

# PROJECT MANUAL

## *Improvements to Water & Wastewater Systems Infrastructure*

### *St. James Veterans Home*

### *St. James, Missouri*

Designed By: Archer – Elgin  
310 East 6<sup>th</sup> Street  
Rolla, MO, 65401

Date Issued: May 3, 2024

Project No.: U2309-01

STATE of MISSOURI

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OFFICE of ADMINISTRATION  
Facilities Management, Design & Construction

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SECTION 00 01 07

PROFESSIONAL SEALS AND CERTIFICATIONS

PROJECT NUMBER: (U2309-01)

THE FOLLOWING DESIGN PROFESSIONALS HAVE SIGNED AND SEALED THE ORIGINAL PLANS AND SPECIFICATIONS FOR THIS PROJECT, WHICH ARE ON FILE WITH THE DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION:



CIVIL ENGINEER  
KENNETH A CAMPBELL  
PE - 2006002797

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**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section provides a comprehensive list of the drawings that comprise the Bid Documents for this project.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.01 LIST OF DRAWINGS**

- A. The following list of drawings is a part of the Bid Documents:

	<u>TITLE</u>	<u>SHEET #</u>	<u>DATE</u>	<u>CAD #</u>
1.	Cover Sheet	Sheet G-001	05/03/24	G-001
2.	Overall Site Plan & Key Sheet	Sheet C-101	05/03/24	C-101
3.	Waterline Plan	Sheet C-102	05/03/24	C-102
4.	Waterline Plan	Sheet C-103	05/03/24	C-103
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10.	Civil Details	Sheet C-501	05/03/24	C-501
11.	Civil Details	Sheet C-502	05/03/24	C-502
12.	Civil Details	Sheet C-503	05/03/24	C-503

END OF SECTION

## SECTION 001116 - INVITATION FOR BID

### 1.0 OWNER:

- A. The State of Missouri  
Office of Administration,  
Division of Facilities Management, Design and Construction  
Jefferson City, Missouri

### 2.0 PROJECT TITLE AND NUMBER:

- A. Improvements to Water and Wastewater Systems Infrastructure  
St. James Veterans Home  
St. James, Missouri  
**Project No.: U2309-01**

### 3.0 BIDS WILL BE RECEIVED:

- A. Until: 1:30 PM, June 25, 2024
- B. **Only electronic bids on MissouriBUYS shall be accepted: <https://missouribuys.mo.gov>. Bidder must be registered to bid.**

### 4.0 DESCRIPTION:

- A. Scope: The project includes replacing and realigning the existing waterline, isolation valves, and fire hydrants on site. A portion of the sanitary sewer line is to be replaced and realigned.
- B. MBE/WBE/SDVE Goals: MBE 10%, WBE 10%, and SDVE 3%. **NOTE: Only MBE/WBE firms certified by the State of Missouri Office of Equal Opportunity as of the date of bid opening, or SDVE(s) meeting the requirements of Section 34.074, RSMo and 1 CSR 30-5.010, can be used to satisfy the MBE/WBE/SDVE participation goals for this project.**
- C. **\*\*NOTE:** Bidders are provided new Good Faith Effort (GFE) forms on MissouriBUYS.

### 5.0 PRE-BID MEETING:

- A. Place/Time: 11:00 AM, June 11, 2024, at 620 North Jefferson Street, St. James, MO 65559
- B. Access to State of Missouri property requires presentation of a photo ID by all persons

### 6.0 HOW TO GET PLANS & SPECIFICATIONS:

- A. View Only Electronic bid sets are available at no cost or paper bid sets for a deposit of \$100.00 from American Document Solutions (ADS). MAKE CHECKS PAYABLE TO: American Document Solutions. Mail to: American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433, <https://www.adsplanroom.net>. NOTE: Prime contractors will be allowed a maximum of two bid sets at the deposit rate shown above. Other requesters will be allowed only one bid set at this rate. Additional bid sets or parts thereof may be obtained by any bidder at the cost of printing and shipping by request to American Document Solutions at the address shown above. **Bidder must secure at least one bid set to become a planholder.**
- B. **Refunds: Return plans and specifications in unmarked condition within 15 working days of bid opening to American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433. Deposits for plans not returned within 15 working days shall be forfeited.**
- C. Information for upcoming bids, including downloadable plans, specifications, Invitation for Bid, bid tabulation, award, addenda, and access to the ADS planholders list, is available on the Division of Facilities Management, Design and Construction's web site: <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans>.

### 7.0 POINT OF CONTACT:

- A. Designer: Archer – Elgin, Ken Campbell, 573-364-6362, email: [kcampbell@cmarcher.com](mailto:kcampbell@cmarcher.com)
- B. Project Manager: Eric Hibdon, 573-508-3666, email: [Eric.Hibdon@oa.mo.gov](mailto:Eric.Hibdon@oa.mo.gov)

### 8.0 GENERAL INFORMATION:

- A. The State reserves the right to reject any and all bids and to waive all informalities in bids. No bid may be withdrawn for a period of 20 working days subsequent to the specified bid opening time. The contractor shall pay not less than the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed, as determined by the Missouri Department of Labor and Industrial Relations and as set out in the detailed plans and specifications.
- B. Bid results will be available at <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans> after it is verified that at least one bid is awardable and affordable.
- C. This is a federally funded/assisted construction project that requires compliance by the awarded Bidder with applicable federal laws and regulations. The Bidder should review Section 007333, Supplementary General Conditions for Federally Funded/Assisted Construction Projects and Section 007334, Terms and Conditions for Contractor Receipt of Federal ARPA SFRF Funds, which are made part of this Invitation to Bid and will be made part of the resulting contract by reference.

## Very Important MissouriBUYS Instructions to Help Submit a Bid Correctly

- A. The bidder shall submit his or her bid and all supporting documentation on MissouriBUYS eProcurement System. No hard copy bids shall be accepted. Go to <https://missouribuys.mo.gov> and register. The bidder must register and complete a profile fully with all required documents submitted prior to submitting a bid.
- B. Once registered, log in.
1. Under "Solicitation" select "View Current Solicitations."
  2. Under "Filter by Agency" select "OA-FMDC-Contracts Chapter 8", then click "Filter Solicitation" button.
  3. Select "Active Solicitations" tab.
  4. To see the Solicitation Summary, click on the Project Number and the summary will open. Click each heading to open detailed information.
- C. Here are simplified instructions for uploading the bid to MissouriBUYS:
1. Find the solicitation by completing Steps 1 through 4 above.
  2. Select the three dots under "Actions." Select "Add New Response."
  3. When the Quote box opens, give the response a title and select "OK."
  4. The detailed solicitation will open. Select "Check All" for the Original Solicitation Documents, open each document, and select "Accept." If this step is not completed, a bid cannot be uploaded. Scroll to the bottom of the page and select "Add Attachments." If you do not see this command, not all documents have been opened and accepted.
  5. The Supplier Attachments box will open. Select "Add Attachment" again.
  6. The Upload Documents box will open. Read the instructions for uploading. Disregard the "Confidential" check box.
  7. Browse and attach up to 5 files at a time. Scroll to bottom of box and select "Upload." The Supplier Attachments box will open. Repeat Steps 5 through 7 if more than 5 files are to be uploaded.
  8. When the Supplier Attachments box opens again and uploading is complete, select "Done." A message should appear that the upload is successful. If it does not, go to the Bidder Response tab and select "Submit."
  9. The detailed solicitation will open. At the bottom select "Close."
- D. Any time a bidder wants to modify the bid, he or she will have to submit a new one. FMDC will open the last response the bidder submits. The bidder may revise and submit the bid up to the close of the solicitation (bid date and time). Be sure to allow for uploading time so that the bid is successfully uploaded prior to the 1:30 PM deadline; we can only accept the bid if it is uploaded before the deadline.
- E. If you want to verify that you are uploading documents correctly, please contact Paul Girouard: 573-751-4797, [paul.girouard@oa.mo.gov](mailto:paul.girouard@oa.mo.gov) ; April Howser: 573-751-0053, [April.Howser@oa.mo.gov](mailto:April.Howser@oa.mo.gov) ; or Mandy Roberson: 573-522-0074, [Mandy.Roberson@oa.mo.gov](mailto:Mandy.Roberson@oa.mo.gov).
- F. If you are experiencing login issues, please contact Web Procure Support (Proactis) at 866-889-8533 anytime from 7:00 AM to 7:00 PM Central Time, Monday through Friday. If you try using a userid or password several times that is incorrect, the system will lock you out. Web Procure Support is the only option to unlock you! If you forget your userid or password, Web Procure Support will provide a temporary userid or password. Also, if it has been a while since your last successful login and you receive an "inactive" message, contact Web Procure (Proactis). If you are having a registration issue, you may contact Cathy Holliday at 573-751-3491 or by email: [cathy.holliday@oa.mo.gov](mailto:cathy.holliday@oa.mo.gov).

## **SECTION 002113 – INSTRUCTIONS TO BIDDERS**

### **1.0 - SPECIAL NOTICE TO BIDDERS**

- A. If awarded a contract, the Bidder's employees, and the employees of all subcontractors, who perform the work on the project must adhere to requirements in Section 013513 – Site Security and Health Requirements as applicable per Agency.
- B. The Bidder's prices shall include all city, state, and federal sales, excise, and similar taxes that may lawfully be assessed in connection with the performance of work, and the purchased of materials to be incorporated in the work. THIS PROJECT IS NOT TAX EXEMPT.

### **2.0 - BID DOCUMENTS**

- A. The number of sets obtainable by any one (1) party may be limited in accordance with available supply.
- B. For the convenience of contractors, sub-contractors and suppliers, copies of construction documents are on file at the office of the Director, Division of Facilities Management, Design and Construction and on the Division's web site - <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans>.

### **3.0 - BIDDERS' OBLIGATIONS**

- A. Bidders must carefully examine the entire site of the work and shall make all reasonable and necessary investigations to inform themselves thoroughly as to the facilities available as well as to all the difficulties involved in the completion of all work in accordance with the specifications and the plans. Bidders are also required to examine all maps, plans and data mentioned in the specifications. No plea of ignorance concerning observable existing conditions or difficulties that may be encountered in the execution of the work under this contract will be accepted as an excuse for any failure or omission on the part of the contractor to fulfill in every detail all of the requirements of the contract, nor accepted as a basis for any claims for extra compensation.
- B. Under no circumstances will contractors give their plans and specifications to another contractor. Any bid received from a contractor whose name does not appear on the list of plan holders may be subject to rejection.

### **4.0 - INTERPRETATIONS**

- A. No bidder shall be entitled to rely on oral interpretations as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction. Every request for interpretation shall be made in writing and submitted with all supporting documents not less than five (5) working days before opening of bids. Every interpretation made to a bidder will be in the form of an addendum and will be sent as promptly as is practicable to all persons to whom plans and specifications have been issued. All such addenda shall become part of the contract documents.
- B. Approval for an "acceptable substitution" issued in the form of an addendum as per Paragraph 4A above, and as per Article 3.1 of the General Conditions; ACCEPTABLE SUBSTITUTIONS shall constitute approval for use in the project of the product.
- C. An "acceptable substitution" requested after the award of bid shall be approved if proven to the satisfaction of the Owner and the Designer as per Article 3.1, that the product is acceptable in design, strength, durability, usefulness, and convenience for the purpose intended. Approval of the substitution after award is at the sole discretion of the Owner.
- D. A request for "Acceptable Substitutions" shall be made on the Section 006325 Substitution Request Form. The request shall be sent directly to the project Designer. A copy of said request should also be mailed to the Owner, Division of Facilities Management, Design and Construction, Post Office Box 809, Jefferson City, Missouri 65102.



## **5.0 - BIDS AND BIDDING PROCEDURE**

- A. Bidders shall submit all submission forms and accompanying documents listed in SECTION 004113 – BID FORM, Article 5.0, ATTACHMENTS TO BID by the stated time or their bid will be rejected for being non-responsive.

