded end.

E. Plastic-to-Metal Transition Unions:

1. Description: MSS SP-107, CPVC and PVC four-part union. Include brass or stainless-steel threaded end, solvent-cement-joint or threaded plastic end, rubber O-ring, and union nut.

F. Flexible Transition Couplings for Underground Nonpressure Drainage Piping:

1. Description: ASTM C1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.3 SLEEVES

A. Mechanical sleeve seals for pipe penetrations are specified in other sections.

B. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

C. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, galvanized, plain ends.

D. Cast-Iron Sleeves: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

E. Molded PVC Sleeves: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe Sleeves: ASTM D1785, Schedule 40.

G. Molded PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

2.4 GROUT

A. Description: ASTM C1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.5 FLOWABLE FILL

A. Description: Low-strength-concrete, flowable-slurry mix.

1. Cement: ASTM C150, Type I, portland.
2. Density: 115- to 145-lb/cu. ft..
3. Aggregates: ASTM C33, natural sand, fine and crushed gravel or stone, coarse.

4. Aggregates: ASTM C33, natural sand, fine.
5. Admixture: ASTM C618, fly-ash mineral.
6. Water: Comply with ASTM C94/C94M.
7. Strength: 100 to 200 psi at 28 days.

PART 3 - EXECUTION

3.1 PIPED UTILITY DEMOLITION

A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING INSTALLATION

A. Install piping according to the following requirements and utilities Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on the Coordination Drawings.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping to permit valve servicing.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Select system components with pressure rating equal to or greater than system operating pressure.

I. Sleeves are not required for core-drilled holes.

J. Permanent sleeves are not required for holes formed by removable PE sleeves.

K. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of equipment areas or other wet areas 2 inches above finished floor level.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.

a. PVC or Steel Pipe Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.

L. Verify final equipment locations for roughing-in.

M. Refer to equipment specifications in other Sections for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and utilities Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

G. Grooved Joints: Assemble joints with grooved-end pipe coupling with coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

H. Soldered Joints: Apply ASTM B813 water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B32.

I. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

J. Pressure-Sealed Joints: Assemble joints for plain-end copper tube and mechanical pressure seal fitting with proprietary crimping tool to according to fitting manufacturer's written instructions.

K. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D2235 and ASTM D2661 appendixes.
3. CPVC Piping: Join according to ASTM D2846/D2846M Appendix.
4. PVC Pressure Piping: Join schedule number ASTM D1785, PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.
5. PVC Nonpressure Piping: Join according to ASTM D2855.
6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D3138 Appendix.

L. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D3139.

M. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D3212.

N. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.

1. Plain-End PE Pipe and Fittings: Use butt fusion.
2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.

O. Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Install dielectric fittings at connections of dissimilar metal pipes.

3.5 GROUTING

A. Mix and install grout for equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 330500