Depending on the specific project requirements, **the following is a GENERIC list** of all possible bid forms that may be due with bid submittals and times when they may be due. Please check for specific project requirements on the proposal form (Section 004113). ***Not all of the following bid forms may be required to be submitted.***

### **Bid Submittal – due before stated date and time of bid opening (see IFB):**

004113	Bid Form (all pages are always required)
004322	Unit Prices Form
004336	Proposed Subcontractors Form
004337	MBE/WBE/SDVE Compliance Evaluation Form
004338	MBE/WBE/SDVE Eligibility Determination for Joint Ventures
004339	MBE/WBE/SDVE GFE Determination
004340	SDVE Business Form
004541	Affidavit of Work Authorization
004545	Anti-Discrimination Against Israel Act Certification form

- B. All bids shall be submitted without additional terms and conditions, modification or reservation on the bid forms with each space properly filled. Bids not on these forms will be rejected.
- C. All bids shall be accompanied by a bid bond executed by the bidder and a duly authorized surety company, certified check, cashier's check or bank draft made payable to the Division of Facilities Management, Design and Construction, State of Missouri, in the amount indicated on the bid form, Section 004113. Failure of the contractor to submit the full amount required shall be sufficient cause to reject his bid. The bidder agrees that the proceeds of the check, draft or bond shall become the property of the State of Missouri, if for any reason the bidder withdraws his bid after closing, or if on notification of award refuses or is unable to execute tendered contract, provide an acceptable performance and payment bond, provide evidence of required insurance coverage and/or provide required copies of affirmative action plans within ten (10) working days after such tender.
- D. The check or draft submitted by the successful bidder will be returned after the receipt of an acceptable performance and payment bond and execution of the formal contract. Checks or drafts of all other bidders will be returned within a reasonable time after it is determined that the bid represented by same will receive no further consideration by the State of Missouri. Bid bonds will only be returned upon request.

## **6.0 - SIGNING OF BIDS**

- A. A bid from an individual shall be signed as noted on the Bid Form.
- B. A bid from a partnership or joint venture shall require only one signature of a partner, an officer of the joint venture authorized to bind the venture or an attorney-in-fact. If the bid is signed by an officer of a joint venture or an attorney-in-fact, a document evidencing the individual's authority to execute contracts should be included with the bid form.
- C. A bid from a limited liability company (LLC) shall be signed by a manager or a managing member of the LLC.
- D. A bid from a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation manually written. Title of office held by the person signing for the corporation shall appear, along with typed name of said individual. Corporate license number shall be provided and, if a corporation organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached. In addition, for corporate proposals, the President or Vice-President should sign as the bidder. If the signator is other than the corporate president or vice president, the bidder must provide satisfactory evidence that the signator has the legal authority to bind the corporation.

- E. A bid should contain the full and correct legal name of the Bidder. If the Bidder is an entity registered with the Missouri Secretary of State, the Bidder's name on the bid form should appear as shown in the Secretary of State's records.
- F. The Bidder should include its corporate license number on the Bid Form and, if the corporation is organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached to the bid form.

#### **7.0 - RECEIVING BID SUBMITTALS**

- A. It is the bidder's sole responsibility to assure receipt by Owner of bid submittals by the date and time specified in the Invitation for Bid. Bids received after the date and time specified shall not be considered by the Owner.
- B. Bids must be submitted through the MissouriBUYS statewide eProcurement system (<https://www.missouribuys.mo.gov/>) in accordance with the instructions for that system. The Owner shall only accept bids submitted through MissouriBUYS. Bids received by the Owner through any other means, including hard copies, shall not be considered and will be discarded by the Owner unopened.
- C. To respond to an Invitation for Bid, the Bidder must first register with MissouriBUYS by going through the MissouriBUYS Home Page (<https://www.missouribuys.mo.gov/>), clicking the "Register" button at the top of the page, and completing the Vendor Registration. Once registered, the Bidder accesses its account by clicking the "Login" button at the top of the MissouriBUYS Home Page. Enter your USERID and PASSWORD, which the Bidder will select. Under Solicitations, select "View Current Solicitations." A new screen will open. Under "Filter by Agency" select "OA-FMDC-Contracts Chapter 8." Under "Filter by Opp. No." type in the State Project Number. Select "Submit." Above the dark blue bar, select "Other Active Opportunities." To see the Solicitation Summary, single click the Opp. No. (Project Number) and the summary will open. Single quick click each blue bar to open detailed information. The Bidder must read and accept the Original Solicitation Documents and complete all identified requirements. The Bidder should download and save all of the Original Solicitation Documents on its computer so that the Bidder can prepare its response to these documents. The Bidder should upload its completed response to the downloaded documents as an attachment to the electronic solicitation response.
- D. Step-by-step instructions for how a registered vendor responds to a solicitation electronically are provided in Section 001116 – Invitation For Bid.
- E. The Bidder shall submit its bid on the forms provided by the Owner on MissouriBUYS with each space fully and properly completed, including all amounts required for alternate bids, unit prices, cost accounting data, etc. The Owner may reject bids that are not on the Owner's forms or that do not contain all requested information.
- F. No Contractor shall stipulate in his bid any conditions not contained in the specifications or standard bid form contained in the contract documents. To do so may subject the Contractor's bid to rejection.
- G. The completed forms shall be without interlineations, alterations or erasures.

#### **8.0 - MODIFICATION AND WITHDRAWAL OF BIDS**

- A. Bidder may withdraw his bid at any time prior to scheduled closing time for receipt of bids, but no bidder may withdraw his bid for a period of twenty (20) working days after the scheduled closing time for receipt of bids.
- B. The Bidder shall modify his or her original bid by submitting a revised bid on MissouriBUYS.

#### **9.0 - AWARD OF CONTRACT**

- A. The Owner reserves the right to reject any and/or all bids and further to waive all informalities in bidding when deemed in the best interest of the State of Missouri.
- B. The Owner reserves the right to let other contracts in connection with the work, including but not by way of limitation, contracts for the furnishing and installation of furniture, equipment, machines, appliances and other apparatus.

- C. The Owner shall award a contract to the lowest, responsive, responsible Bidder in accordance with Section 8.250, RSMo. No contract will be awarded to any Bidder who has had a contract with the Owner terminated within the preceding twelve months for material breach of contract or who has been suspended or debarred by the Owner.
- D. Award of alternates, if any, will be made in numerical order unless all bids received are such that the order of acceptance of alternates does not affect the determination of the lowest, responsive, responsible bidder.
- E. No bid shall be considered binding upon the Owner until the written contract has been properly executed, a satisfactory bond has been furnished, evidence of required insurance coverage, submittal of executed Section 004541, Affidavit of Work Authorization form, documentation evidencing enrollment and participation in a federal work authorization program has been received and an affirmative action plan submitted. Failure to execute and return the contract and associated documents within the prescribed period of time shall be treated, at the option of the Owner, as a breach of bidder's obligation and the Owner shall be under no further obligation to bidder.
- F. If the successful bidder is doing business in the State of Missouri under a fictitious name, he shall furnish to Owner, attached to the Bid Form, a properly certified copy of the certificate of Registration of Fictitious Name from the State of Missouri, and such certificate shall remain on file with the Owner.
- G. Any successful bidder which is a corporation organized in a state other than Missouri shall furnish to the Owner, attached to the Bid Form, a properly certified copy of its current Certificate of Authority to do business in the State of Missouri, such certificate to remain on file with the Owner. No contract will be awarded by the Owner unless such certificate is furnished by the bidder.
- H. Any successful bidder which is a corporation organized in the State of Missouri shall furnish at its own cost to the Owner, if requested, a Certificate of Good Standing issued by the Secretary of State, such certificate to remain on file with the Owner.
- I. Transient employers subject to Sections 285.230 and 285.234, RSMo, (out-of-state employers who temporarily transact any business in the State of Missouri) may be required to file a bond with the Missouri Department of Revenue. No contract will be awarded by the Owner unless the successful bidder certifies that he has complied with all applicable provisions of Section 285.230-234.
- J. Sections 285.525 and 285.530, RSMo, require business entities to enroll and participate in a federal work authorization program in order to be eligible to receive award of any state contract in excess of \$5,000. Bidders should submit with their bid an Affidavit of Work Authorization (Section 004541) along with appropriate documentation evidencing such enrollment and participation. Section-004541, Affidavit of Work Authorization is located on the MissouriBUYS solicitation for this project. Bidders must also submit an E-Verify Memorandum before the Owner may award a contract to the Bidder. Information regarding an E-Verify is located at <https://www.uscis.gov/e-verify/>. The contractor shall be responsible for ensuring that all subcontractors and suppliers associated with this contract enroll in E-Verify.

#### **10.0 - CONTRACT SECURITY**

- A. The successful bidder shall furnish a performance/payment bond as set forth in General Conditions Article 6.1 on a condition prior to the State executing the contract and issuing a notice to proceed.

#### **11.0 - LIST OF SUBCONTRACTORS**

- A. If required by "Section 004113 – Bid Form," each bidder must submit as part of their bid a list of subcontractors to be used in performing the work (Section 004336). The list must specify the name of the single designated subcontractor, for each category of work listed in "Section 004336 - Proposed Subcontractors Form." If work within a category will be performed by more than one subcontractor, the bidder must provide the name of each subcontractor and specify the exact portion of the work to be done by each. Failure to list the Bidder's firm, or a subcontractor for each category of work identified on the Bid Form or the listing of more than one subcontractor for any category without designating the portion of work to be performed by each shall be cause for rejection of the bid. If the bidder intends to perform any of the designated subcontract work with the use of his own employees, the bidder shall make that fact clear, by listing his own firm for the subject category. **If any category of work is left vacant, the bid shall be rejected.**

## **12.0 - WORKING DAYS**

- A. Contract duration time is stated in working days and will use the following definition in determining the actual calendar date for contract completion:
  - 1. Working days are defined as all calendar days except Saturdays, Sundays and the following State of Missouri observed holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday, Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day.

## **13.0 - AMERICAN AND MISSOURI - MADE PRODUCTS AND FIRMS**

- A. By signing the bid form and submitting a bid on this project, the Bidder certifies that it will use American and Missouri products as set forth in Article 1.7 of the General Conditions. Bidders are advised to review those requirements carefully prior to bidding.
- B. A preference shall be given to Missouri firms, corporations or individuals, or firms, corporations or individuals that maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less.
- C. Pursuant to Section 34.076, RSMo, a contractor or Bidder domiciled outside the boundaries of the State of Missouri shall be required, in order to be successful, to submit a bid the same percent less than the lowest bid submitted by a responsible contractor or Bidder domiciled in Missouri as would be required for such a Missouri domiciled contractor or Bidder to succeed over the bidding contractor or Bidder domiciled outside Missouri on a like contract or bid being let in the person's domiciliary state and, further, the contractor or Bidder domiciled outside the boundaries of Missouri shall be required to submit an audited financial statement as would be required of a Missouri domiciled contractor or Bidder on a like contract or bid being let in the domiciliary state of that contractor or Bidder.

## **14.0 – ANTI-DISCRIMINATION AGAINST ISRAEL ACT CERTIFICATION:**

- A. Pursuant to section 34.600, RSMo, if the Bidder meets the section 34.600, RSMo, definition of a “company” and the Bidder has ten or more employees, the Bidder must certify in writing that the Bidder is not currently engaged in a boycott of goods or services from the State of Israel as defined in section 34.600, RSMo, and shall not engage in a boycott of goods or services from the State of Israel, if awarded a contract, for the duration of the contract. The Bidder is requested to complete and submit the applicable portion of Section 004545 - Anti-Discrimination Against Israel Act Certification with their Bid Form. The applicable portion of the exhibit must be submitted prior to execution of a contract by the Owner and issuance of Notice to Proceed. If the exhibit is not submitted, the Owner shall rescind its Intent to Award and move to the next lowest, responsive, responsible bidder.

## **15.0 - MBE/WBE/SDVE INSTRUCTIONS**

- A. Definitions:
  - 1. “**MBE**” means a Minority Business Enterprise.
  - 2. “**MINORITY**” has the same meaning as set forth in 1 C.S.R. 10-17.010.
  - 3. “**MINORITY BUSINESS ENTERPRISE**” has the same meaning as set forth in section 37.020, RSMo.
  - 4. “**WBE**” means a Women’s Business Enterprise.
  - 5. “**WOMEN’S BUSINESS ENTERPRISE**” has the same meaning as set forth in section 37.020, RSMo.
  - 6. “**SDVE**” means a Service-Disabled Veterans Enterprise.
  - 7. “**SERVICE-DISABLED VETERAN**” has the same meaning as set forth in section 34.074, RSMo.
  - 8. “**SERVICE-DISABLED VETERAN ENTERPRISE**” has the same meaning as “Service-Disabled Veteran Business” set forth in section 34.074, RSMo.

B. MBE/WBE/SDVE General Requirements:

1. For all bids greater than \$100,000, the Bidder shall obtain MBE, WBE and SDVE participation in an amount equal to or greater than the percentage goals set forth in the Invitation for Bid and the Bid Form, unless the Bidder is granted a Good Faith Effort waiver by the Director of the Division, as set forth below. If the Bidder does not meet the MBE, WBE and SDVE goals, or make a good faith effort to do so, the Bidder shall be non-responsive, and its bid shall be rejected.
2. The Bidder should submit with its bid all of the information requested in the MBE/WBE/SDVE Compliance Evaluation Form for every MBE, WBE, or SDVE subcontractor or material supplier the Bidder intends to use for the contract work. The Bidder is required to submit all appropriate MBE/WBE/SDVE documentation before the stated time and date set forth in the Invitation for Bid. If the Bidder fails to provide such information by the specified date and time, the Owner shall reject the bid.
3. The Director reserves the right to request additional information from a Bidder to clarify the Bidder's proposed MBE, WBE, and/or SDVE participation. The Bidder shall submit the clarifying information requested by the Owner within two (2) Working Days of receiving the request for clarification.
4. Pursuant to section 34.074, RSMo, a Bidder that is a SDVE doing business as Missouri firm, corporation, or individual, or that maintains a Missouri office or place of business, shall receive a three-point bonus preference in the contract award evaluation process. The bonus preference will be calculated and applied by reducing the bid amount of the eligible SDVE by three percent of the apparent low responsive bidder's bid. Based on this calculation, if the eligible SDVE's evaluation is less than the apparent low responsive bidder's bid, the eligible SDVE's bid becomes the apparent low responsive bid. This reduction is for evaluation purposes only, and will have no impact on the actual amount(s) of the bid or the amount(s) of any contract awarded. In order to be eligible for the SDVE preference, the Bidder must complete and submit with its bid the Missouri Service Disabled Veteran Business Form, and any information required by the form. The form is available on the MissouriBUYS solicitation for this project.

C. Computation of MBE/WBE/SDVE Goal Participation:

1. A Bidder who is a MBE, WBE, or SDVE may count 100% of the contract towards the MBE, WBE or SDVE goal, less any amounts awarded to another MBE, WBE or SDVE. (NOTE: A MBE firm that bids as general contractor must obtain WBE and SDVE participation; a WBE firm that bids as a general contractor must obtain MBE and SDVE participation; and a SDVE firm that bids as general contractor must obtain MBE and WBE participation.) In order for the remaining contract amount to be counted towards the MBE, WBE or SDVE goal, the Bidder must complete the MBE/WBE/SDVE Compliance Evaluation Form (Section 004337) identifying itself as an MBE, WBE or SDVE.
2. The total dollar value of the work granted to a certified MBE, WBE or SDVE by the Bidder shall be counted towards the applicable goal.
3. Expenditures for materials and supplies obtained from a certified MBE, WBE, or SDVE supplier or manufacturer may be counted towards the MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE assumes the actual and contractual responsibility for the provision of the materials and supplies.
4. The total dollar value of the work granted to a second or subsequent tier subcontractor or a supplier may be counted towards a Bidder's MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE properly assumes the actual and contractual responsibility for the work.
5. The total dollar value of work granted to a certified joint venture equal to the percentage of the ownership and control of the MBE, WBE, or SDVE partner in the joint venture may be counted towards the MBE/WBE/SDVE goals.
6. Only expenditures to a MBE, WBE, or SDVE that performs a commercially useful function in the work may be counted towards the MBE, WBE and SDVE goals. A MBE, WBE, or SDVE performs a commercially useful function when it is responsible for executing a distinct element of the work and carrying out its responsibilities by actually performing, managing and supervising the work or providing supplies or manufactured materials.

D. Certification of MBE/WBE/SDVE Subcontractors:

1. In order to be counted towards the goals, an MBE or WBE must be certified by the State of Missouri Office of Equal Opportunity and an SDVE must be certified by the State of Missouri, Office of Administration, Division of Purchasing and Material Management or by the Department of Veterans Affairs.
2. The Bidder may determine the certification status of a proposed MBE or WBE subcontractor or supplier by referring to the Office of Equal Opportunity (OEO)'s online MBE/WBE directory (<https://apps1.mo.gov/MWBCertifiedFirms/>). The Bidder may determine the eligibility of a SDVE subcontractor or supplier by referring to the Division of Purchasing and Materials Management's online SDVE directory (<https://oa.mo.gov/sites/default/files/sdvelisting.pdf>) or the Department of Veterans Affairs' directory (<https://vetbiz.va.gov/basic-search/>).
3. Additional information, clarifications, etc., regarding the listings in the directories may be obtained by calling the Division at (573)751-3339 and asking to speak to the Contract Specialist of record as shown in the Supplementary Conditions (Section 007300).

E. Waiver of MBE/WBE/SDVE Participation:

1. If a Bidder has made a good faith effort to secure the required MBE, WBE and/or SDVE participation and has failed, the Bidder shall submit with its bid the information requested in MBE/WBE/SDVE Good Faith Effort (GFE) Determination form. The GFE forms are located on the MissouriBUYS solicitation for this project. The Director will determine if the Bidder made a good faith effort to meet the applicable goals. If the Director determines that the Bidder did not make a good faith effort, the bid shall be rejected as being nonresponsive to the bid requirements. Bidders who demonstrate that they have made a good faith effort to include MBE, WBE, and/or SDVE participation will be determined to be responsive to the applicable participation goals, regardless of the percent of actual participation obtained, if the bid is otherwise acceptable.
2. In determining whether a Bidder has made a good faith effort to obtain MBE, WBE and/or SDVE participation, the Director may evaluate the factors set forth in 1 CSR 30-5.010(6)(C) and the following:
  - a. The amount of actual participation obtained;
  - b. How and when the Bidder contacted potential MBE, WBE, and SDVE subcontractors and suppliers;
  - c. The documentation provided by the Bidder to support its contacts, including whether the Bidder provided the names, addresses, phone numbers, and dates of contact for MBE/WBE/SDVE firms contacted for specific categories of work;
  - d. If project information, including plans and specifications, were provided to MBE/WBE/SDVE subcontractors;
  - e. Whether the Bidder made any attempts to follow-up with MBE, WBE or SDVE firms prior to bid;
  - f. Amount of bids received from any of the subcontractors and/or suppliers that the Bidder contacted;
  - g. The Bidder's stated reasons for rejecting any bids;
3. If no bidder has obtained any participation in a particular category (MBE/WBE/SDVE) or made a good faith effort to do so, the Director may waive that goal rather than rebid.

F. Contractor MBE/WBE/SDVE Obligations

1. If awarded a contract, the Bidder will be contractually required to subcontract with or obtain materials from the MBE, WBE, and SDVE firms listed in its bid, in amounts equal to or greater than the dollar amount bid, unless the amount is modified in writing by the Owner.
2. If the Contractor fails to meet or maintain the participation requirements contained in the Contractor's bid, the Contractor must satisfactorily explain to the Director why it cannot comply with the requirement and why failing meeting the requirement was beyond the Contractor's control. If the Director finds the Contractor's explanation unsatisfactory, the Director may take any appropriate action including, but not limited to:
  - a. Declaring the Contractor ineligible to participate in any contracts with the Division for up to twelve (12) months (suspension); and/or
  - b. Declaring the Contractor be non-responsive to the Invitation for Bid, or in breach of contract and rejecting the bid or terminating the contract.
3. If the Contractor replaces an MBE, WBE, or SDVE during the course of this contract, the Contractor shall replace it with another MBE, WBE, or SDVE or make a good faith effort to do so. All MBE, WBE and SDVE substitutions must be approved by the Director.
4. The Contractor shall provide the Owner with regular reports on its progress in meeting its MBE/WBE/SDVE obligations. At a minimum, the Contractor shall report the dollar-value of work completed by each MBE, WBE, or SDVE during the preceding month and the cumulative total of work completed by each MBE, WBE or SDVE to date with each monthly application for payment. The Contractor shall also make a final report, which shall include the total dollar-value of work completed by each MBE, WBE, and SDVE during the entire contract.

**STATE OF MISSOURI  
DIVISION OF FACILITIES MANAGEMENT,  
DESIGN AND CONSTRUCTION  
*MBE/WBE/SDVE DIRECTORIES***

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The MBE/WBE Directory for goods and services is maintained by the Office of Equal Opportunity (OEO) and is located at the following web address:

<https://apps1.mo.gov/MWBCertifiedFirms/>

The SERVICE DISABLED VETERAN ENTERPRISE (SDVE) Directories may be accessed at the following web addresses:

<https://o eo.mo.gov/sdve-certification-program/>

<https://veterans.certify.sba.gov/#search>





# State of Missouri Construction Contract

THIS AGREEMENT is made (DATE) by and between:

## *Contractor Name and Address*

hereinafter called the "Contractor,"

and the **State of Missouri**, hereinafter called the "**Owner**", represented by the Office of Administration, Division of Facilities Management, Design and Construction, on behalf of the Department of Public Safety, Veterans Commission.

WITNESSETH, that the Contractor and the Owner, for the consideration stated herein agree as follows:

## **ARTICLE 1. STATEMENT OF WORK**

The Contractor shall furnish all labor and materials and perform all work required for furnishing and installing all labor, materials, equipment and transportation and everything necessarily inferred from the general nature and tendency of the plans and specifications for the proper execution of the work for:

**Project Name:**                    **Improvements to Water and Wastewater Systems Infrastructure  
St. James Veterans Home  
St. James, Missouri**

**Project Number:**            **U2309-01**

in strict accordance with the Contract Documents as enumerated in Article 7, all of which are made a part hereof.

## **ARTICLE 2. TIME OF COMPLETION**

The contract performance time is **200 working days** from the transmittal date of this agreement. The contract completion date is **MONTH, DAY, YEAR**. This time includes ten (10) working days for the Contractor to receive, sign and return the contract form along with required bonding and insurance certificates. Failure of the Contractor to provide correct bonding and insurance within the ten (10) working days shall not be grounds for a time extension. Receipt of proper bonding and insurance is a condition precedent to the formation of the contract and if not timely received, may result in forfeiture of the Contractor's bid security. Work may not commence until the Owner issues a written Notice to Proceed and must commence within seven (7) working days thereafter.

## **ARTICLE 3. LIQUIDATED DAMAGES**

Whenever time is mentioned in this contract, time shall be and is of the essence of this contract. The Owner would suffer a loss should the Contractor fail to have the work embraced in this contract fully completed on or before the time above specified. THEREFORE, the parties hereto realize in order to adjust satisfactorily the damages on account of such failure that it might be impossible to compute accurately or estimate the amount of such loss or damages which the Owner would sustain by reason of failure to complete fully said work within the time required by this contract. The Contractor hereby covenants and agrees to pay the Owner, as and for **liquidated damages, the sum of \$1,000** per day for each and every day, Sunday and legal holidays excepted, during which the work remains incomplete and unfinished. Any sum which may be due the Owner for such damages shall be deducted and retained by the Owner from any balance which may be due the Contractor when said work shall have been finished and accepted. But such provisions shall not release the Bond of the Contractor from liability according to its terms. In case of failure to complete, the Owner will be under no obligation to show or prove any actual or specific loss or damage.

**ARTICLE 4. CONTRACT SUM**

The Owner shall pay the Contractor for the prompt, faithful and efficient performance of the conditions and undertakings of this contract, subject to additions, and deductions as provided herein, in current funds the sum of:

Base Bid: \$  
**TOTAL CONTRACT AMOUNT: (\$CONTRACT AMOUNT)**

**ARTICLE 5. PREVAILING WAGE RATE**

**MISSOURI PREVAILING WAGE LAW (Sections 290.210 to 290.340, RSMo):** The Contractor shall pay not less than the specified hourly rate of wages, as set out in the wage order attached to and made part of the specifications for work under this contract, to all workers performing work under the contract, in accordance with sections 290.210 to 290.340, RSMo. The Contractor shall forfeit a penalty to the Owner of one hundred dollars per day (or portion of a day) for each worker that is paid less than the specified rates for any work done under the contract by the Contractor or by any subcontractor, in accordance with section 290.250, RSMo.

**DAVIS-BACON ACT:** The requirements of the Davis-Bacon Act are not applicable to this project, which is funded solely by Coronavirus State and Local Fiscal Recover Funds (SLFRF) under the American Rescue Plan Act (ARPA).

**ARTICLE 6. MINORITY/WOMEN/SERVICE DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION**

The Contractor has been granted a waiver of the 10% MBE and 10% WBE and 3% SDVE participation goals. The Contractor agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows: (OR)

The Contractor has met the MBE/WBE/SDVE participation goals and agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows:

MBE/WBE/SDVE Firm: Subcontract Amt:\$  
MBE/WBE/SDVE Firm: Subcontract Amt:\$  
MBE/WBE/SDVE Firm: Subcontract Amt:\$  
Total \$

MBE/WBE/SDVE assignments identified above shall not be changed without a contract change signed by the Owner.

The Director of the Division of Facilities Management, Design and Construction or his Designee shall be the final authority to resolve disputes and disagreements between the Contractor and the MBE/WBE/SDVE firms listed above when such disputes impact the subcontract amounts shown above.

**ARTICLE 7. CONTRACT DOCUMENTS**

The following documents are hereby incorporated into this contract by reference (all division/section numbers and titles are as utilized in the Project Manual published by the Owner for this Project):

- 1. Division 0 – Procurement and Contracting Information, including, but not limited to:
  - a. Invitation for Bid (Section 001116)
  - b. Instructions to Bidders (Section 002113)
  - c. Supplementary Instructions to Bidders (if applicable) (Section 002213)
  - d. The following documents as completed and executed by the Contractor and accepted by the Owner, if applicable:
    - i. Bid Form (Section 004113)
    - ii. Unit Prices (Section 004322)
    - iii. Proposed Contractors Form (Section 004336)
    - iv. MBE, WBE, SDVE Compliance Evaluation Form(s) (Section 004337)
    - v. MBE, WBE, SDVE Eligibility Determination Form for Joint Ventures (Section 004338)
    - vi. MBE, WBE, SDVE Good Faith Effort (GFE) Determination Form (Section 004339)
    - vii. Missouri Service Disabled Veteran Business Form (Section 004340)

- viii. Affidavit of Work Authorization (Section 004541)
    - ix. Affidavit for Affirmative Action (Section 005414)
  - e. Performance and Payment Bond, completed and executed by the Contractor and surety (Section 006113)
  - f. General Conditions (Section 007213)
  - g. Supplementary Conditions (Section 007300)
  - h. Supplementary General Conditions for Federally Funded/Assisted Construction Projects (Section 007333)
  - i. Wage Rate(s) (Section 007346)
2. Division 1 – General Requirements
  3. All Drawings identified in the Project Manual
  4. All Technical Specifications included in the Project Manual
  5. Addenda, if applicable

**ARTICLE 8 – CERTIFICATION**

By signing this contract, the Contractor hereby re-certifies compliance with all legal requirements set forth in Section 6.0, Bidder’s Certifications of the Bid Form.

Further, if the Contractor provides any “personal information” as defined in §105.1500, RSMo concerning an entity exempt from federal income tax under Section 501(c) of the Internal Revenue Code of 1986, as amended, the Contractor understands and agrees that it is voluntarily choosing to enter into a state contract and providing such information for that purpose. The state will treat such personal information in accord with §105.1500, RSMo.

By signature below, the parties hereby execute this contract document.

**APPROVED:**

\_\_\_\_\_  
 Brian Yansen, Director  
 Division of Facilities Management,  
 Design and Construction

\_\_\_\_\_  
 Contractor’s Authorized Signature

I, Corporate Secretary, certify that I am Secretary of the corporation named above and that (CONTRACTOR NAME), who signed said contract on behalf of the corporation, was then (TITLE) of said corporation and that said contract was duly signed for and in behalf of the corporation by authority of its governing body, and is within the scope of its corporate powers.

\_\_\_\_\_  
*Corporate Secretary*



STATE OF MISSOURI  
 OFFICE OF ADMINISTRATION  
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**AFFIDAVIT FOR AFFIRMATIVE ACTION**

PROJECT NUMBER
----------------

NAME
------

First being duly sworn on oath states: that

he/she is the  sole proprietor  partner  officer or  manager or managing member of

NAME
------

a  sole proprietorship  partnership  
 limited liability company (LLC)

or  corporation, and as such, said proprietor, partner, or officer is duly authorized to make this

affidavit on behalf of said sole proprietorship, partnership, or corporation; that under the contract known as

PROJECT TITLE
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Less than 50 persons in the aggregate will be employed and therefore, the applicable Affirmative Action requirements as set forth in Article 1.4 of the General Conditions of the State of Missouri have been met.

PRINT NAME & SIGNATURE
------------------------

DATE
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**NOTARY INFORMATION**

NOTARY PUBLIC EMBOSSER SEAL
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STATE OF
----------

COUNTY (OR CITY OF ST. LOUIS)
-------------------------------

USE RUBBER STAMP IN CLEAR AREA BELOW
--------------------------------------

SUBSCRIBED AND SWORN BEFORE ME, THIS
--------------------------------------

DAY OF
--------

YEAR
------

NOTARY PUBLIC SIGNATURE
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MY COMMISSION EXPIRES
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NOTARY PUBLIC NAME (TYPED OR PRINTED)
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**SECTION 006113 - PERFORMANCE AND PAYMENT BOND FORM**

KNOW ALL MEN BY THESE PRESENTS, THAT we \_\_\_\_\_

as principal, and \_\_\_\_\_

\_\_\_\_\_ as Surety, are held and firmly bound unto the

STATE OF MISSOURI. in the sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ )

for payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal has, by means of a written agreement dated the \_\_\_\_\_

day of \_\_\_\_\_, 20\_\_\_\_\_, enter into a contract with the State of Missouri for

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Insert Project Title and Number)

NOW, THEREFORE, if the Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the State of Missouri, with or without notice to the Surety and during the life of any guaranty required under the contract; and shall also faithfully perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made with or without notice to the Surety; and shall also promptly make payment for materials incorporated, consumed or used in connection with the work set forth in the contract referred to above, and all insurance premiums, both compensation and all other kinds of insurance, on said work, and for all labor performed on such work, whether by subcontractor or otherwise, at not less than the prevailing hourly rate of wages for work of a similar character (exclusive of maintenance work) in the locality in which the work is performed and not less than the prevailing hourly rate of wages for legal holiday and overtime work (exclusive of maintenance work) in the locality in which the work is performed both as determined by the Department of Labor and Industrial Relations or determined by the Court of Appeal, as provided for in said contract and in any and all duly authorized modifications of said contract that may be hereafter made, with or without notice to the Surety, then, this obligation shall be void and of no effect, but it is expressly understood that if the Principal should make default in or should fail to strictly, faithfully and efficiently do, perform and comply with any or more of the covenants, agreements, stipulations, conditions, requirements or undertakings, as specified in or by the terms of said contract, and with the time therein named, then this obligation shall be valid and binding upon each of the parties hereto and this bond shall remain in full force and effect; and the same may be sued on at the instance of any material man, laborer, mechanic, subcontractor, individual, or otherwise to whom such payment is due, in the name of the State of Missouri, to the use of any such person.

AND, IT IS FURTHER specifically provided that any modifications which may hereinafter be made in the terms of the contract or in the work to be done under it or the giving by the Owner of any extension of the time for the performance of the contract or any other forbearance on the part of either the Owner or the Principal to the other, shall not in any way release the Principal and the Surety, or either or any of them, their heirs, executors, administrators and successors, from their liability hereunder, notice to the Surety of any such extension, modifications or forbearance being hereby waived.

IN WITNESS WHEREOF, the above bounden parties have executed the within instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

**AS APPLICABLE:**

**AN INDIVIDUAL**

Name: \_\_\_\_\_  
Signature: \_\_\_\_\_

**A PARTNERSHIP**

Name of Partner: \_\_\_\_\_  
Signature of Partner: \_\_\_\_\_

Name of Partner: \_\_\_\_\_  
Signature of Partner: \_\_\_\_\_

**CORPORATION**

Firm Name: \_\_\_\_\_  
Signature of President: \_\_\_\_\_

**SURETY**

Surety Name: \_\_\_\_\_  
Attorney-in-Fact: \_\_\_\_\_  
Address of Attorney-in-Fact: \_\_\_\_\_  
Telephone Number of Attorney-in-Fact: \_\_\_\_\_  
Signature Attorney-in-Fact: \_\_\_\_\_

**NOTE:** Surety shall attach Power of Attorney



STATE OF MISSOURI  
 OFFICE OF ADMINISTRATION  
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**PRODUCT SUBSTITUTION REQUEST**

PROJECT NUMBER

PROJECT TITLE AND LOCATION

CHECK APPROPRIATE BOX

**SUBSTITUTION PRIOR TO BID OPENING**  
 (Minimum of (5) working days prior to receipt of Bids as per Article 4 – Instructions to Bidders)

**SUBSTITUTION FOLLOWING AWARD**  
 (Maximum of (20) working days from Notice to Proceed as per Article 3 – General Conditions)

FROM: BIDDER/CONTRACTOR (PRINT COMPANY NAME)

TO: ARCHITECT/ENGINEER (PRINT COMPANY NAME)

Bidder/Contractor hereby requests acceptance of the following product or systems as a substitution in accordance with provisions of Division One of the Bidding Documents:

SPECIFIED PRODUCT OR SYSTEM

SPECIFICATION SECTION NO.

SUPPORTING DATA

Product data for proposed substitution is attached (include description of product, standards, performance, and test data)

Sample                       Sample will be sent, if requested

**QUALITY COMPARISON**

	SPECIFIED PRODUCT	SUBSTITUTION REQUEST
NAME, BRAND		
CATALOG NO.		
MANUFACTURER		
VENDOR		

**PREVIOUS INSTALLATIONS**

PROJECT	ARCHITECT/ENGINEER	DATE INSTALLED
LOCATION		

**SIGNIFICANT VARIATIONS FROM SPECIFIED PRODUCT**

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**REASON FOR SUBSTITUTION**

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**DOES PROPOSED SUBSTITUTION AFFECT OTHER PARTS OF WORK?**

YES     NO

IF YES, EXPLAIN

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**SUBSTITUTION REQUIRES DIMENSIONAL REVISION OR REDESIGN OF STRUCTURE OR A/E WORK**

YES     NO

**BIDDER'S/CONTRACTOR'S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:**

We have investigated the proposed substitution. We believe that it is equal or superior in all respects to specified product, except as stated above; that it will provide the same Warranty as specified product; that we have included complete implications of the substitution; that we will pay redesign and other costs caused by the substitution which subsequently become apparent; and that we will pay costs to modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning as a result of the substitution.

BIDDER/CONTRACTOR

DATE

**REVIEW AND ACTION**

Resubmit Substitution Request with the following additional information:

---

Substitution is accepted.

Substitution is accepted with the following comments:

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Substitution is not accepted.

ARCHITECT/ENGINEER

DATE





PROJECT NUMBER
----------------

KNOW ALL MEN BY THESE PRESENT THAT:                    hereinafter called "Subcontractor" who heretofore entered into an agreement with                    hereinafter called "Contractor", for the performance of work and/or furnishing of material for the construction of the project entitled

(PROJECT TITLE, PROJECT LOCATION, AND PROJECT NUMBER)

at  
 \_\_\_\_\_  
 (ADDRESS OF PROJECT)

for the State of Missouri (Owner) which said subcontract is by this reference incorporated herein, in consideration of such final payment by Contractor.

DOES HEREBY:

1. ACKNOWLEDGE that they have been **PAID IN FULL** all sums due for work and materials contracted or done by their Subcontractors, Material Vendors, Equipment and Fixture Suppliers, Agents and Employees, or otherwise in the performance of the Work called for by the aforesaid Contract and all modifications or extras or additions thereto, for the construction of said project or otherwise.
2. RELEASE and fully, finally, and forever discharge the Owner from any and all suits, actions, claims, and demands for payment for work performed or materials supplied by Subcontractor in accordance with the requirements of the above referenced Contract.
1. REPRESENT that all of their Employees, Subcontractors, Material Vendors, Equipment and Fixture Suppliers, and everyone else has been **paid in full** all sums due them, or any of them, in connection with performance of said Work, or anything done or omitted by them, or any of them in connection with the construction of said improvements, or otherwise.

DATED this            day of            , 20    .

NAME OF SUBCONTRACTOR

BY (TYPED OR PRINTED NAME)

SIGNATURE

TITLE

ORIGINAL: FILE/Closeout Documents



STATE OF MISSOURI  
 OFFICE OF ADMINISTRATION  
 DIVISION OF FACILITIES MANAGEMENT,  
 DESIGN AND CONSTRUCTION

**MBE/WBE/SDVE PROGRESS REPORT**

Remit with **ALL** Progress and Final Payments

(Please check appropriate box) CONSULTANT CONSTRUCTION

PAY APP NO.	PROJECT NUMBER
CHECK IF FINAL <input checked="" type="checkbox"/> <b>FINAL</b>	DATE

PROJECT TITLE

PROJECT LOCATION

FIRM

ORIGINAL CONTRACT SUM (Same as Line Item 1. on Form A of Application for Payment)  
 \$

TOTAL CONTRACT SUM TO DATE (Same as Line Item 3. on Form A of Application for Payment)  
 \$

THE TOTAL MBE/WBE/SDVE PARTICIPATION DOLLAR AMOUNT OF THIS PROJECT AS INDICATED IN THE ORIGINAL CONTRACT: \$

SELECT MBE, WBE, SDVE	ORIGINAL CONTRACT PARTICIPATION AMOUNT	PARTICIPATION AMOUNT PAID-TO-DATE (includes approved contract changes)	CONSULTANT/SUBCONSULTANT OR CONTRACTOR/SUBCONTRACTOR/SUPPLIER COMPANY NAME
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	

## **INSTRUCTIONS FOR MBE/WBE/SDVE PROGRESS REPORT**

### **CONTRACTOR OR CONSULTANT TO FILL OUT AND REMIT WITH EACH PAY APPLICATION:**

The MBE/WBE/SDVE Progress Report for the project is issued with the contract comprising values reported in the consultant's Proposal or on the successful contractor's Section 004337 Compliance Evaluation Forms.

At Initial Pay Application fill in the following:

1. Pay App No. Start with 1.
2. Fill in the Project Number and Date.
3. Enter Project Title, Project Location, and Firm.
4. Fill in the "Original Contract Sum" and "Total Contract Sum To Date" (Reference applicable Line Items on Form A of Application for Payment).
5. Indicate the Total Participation Dollar Amount from the Original Contract.
6. Select MBE, WBE, or SDVE for each Consultant/Subconsultant or Contractor/Subcontractor/Supplier.
7. Enter the "Total Amount of Subcontract", "\$ Amount (Paid-To-Date)", and Company Name.

For all subsequent Pay Applications fill in the following:

1. Pay App No.
2. If Final Pay App, check box.
3. Fill in the Project Number and Date.
4. Enter Project Title, Project Location, and Firm
5. At each Pay App fill in the "Original Contract Sum" and "Total Contract Sum To Date" (reference applicable Line Items on Form A of Application for Payment).
6. Indicate the Total Participation Dollar Amount from the Original Contract.
7. Select MBE, WBE, or SDVE for each Consultant/Subconsultant or Contractor/Subcontractor/Supplier
8. Enter the "Total Amount of Subcontract", "\$ Amount (Paid-To-Date)", and Company Name.



STATE OF MISSOURI  
 OFFICE OF ADMINISTRATION  
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**AFFIDAVIT – COMPLIANCE WITH PREVAILING WAGE LAW**

PROJECT NUMBER
----------------

Before me, the undersigned Notary Public, in and for the County of \_\_\_\_\_  
 State of \_\_\_\_\_ personally came and appeared \_\_\_\_\_  
 (NAME)  
 \_\_\_\_\_ of the \_\_\_\_\_  
 (POSITION) (NAME OF THE COMPANY)  
 (a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions and requirements set out in Chapter 290, Sections 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works project have been fully satisfied and there has been no exception to the full and completed compliance with said provisions and requirements and with Wage Determination No: \_\_\_\_\_ issued by the Department of Labor and Industrial Relations, State of Missouri on the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_ in carrying out the contract and working in connection with \_\_\_\_\_  
 (NAME OF PROJECT)  
 Located at \_\_\_\_\_ in \_\_\_\_\_ County  
 (NAME OF THE INSTITUTION)  
 Missouri, and completed on the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

SIGNATURE

**NOTARY INFORMATION**

NOTARY PUBLIC EMBOSSEER OR BLACK INK RUBBER STAMP SEAL	STATE	COUNTY (OR CITY OF ST. LOUIS)
	SUBSCRIBED AND SWORN BEFORE ME, THIS	
	DAY OF	YEAR
	NOTARY PUBLIC SIGNATURE	MY COMMISSION EXPIRES
NOTARY PUBLIC NAME (TYPED OR PRINTED)		<b>USE RUBBER STAMP IN CLEAR AREA BELOW</b>

FILE: Closeout Documents

# GENERAL CONDITIONS

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## SECTION 007213 - GENERAL CONDITIONS

- A. These General Conditions apply to each section of these specifications. The Contractor is subject to the provisions contained herein.
- B. The General Conditions are intended to define the relationship of the Owner, the Designer and the Contractor thereby establishing certain rules and provisions governing the operation and performance of the work so that the work may be performed in a safe, orderly, expeditious and workmanlike manner.

## ARTICLE 1 – GENERAL PROVISIONS

### ARTICLE 1.1 - DEFINITIONS

As used in these contract documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

1. **"COMMISSIONER"**: The Commissioner of the Office of Administration.
2. **"CONSTRUCTION DOCUMENTS"**: The "Construction Documents" shall consist of the Project Manual, Drawings and Addenda.
3. **"CONSTRUCTION REPRESENTATIVE"**: Whenever the term "Construction Representative" is used, it shall mean the Owner's Representative at the work site.
4. **"CONTRACTOR"**: Party or parties who have entered into a contract with the Owner to furnish work under these specifications and drawings.
5. **"DESIGNER"**: When the term "Designer" is used herein, it shall refer to the Architect, Engineer, or Consultant of Record specified and defined in Paragraph 2.0 of the Supplemental Conditions, or his duly authorized representative. The Designer may be either a consultant or state employee.
6. **"DIRECTOR"**: Whenever the term "Director" is used, it shall mean the Director of the Division of Facilities Management, Design and Construction or his Designee, representing the Office of Administration, State of Missouri. The Director is the agent of the Owner.
7. **"DIVISION"**: Shall mean the Division of Facilities Management, Design and Construction, State of Missouri.

8. **"INCIDENTAL JOB BURDENS"**: Shall mean those expenses relating to the cost of work, incurred either in the home office or on the job-site, which are necessary in the course of doing business but are incidental to the job. Such costs include office supplies and equipment, postage, courier services, telephone expenses including long distance, water and ice and other similar expenses.
9. **"JOINT VENTURE"**: An association of two (2) or more businesses to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge.
10. **"OWNER"**: Whenever the term "Owner" is used, it shall mean the State of Missouri, acting by and through the Office of Administration, Division of Facilities Management, Design and Construction.
11. **"PROJECT"**: Wherever the term "Project" is used, it shall mean the work required to be completed by the construction contract.
12. **"PROJECT MANUAL"**: The "Project Manual" shall consist of Introductory Information, Invitation for Bid, Instructions to Bidders, Bid Documents, Additional Information, Standard Forms, General Conditions, Supplemental General Conditions, General Requirements and Technical Specifications.
13. **"SUBCONTRACTOR"**: Party or parties who contract under, or for the performance of part or this entire Contract between the Owner and Contractor. The subcontract may or may not be direct with the Contractor.
14. **"WORK"**: All supervision, labor, materials, tool, supplies, equipment, and any incidental operations and/or activities required by or reasonably inferable from the Contract Documents necessary to construct the Project and to produce the results intended by the Contract Documents in a safe, expeditious, orderly, and workmanlike manner, and in the best manner known to each respective trade.
15. **"WORKING DAYS"**: are all calendar days except Saturdays, Sundays and the following holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday (observed), Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day (observed), Thanksgiving Day, Christmas Day.

## ARTICLE 1.2 DRAWINGS AND SPECIFICATIONS

- A. In case of discrepancy between drawings and specifications, specifications shall govern. Should discrepancies in architectural drawings, structural drawings and mechanical drawings occur, architectural drawings shall govern and, in case of conflict between structural and mechanical drawings, structural drawings shall govern.
- B. Specifications are separated into titled divisions for convenience of reference only and to facilitate letting of contracts and subcontracts. The Contractor is responsible for establishing the scope of work for subcontractors, which may cross titled divisions. Neither the Owner nor Designer will establish limits and jurisdiction of subcontracts.
- C. Figured dimensions take precedence over scaled measurements and details over smaller scale general drawings. In the event of conflict between any of the documents contained within the contract, the documents shall take precedence and be controlling in the following sequence: addenda, supplementary general conditions, general conditions, division 1 specifications, technical division specifications, drawings, bid form and instructions to bidders.
- D. Anything shown on drawings and not mentioned in these specifications or vice versa, as well as any incidental work which is obviously necessary to complete the project within the limits established by the drawings and specifications, although not shown on or described therein, shall be performed by the Contractor at no additional cost as a part of his contract.
- E. Upon encountering conditions differing materially from those indicated in the contract documents, the Contractor shall promptly notify the Designer and Construction Representative in writing before such conditions are disturbed. The Designer shall promptly investigate said conditions and report to the Owner, with a recommended course of action. If conditions do materially differ and cause an increase or decrease in contract cost or time required for completion of any portion of the work, a contract change will be initiated as outlined in Article 4 of these General Conditions.
- E. Only work included in the contract documents is authorized, and the Contractor shall do no work other than that described therein or in accordance with appropriately authorized and approved contract changes.

## ARTICLE 1.3 - COMPLIANCE WITH LAWS, PERMITS, REGULATIONS AND INSPECTIONS

- A. Since the Owner is the State of Missouri, municipal or political subdivisions, zoning ordinances, construction codes (other than licensing of trades), and other like ordinances are not applicable to construction on Owner's property, and Contractor will not be required to submit drawings and specifications to any municipal or political subdivision, authority, obtain construction permits or any other licenses (other than licensing of trades) or permits from or submit to inspections by any municipality or political subdivision relating to the construction for this project. All permits or licenses required by municipality or political subdivision for operation on property not belonging to Owner shall be obtained by and paid for by Contractor. Each Contractor shall comply with all applicable laws, ordinances, rules and regulations that pertain to the work of this contract.
- B. Contractors, subcontractors and their employees engaged in the businesses of electrical, mechanical, plumbing, carpentry, sprinkler system work, and other construction related trades shall be licensed to perform such work by the municipal or political subdivision where the project is located, if such licensure is required by local code. Local codes shall dictate the level (master, journeyman, and apprentice) and the number, type and ratio of licensed tradesmen required for this project within the jurisdiction of such municipal or political subdivision.
- C. Equipment and controls manufacturers and their authorized service and installation technicians that do not maintain an office within the jurisdiction of the municipal or political subdivision but are a listed or specified contractor or subcontractor on this project are exempt from Paragraph 1.3 B above.
- D. The Contractor shall post a copy of the wage determination issued for the project and included as a part of the contract documents, in a prominent and easily accessible location at the site of construction for the duration of the project.
- E. Any contractor or subcontractor to such contractor at any tier signing a contract to work on this project shall provide a ten-hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The contractor shall

forfeit as a penalty to the public body on whose behalf the contract is made or awarded, two thousand five hundred dollars plus one hundred dollars for each employee employed by the contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training.

#### **ARTICLE 1.4 - NONDISCRIMINATION IN EMPLOYMENT**

A. The Contractor and his subcontractors will not discriminate against individuals based on race, color, religion, national origin, sex, disability, or age, but may use restrictions which relate to bona fide occupational qualifications. Specifically, the Contractor and his subcontractors shall not discriminate:

1. Against recipients of service on the basis of race, color, religion, national origin, sex, disability or age.
2. Against any employee or applicant, for employment on the basis of race, color, religion, national origin, sex or otherwise qualified disability status.
3. Against any applicant for employment or employee on the basis of age, where such applicant or employee is between ages 40 and 70 and where such Contractor employs at least 20 persons.
4. Against any applicant for employment or employee on the basis of that person's status as a disabled or Vietnam-era veteran.

The Contractor and his Subcontractors will take affirmative action to insure applicants for employment and employees are treated equally without regard to race, color, religion, national origin, sex, disability, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion and transfer; recruitment or recruitment advertising; and selection for training, including apprenticeship. The Contractor and his Subcontractors will give written notice of their commitments under this clause to any labor union with which they have bargaining or other agreements.

B. The Contractor and his subcontractors shall develop, implement, maintain and submit in writing to the Owner an affirmative action program if at least fifty (50) persons in the aggregate are employed under this contract. If less than fifty (50) persons in the aggregate are to be employed under this contract, the Contractor shall submit, in lieu of the written affirmative action program, a properly executed Affidavit for Affirmative Action

in the form included in the contract specifications. For the purpose of this section, an "affirmative action program" means positive action to influence all employment practices (including, but not limited to, recruiting, hiring, promoting and training) in providing equal employment opportunity regardless of race, color, sex, national origin, religion, age (where the person affected is between age 40 and 70), disabled and Vietnam-era veteran status, and disability. Such "affirmative action program" shall include:

1. A written policy statement committing the total organization to affirmative action and assigning management responsibilities and procedures for evaluation and dissemination;
2. The identification of a person designated to handle affirmative action;
3. The establishment of non-discriminatory selection standards, objective measures to analyze recruitment, an upward mobility system, a wage and salary structure, and standards applicable to lay-off, recall, discharge, demotion and discipline;
4. The exclusion of discrimination from all collective bargaining agreements; and
5. Performance of an internal audit of the reporting system to monitor execution and to provide for future planning.

In the enforcement of this non-discrimination clause, the Owner may use any reasonable procedures available, including, but not limited to: requests, reports, site visits and inspection of relevant documents of contractors and subcontractors.

C. In the event of the Contractor's or his subcontractor's noncompliance with any provisions of this Article of the Contract, the Owner may cancel this contract in whole or in part or require the Contractor to terminate his contract with the subcontractor.

#### **ARTICLE 1.5 - ANTI-KICKBACK**

No employee of the division, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract or in any part hereof. No officer, employee, designer, attorney, or administrator of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract, any material supply contract, subcontract,



insurance contract, or any other contract pertaining to the project.

#### **ARTICLE 1.6 - PATENTS AND ROYALTIES**

- A. The Contractor shall hold and save the Owner and its officers, agents, servants and employees harmless from liabilities of any nature or kind, including cost and expenses, for, or on account of, any patented or unpatented invention, process, article or appliance manufactured or used in the performance of this contract, including its use by the Owner, unless otherwise specifically stipulated in the contract documents.
- B. If the Contractor uses any design, device or materials covered by letters, patent or copyright, the Contractor shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, without exception, that the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract and shall indemnify the Owner for any cost, expense or damage it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

#### **ARTICLE 1.7 - PREFERENCE FOR AMERICAN AND MISSOURI PRODUCTS AND SERVICES**

- A. By virtue of statutory authority a preference will be given to Missouri labor and to products of mines, forests and quarries of the state of Missouri when they are found in marketable quantities in the state, and all such materials shall be of the best quality and suitable character that can be obtained at reasonable market prices, all as provided for in Section 8.280, Missouri Revised Statutes and Cumulative Supplements.
- B. Furthermore, pursuant to Section 34.076 Missouri Revised Statutes and Cumulative Supplements, a preference shall be given to those persons doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less. In addition, in order for a non-domiciliary bidder to be successful, his bid must be that same percentage lower than a domiciliary Missouri bidder's bid, as would be

required for a Missouri bidder to successfully bid in the non-domiciliary state.

- C. In accordance with the Missouri Domestic Products Procurement Act Section 34.350 RSMo and Cumulative Supplements any manufactured goods or commodities used or supplied in the performance of this contract or any subcontract thereto shall be manufactured, assembled or produced in the United States, unless the specified products are not manufactured, assembled or produced in the United States in sufficient quantities to meet the agency's requirements or cannot be manufactured, assembled or produced in the United States within the necessary time in sufficient quantities to meet the contract requirements, or if obtaining the specified products manufactured, assembled or produced in the United States would increase the cost of this contract for purchase of the product by more than ten percent.

#### **ARTICLE 1.8 - COMMUNICATIONS**

- A. All notices, requests, instructions, approvals and claims must be in writing and shall be delivered to the Designer and copied to the Construction Representative for the project except as required by Article 1.12 Disputes and Disagreements, or as otherwise specified by the Owner in writing as stated in Section 012600. Any such notice shall be deemed to have been given as of the time of actual receipt.
- B. The Contractor shall attend on-site progress and coordination meetings, as scheduled by the Construction Representative, no less than once a month.
- C. The Contractor shall ensure that major subcontractors and suppliers shall attend monthly progress meetings as necessary to coordinate the work, and as specifically requested by the Construction Representative.

#### **ARTICLE 1.9 - SEPARATE CONTRACTS AND COOPERATION**

- A. The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.
- B. The Contractor shall consult the drawings for all other contractors in connection with this work. Any work conflicting with the above shall be brought to the attention of the Owner's Representative before the work is performed. If the Contractor fails to do this, and constructs any

work which interferes with the work of another contractor, the Contractor shall remove any part so conflicting and rebuild same, as directed by the Owner's Representative at no additional cost to the Owner.

- C. Each contractor shall be required to coordinate his work with other contractors so as to afford others reasonable opportunity for execution of their work. No contractor shall delay any other contractor by neglecting to perform contract work at the proper time. If any contractor causes delay to another, they shall be liable directly to that contractor for such delay in addition to any liquidated damages which might be due the Owner.
- D. Should the Contractor or project associated subcontractors refuse to cooperate with the instructions and reasonable requests of other Contractors or other subcontractors in the overall coordinating of the work, the Owner may take such appropriate action and issue directions, as required, to avoid unnecessary and unwarranted delays.
- E. Each Contractor shall be responsible for damage done to Owner's or other Contractor's property by him/her or workers in his employ through their fault or negligence.
- F. Should a Contractor sustain any damage through any act or omission of any other Contractor having a contract with the Owner, the Contractor so damaged shall have no claim or cause of action against the Owner for such damage, but shall have a claim or cause of action against the other Contractor to recover any and all damages sustained by reason of the acts or omissions of such Contractor. The phrase "acts or omissions" as used in this section shall be defined to include, but not be limited to, any unreasonable delay on the part of any such contractors.

#### **ARTICLE 1.10 - ASSIGNMENT OF CONTRACT**

- A. No assignment by Contractor of any amount or any part of this contract or of the funds to be received there under will be recognized unless such assignment has had the written approval of the Director and the surety has been given due notice of such assignment and has furnished written consent thereto. In addition to the usual recitals in assignment contracts, the following language must be set forth: "It is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of this contract and to claims or liens for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials."

#### **ARTICLE 1.11 - INDEMNIFICATION**

- A. Contractor agrees to indemnify and save harmless Owner and its respective commissioners, officers, officials, agents, consultants and employees and Designer, their agents, servants and employees, from and against any and all liability for damage arising from injuries to persons or damage to property occasioned by any acts or omissions of Contractor, any subcontractors, agents, servants or employees, including any and all expense, legal or otherwise, which may be incurred by Owner or Designer, its agents, servants or employees, in defense of any claim, action or suit.
- B. The obligations of the Contractor under this paragraph shall not extend to the liability of the Designer, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, contract changes, design or specifications, or (2) giving of or the failure to give directions or instructions by the Designer, his agents or employees as required by this contract documents provided such giving or failure to give is the primary cause of the injury or damage.

#### **ARTICLE 1.12 - DISPUTES AND DISAGREEMENTS**

It is hereby expressly agreed and understood that in case any controversy or difference of opinion arises during construction, best efforts will be given to resolution at the field level. Should those efforts be unsuccessful, the Contractor has the right to appeal in writing, the decision of the Director's Designee to the Director at Room 730 Truman Building, P.O. Box 809, Jefferson City, Missouri 65102. The decision of the Director shall be final and binding on all parties.

#### **ARTICLE 2 -- OWNER/DESIGNER RESPONSIBILITIES**

- A. The Owner shall give all orders and directions contemplated under this contract relative to the execution of the work. During progress of work the Owner will be represented at the project site by the Construction Representative and/or Designer, whose responsibilities are to see that this contract is properly fulfilled.
- B. The Owner shall at all times have access to the work whenever it is in preparation or progress. The Contractors shall provide proper facilities for such access and for inspection and supervision.
- C. All materials and workmanship used in the work shall be subject to the inspection of the Designer and Construction Representative, and any work which is deemed defective shall be removed, rebuilt or made good immediately upon notice.

The cost of such correction shall be borne by the Contractor. Contractor shall not be entitled to an extension of the contract completion date in order to remedy defective work. All rejected materials shall be immediately removed from the site of the work.

- D. If the Contractor fails to proceed at once with the correction of rejected defective materials or workmanship, the Owner may, by separate contract or otherwise, have the defects remedied or rejected. Materials removed from the site and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.
- E. Failure or neglect on the part of Owner to observe faulty work, or work done which is not in accordance with the drawings and specifications shall not relieve the Contractor from responsibility for correcting such work without additional compensation.
- F. The Owner shall have the right to direct the Contractor to uncover any completed work.
  - 1. If the Contractor fails to adequately notify the Construction Representative and/or Designer of an inspection as required by the Contract Documents, the Contractor shall, upon written request, uncover the work. The Contractor shall bear all costs associated with uncovering and again covering the work exposed.
  - 2. If the Contractor is directed to uncover work, which was not otherwise required by the Contract Documents to be inspected, and the work is found to be defective in any respect, no compensation shall be allowed for this work. If, however, such work is found to meet the requirements of this contract, the actual cost of labor and material necessarily involved in the examination and replacement plus 10% shall be allowed the Contractor.
- G. The Designer shall give all orders and directions contemplated under this contract relative to the scope of the work and shall give the initial interpretation of the contract documents.
- H. The Owner may file a written notice to the Contractor to dismiss immediately any subcontractors, project managers, superintendents, foremen, workers, watchmen or other employees whom the Owner may deem incompetent, careless or a hindrance to proper or timely execution of the work. The Contractor shall comply with such notice as promptly as practicable without detriment to the work or its progress.

- I. If in the Owner's judgment it becomes necessary at any time to accelerate work, when ordered by the Owner in writing, the Contractor shall redirect resources to such work items and execute such portions of the work as may be required to complete the work within the current approved contract schedule.

### **ARTICLE 3 -- CONTRACTOR RESPONSIBILITIES**

The Contractor shall register and utilize the Owner's eBuilder digital project management system for submission of documents described in the following sections. This includes but is not limited to submittals as required by designer, payment applications, Request for Information (RFI), construction change orders, Request for Proposals (RFP), Designer Supplemental Instructions (DSI), etc.

#### **ARTICLE 3.1 -- ACCEPTABLE SUBSTITUTIONS**

- A. The Contractor may request use of any article, device, product, material, fixture, form or type of construction which in the judgment of the Owner and Designer is equal in all respects to that named. Standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner and Designer that they are equal in design, strength, durability, usefulness and convenience for the purpose intended.
- B. Any changes required in the details and dimensions indicated on the drawings for the substitution of products other than those specified shall be properly made at the expense of the Contractor requesting the substitution or change.
- C. The Contractor shall submit a request for such substitutions in writing to the Owner and Designer within twenty (20) working days after the date of the "Notice to Proceed." Thereafter no consideration will be given to alternate forms of accomplishing the work. This Article does not preclude the Owner from exercising the provisions of Article 4 hereof.
- D. Any request for substitution by the Contractor shall be submitted in accordance with SECTION 002113 - INSTRUCTIONS TO BIDDERS.
- E. When a material has been approved, no change in brand or make will be permitted unless:
  - 1. Written verification is received from the manufacturer stating they cannot make delivery on the date previously agreed, or
  - 2. Material delivered fails to comply with contract requirements.

### ARTICLE 3.2 -- SUBMITTALS

- A. The Contractor's submittals must be submitted with such promptness as to allow for review and approval so as not to cause delay in the work. The Contractor shall coordinate preparation and processing of submittals with performance of construction activities.

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

Submit four (4) copies to the Designer and additional copies as required for the subcontractors and material suppliers. Also provide copies to meet the requirements for maintenance manuals.

- B. All subcontractors' shop drawings and schedules shall be submitted by the Contractor and shall bear evidence that Contractor has received, reviewed, and approved them. Any shop drawings and schedules submitted without this evidence will be returned to the Contractor for resubmission.
- C. The Contractor shall include with the shop drawing, a letter indicating any and all deviations from the drawings and/or specifications. Failure to notify the Designer of such deviations will be grounds for subsequent rejection of the related work or materials. If, in the opinion of the Designer, the deviations are not acceptable, the Contractor will be required to furnish the item as specified and indicated on the drawings.
- D. The Designer shall check shop drawings and schedules with reasonable promptness and approve them only if they conform to the design concept of the project and comply with the information given in the contract documents. The approval shall not relieve the Contractor from the responsibility to comply with the drawings and specifications, unless the Contractor has called the Designer's attention to the deviation, in writing, at the time of submission and the Designer has knowingly approved thereof. An approval of any such modification will be given only under the following conditions:
1. It is in the best interest of the Owner
  2. It does not increase the contract sum and/or completion time
  3. It does not deviate from the design intent
  4. It is without prejudice to any and all rights under the surety bond.
- E. No extension of time will be granted because of the Contractor's failure to submit shop drawings and schedules in ample time to allow for review,

possible resubmission, and approval. Fabrication of work shall not commence until the Contractor has received approval. The Contractor shall furnish prints of approved shop drawings and schedules to all subcontractors whose work is in any way related to the work under this contract. Only prints bearing this approval will be allowed on the site of construction

- F. The Contractor shall maintain a complete file on-site of approved shop drawings available for use by the Construction Representative.

### ARTICLE 3.3 – AS-BUILT DRAWINGS

- A. The Contractor shall update a complete set of the construction drawings, shop drawings and schedules of all work monthly by marking changes, and at the completion of their work (prior to submission of request for final payment) note all changes and turn the set over to the Construction Representative. The updates shall show all addenda, all field changes that were made to adapt to field conditions, changes resulting from contract changes or supplemental instructions, and all locations of structures, buried installations of piping, conduit, and utility services. All buried and concealed items both inside and outside shall be accurately located as to depth and referenced to permanent features such as interior or exterior wall faces and dimensions shall be given in a neat and legible manner in a contrasting colored pencil or ink. If approved by the Designer, an electronic file format may be provided.

### ARTICLE 3.4 – GUARANTY AND WARRANTIES

- A. General Guaranty
1. Neither the final certificate of payment nor any provision in the contract documents nor partial use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with contract requirements.
  2. The Contractor or surety shall remedy any defects in the work and pay for any damage to property resulting there from which shall appear within a period of one (1) year from the date of substantial completion unless a longer period is otherwise specified or a differing guaranty period has been established in the substantial completion certificate. The Owner will give notice of observed defects with reasonable promptness.
  3. In case of default on the part of the Contractor in fulfilling this part of this contract, the Owner may correct the work or repair the

damage and the cost and expense incurred in such event shall be paid by or recoverable from the Contractor or surety.

4. The work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's guaranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment

**B. Extended Warranty**

Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year. Where a longer period is offered at no additional cost or called for in the specific equipment specifications, the longer period shall govern.

**ARTICLE 3.5 -- OPERATION AND MAINTENANCE MANUALS**

- A. Immediately after equipment submittals are approved and no later than ten (10) working days prior to the substantial completion inspection, the Contractor shall provide to the Designer three (3) copies of operating instructions and service manuals, containing the following:

1. Start-up and Shut-down Procedures: Provide a step-by-step write up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available; they may be incorporated into the operating manual for reference.
2. Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.
3. Equipment List: List of all major equipment as installed shall be prepared to include model number, capacities, flow rate, name place data, shop drawings and air and water balance reports.
4. Service Instructions: Provide the following information for all pieces of equipment.

- a. Recommended spare parts including catalog number and name of local supplier or factory representative.
- b. Belt sizes, types, and lengths.
- c. Wiring diagrams.

5. Manufacturer's Certificate of Warranty as described in Article 3.4.

6. Prior to the final payment, furnish to the Designer three (4) copies of parts catalogs for each piece of equipment furnished by him/her on the project with the components identified by number for replacement ordering.

- B. Submission of operating instructions shall be done in the following manner.

1. Manuals shall be in quadruplicate, and all materials shall be bound into volumes of standard 8½" x 11" hard binders. Large drawings too bulky to be folded into 8½" x 11" shall be separately bound or folded and in envelopes, cross referenced and indexed with the manuals.

2. The manuals shall identify project name, project number, and include the name and address of the Contractor, subcontractors and manufacturers who were involved with the activity described in that particular manual.

3. Internally subdivide the binder contents with permanent page dividers, logically organized with tab titles clearly printed under reinforced laminated plastic tabs.

4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified.

**ARTICLE 3.6 – OTHER CONTRACTOR RESPONSIBILITIES**

- A. The Contractor shall keep on site, during progress of the work, a competent superintendent satisfactory to the Construction Representative. The superintendent shall represent the Contractor and all agreements made by the superintendent shall be binding. The superintendent shall carefully study and compare all drawings, specifications and other instructions and shall promptly notify the Construction Representative and Designer, in writing, any error, inconsistency or omission which may be discovered. The superintendent shall coordinate all work on the project. Any change of the superintendent shall be approved by the Construction Representative.
- B. Contractor shall, at all times, enforce strict discipline and good order among his employees,

and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him/her.

- C. The Contractor shall supply sufficient labor, material, plant and equipment and pay when due any laborer, subcontractor or supplier for supplies furnished and otherwise prosecute the work with diligence to prevent work stoppage and insure completion thereof within the time specified.
- D. The Contractor and each of his subcontractors shall submit to the Construction Representative, through the Designer such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this contract.
- E. The Contractor, subcontractors, and material suppliers shall upon written request, give the Owner access to all time cards, material invoices, payrolls, estimates, profit and loss statements, and all other direct or indirect costs related to this work.
- F. The Contractor shall be responsible for laying out all contract work such as layout of architectural, structural, mechanical and electrical work, which shall be coordinated with layouts of subcontractors for general construction work. The Contractor is also responsible for unloading, uncrating and handling of all materials and equipment to be erected or placed by him/her, whether furnished by Contractor or others. No extra charges or compensation will be allowed as a result of failure to verify dimensions before ordering materials or fabricating items.
- G. The Contractor must notify the Construction Representative at least one working day before placing concrete or burying underground utilities, pipelines, etc.
- H. Contractors shall prearrange time with the Construction Representative for the interruption of any facility operation. Unless otherwise specified in these documents, all connections, alterations or relocations as well as all other portions of the work will be performed during normal working hours.
- I. The Contractor shall coordinate all work so there will not be prolonged interruptions of existing equipment operation. Any existing plumbing, heating, ventilating, air conditioning or electrical disconnections necessary for the project, which affect portions of this construction or building or any other building must be scheduled with the Construction Representative to minimize or avoid any disruption of facility operations. In no case,

unless previously approved in writing by the Construction Representative, shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities either intentionally or accidentally shall not relieve the Contractor responsible for the interruption from the responsibility to repair and restore the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.

- J. Contractors shall limit operations and storage of materials to the area within the project, except as necessary to connect to existing utilities, and shall not encroach on neighboring property. The Contractor shall be responsible for repair of their damage to property on or off the project site occurring during construction of project. All such repairs shall be made to the satisfaction of the property owner.
- K. Unless otherwise permitted, all materials shall be new and both workmanship and materials shall be of the best quality.
- L. Unless otherwise provided and stipulated within these specifications, the Contractor shall furnish, construct, and/or install and pay for materials, devices, mechanisms, equipment, all necessary personnel, utilities including, but not limited to water, heat, light and electric power, transportation services, applicable taxes of every nature, and all other facilities necessary for the proper execution and completion of the work.
- M. Contractor shall carefully examine the plans and drawings and shall be responsible for the proper fitting of his material, equipment and apparatus into the building.
- N. The Contractor or subcontractors shall not overload, or permit others to overload, any part of any structure during the performance of this contract.
- O. All temporary shoring, bracing, etc., required for the removal of existing work and/or for the installation of new work shall be included in this contract. The Contractor shall make good, at no cost to the Owner, any damage caused by improper support or failure of shoring in any respect. Each Contractor shall be responsible for shoring required to protect his work or adjacent property and improvements of Owner and shall be responsible for shoring or for giving written notice to adjacent property owners. Shoring shall be removed only after completion of permanent supports.

- P. The Contractor shall provide at the proper time such material as is required for support of the work. If openings are required, whether shown on drawings or not, the Contractor shall see that they are properly constructed.
- Q. During the performance of work the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences and other devices appropriately located on site which will give proper and understandable warning to all persons of danger of entry onto land, structure or equipment.
- R. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials.
- S. The Contractor shall be responsible for care of the finished work and shall protect same from damage or defacement until substantial completion by the Owner. If the work is damaged by any cause, the Contractor shall immediately begin to make repairs in accordance with the drawings and specifications. Contractor shall be liable for all damage or loss unless attributable to the acts or omissions of the Owner or Designer. Any claim for reimbursement shall be submitted in accordance with Article 4. After substantial completion the Contractor will only be responsible for damage resulting from acts or omissions of the Contractor or subcontractors through final warranty.
- T. In the event the Contractor encounters an unforeseen hazardous material, the Contractor shall immediately stop work in the area affected and report the condition to the Owner and Designer in writing. The Contractor shall not be required, pursuant to Article 4, to perform, any work relating to hazardous materials.
- U. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 4.
- V. Before commencing work, Contractors shall confer with the Construction Representative and facility representative and review any facility rules and regulations which may affect the conduct of the work.
- W. Project signs will only be erected on major projects and only as described in the specifications. If no sign is specified, none shall be erected.

## **ARTICLE 3.7 -- SUBCONTRACTS**

- A. Subcontractor assignments as identified in the bid form shall not be changed without written approval of the Owner. The Owner will not approve changes of a listed subcontractor unless the Contractor documents, to the satisfaction of the Owner that the subcontractor cannot or will not perform the work as specified.
- B. The Contractor is fully responsible to the Owner for the acts and omissions of all subcontractors and of persons either directly or indirectly employed by them.
- C. Every subcontractor shall be bound by the applicable terms and provisions of these contract documents, but no contractual relationship shall exist between any subcontractor and the Owner unless the right of the Contractor to proceed with the work is suspended or this contract is terminated as herein provided, and the Owner in writing elects to assume the subcontract.
- D. The Contractor shall upon receipt of "Notice to Proceed" and prior to submission of the first payment request, notify the Designer and Construction Representative in writing of the names of any subcontractors to be used in addition to those identified in the bid form and all major material suppliers proposed for all parts of the work.

## **ARTICLE 4 -- CHANGES IN THE WORK**

### **4.1 CHANGES IN THE WORK**

- A. The Construction Representative, without giving notice to the surety and without invalidating this contract, may order extra work or make changes by altering, adding to or deducting from the work, this contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract. A claim for extension of time caused by any change must be adjusted at the time of ordering such change. No future request for time will be considered.
- B. Each Contract Change shall include all costs required to perform the work including all labor, material, equipment, overheads and profit, delay, disruptions, or other miscellaneous expenses. No subsequent requests for additional compensation including claims for delay, disruption, or reduced efficiency as a result of each change will be considered. Values from the Schedule of Values will not be binding as a basis for additions to or deductions from the contract price.
- C. The amount of any adjustment in this contract price for authorized changes shall be agreed upon

before such changes become effective and shall be determined, through submission of a request for proposal, as follows:

1. By an acceptable fixed price proposal from the Contractor. Breakdowns shall include all takeoff sheets of each Contractor and subcontractor. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.
2. By a cost-plus-fixed-fee (time and material) basis with maximum price, total cost not to exceed said maximum. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.
3. By unit prices contained in Contractor's original bid form and incorporated in the construction contract.

D. Overhead and Profit on Contract Changes shall be applied as follows:

1. The overhead and profit charge by the Contractor and all subcontractors shall be considered to include, but is not limited to: incidental job burdens, small truck (under 1 ton) expense, mileage, small hand tools, warranty costs, company benefits and general office overhead. Project supervision including field supervision and job site office expense shall be considered a part of overhead and profit unless a compensable time extension is granted.
2. The percentages for overhead and profit charged on Contract Changes shall be subject to the following limits: (a) the percentage mark-up for the Contractor shall be limited to the Contractor's fee; (b) fifteen percent (15%) maximum for Work directly performed by employees of a subcontractor, or sub-subcontractor; (c) five percent (5%) maximum for the Work performed or passed through to the Owner by the Contractor; (d) five percent (5%) maximum subcontractor's mark-up for Work performed by a sub-subcontractor and

passed through to the Owner by the subcontractor and Contractor; and (e) in no case shall the total overhead and profit paid by the Owner on any Contract Changes exceed twenty-five percent (25%) of the cost of materials, labor and equipment (exclusive of Contractor or any Subcontractor overhead and profit) necessary to put the contract change work in place.

3. The Contractor will be allowed to add the cost of Contractor's payment and performance bonding, builder's risk insurance, and general liability insurance to their cost of work. The above listed bonding and insurance cost shall not exceed 2% and shall be allowed on the total cost of the added work, including overhead and profit.
  4. On proposals covering both increases and decreases in the amount of this contract, the application of overhead and profit shall be on the net change in the cost of the work.
  5. The percentage(s) for overhead and profit to be credited to the Owner on Contract Changes that are solely decreases in the quantity of work or materials shall be the same as those for additive Contract Changes provided above.
- E. No claim for an addition to this contract sum shall be valid unless authorized as aforesaid in writing by the Owner. In the event that none of the foregoing methods are agreed upon, the Owner may order the Contractor to perform work on a time and material basis. The cost of such work shall be determined by the Contractor's actual labor and material cost to perform the work plus overhead and profit as outlined herein. The Designer and Construction Representative shall approve the Contractor's daily time and material invoices for the work involved.
- F. If the Contractor claims that any instructions involve extra cost under this contract, the Contractor shall give the Owner's Representative written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute the work. No such claim shall be valid unless so made and authorized by the Owner, in writing.
- G. In an emergency affecting the safety of life or of the structure or of adjoining property, the Contractor, without special instruction or authorization from the Construction Representative, is hereby permitted to act at their discretion to prevent such threatened loss or injury. The Contractor shall submit a claim for



compensation for such emergency work in writing to the Owner's Representative.

#### **ARTICLE 4.2 – CHANGES IN COMPLETION TIME**

- A. Extension of the number of work days stipulated in the Contract for completion of the work with compensation may be made when:
  - 1. The contractor documents that proposed Changes in the work, as provided in Article 4.1, extends construction activities critical to contract completion date, OR
  - 2. The Owner suspends all work for convenience of the Owner as provided in Article 7.3, OR
  - 3. An Owner caused delay extends construction activities critical to contract completion (except as provided elsewhere in these General Conditions). The Contractor is to review the work activities yet to begin and evaluate the possibility of rescheduling the work to minimize the overall project delay.
- B. Extension of the number of work days stipulated in the Contract for completion of the work without compensation may be made when:
  - 1. Weather-related delays occur, subject to provisions for the inclusion of a specified number of "bad weather" days when provided for in Section 012100-Allowances, OR
  - 2. Labor strikes or acts of God occur, OR
  - 3. The work of the Contractor is delayed on account of conditions which were beyond the control of the Contractor, subcontractors or suppliers, and were not the result of their fault or negligence.
- C. No time extension or compensation will be provided for delays caused by or within the control of the Contractor, subcontractors or suppliers and for concurrent delays caused by the Owner.
- D. The Contractor shall notify the Owner promptly of any occurrence or conditions which in the Contractor's opinion results in a need for an extension of time. The notice shall be in writing and shall include all necessary supporting materials with details of any resultant costs and be submitted in time to permit full investigation and evaluation of the Contractor's claim. The Owner shall promptly acknowledge the Contractor's notice and, after recommendation from the Owner's Representative and/or Designer, shall provide a decision to the Contractor. Failure on the part of the Contractor to provide such notice and to detail the costs shall constitute a waiver by

the Contractor of any claim. Requests for extensions of time shall be for working days only.

#### **ARTICLE 5 - CONSTRUCTION AND COMPLETION**

##### **ARTICLE 5.1 – CONSTRUCTION COMMENCEMENT**

- A. Upon receipt of the "Intent to Award" letter, the Contractor must submit the following properly executed instruments to the Owner:
    - 1. Contract;
    - 2. Performance/payment bond as described in Article 6.1;
    - 3. Certificates of Insurance, or the actual policies themselves, showing that the Contractor has obtained the insurance coverage required by Article 6.2.
    - 4. Written Affirmative Action Plans as required in Article 1.4.
- Above referenced items must be received by the Owner within ten (10) working days after the effective date of the contract. If not received, the Owner may treat the failure to timely submit them as a refusal by the Contractor to accept a contract for this work and may retain as liquidated damages the Contractor's bid bond, cashier's check or certified check as provided in the Instructions to Bidders. Upon receipt the Owner will issue a "Notice to Proceed" with the work to the Contractor.
- B. Within the time frame noted in Section 013200 - Schedules, following receipt of the "Notice to Proceed", the Contractor shall submit to the Owner a progress schedule and schedule of values, showing activities through the end of the contract period. Should the Contractor not receive written notification from the Owner of the disapproval of the schedule of values within fifteen (15) working days, the Contractor may consider it approved for purpose of determining when the first monthly Application and Certification for Payment may be submitted.
  - C. The Contractor may commence work upon receipt of the Division of Facilities Management, Design and Construction's "Notice to Proceed" letter. Contractor shall prosecute the work with faithfulness and energy, and shall complete the entire work on or before the completion time stated in the contract documents or pay to the Owner the damages resulting from the failure to timely complete the work as set out within Article 5.4.

## ARTICLE 5.2 -- PROJECT CONSTRUCTION

- A. Each Contractor shall submit for the Owner's approval, in reproducible form, a progress schedule showing the rate of progress and the order of the work proposed to carry on various phases of the project. The schedule shall be in conformance with the requirements outlined in Section 013200 – Schedules.
- B. Contractor shall employ and supply a sufficient force of workers, material, and equipment and shall pay when due, any worker, subcontractor or supplier and otherwise prosecute the work with such diligence so as to maintain the rate of progress indicated on the progress schedule, prevent work stoppage, and insure completion of the project within the time specified.

## ARTICLE 5.3 -- PROJECT COMPLETION

- A. Substantial Completion. A Project is substantially complete when construction is essentially complete and work items remaining to be completed can be done without interfering with the Owner's ability to use the Project for its intended purpose.
  1. Once the Contractor has reached what they believe is Substantial Completion, the Contractor shall notify the Designer and the Construction Representative of the following:
    - a. That work is essentially complete with the exception of certain listed work items. The list shall be referred to as the "Contractor's Punch."
    - b. That all Operation and Maintenance Manuals have been assembled and submitted in accordance with Article 3.5A.
    - c. That the Work is ready for inspection by the Designer and Construction Representative. The Owner shall be entitled to a minimum of ten working days notice before the inspection shall be performed.
  2. If the work is acceptable, the Owner shall issue a Certificate of Substantial Completion, which shall set forth the responsibilities of the Owner and the Contractor for utilities, security, maintenance, damage to the work and risk of loss. The Certificate shall also identify those remaining items of work to be performed by the Contractor. All such work items shall be complete within 30 working days of the date of the Certificate, unless the Certificate specifies a different time. If the

Contractor shall be required to perform tests that must be delayed due to climatic conditions, it is understood that such tests and affected equipment will be identified on the Certificate and shall be accomplished by the Contractor at the earliest possible date. Performance of the tests may not be required before Substantial Completion can be issued. The date of the issuance of the Certificate of Substantial Completion shall determine whether or not the work was completed within the contract time and whether or not Liquidated Damages are due.

3. If the work is not acceptable, and the Owner does not issue a Certificate of Substantial Completion, the Owner shall be entitled to charge the Contractor with the Designer's and Owner's costs of re-inspection, including time and travel.
- B. Partial Occupancy. Contractor agrees that the Owner shall be permitted to occupy and use any completed or partially completed portions of the Project, when such occupancy and use is in the Owner's best interest. Owner shall notify Contractor of its desire and intention to take Partial Occupancy as soon as possible but at least ten (10) working days before the Owner intends to occupy. If the Contractor believes that the portion of the work the Owner intends to occupy is not ready for occupancy, the Contractor shall notify the Owner immediately. The Designer shall inspect the work in accordance with the procedures above. If the Contractor claims increased cost of the project or delay in completion as a result of the occupancy, he shall notify the Owner immediately but in all cases before occupancy occurs.
- C. Final Completion. The Project is finally complete when the Certificate of Substantial Completion has been issued and all work items identified therein as incomplete have been completed, and when all administrative items required by the contract have been completed. Final Completion entitles the Contractor to payment of the outstanding balance of the contract amount including all change orders and retainage. Within five (5) working days of the date of the Certificate of Substantial Completion, the Contractor shall identify the cost to complete any outstanding items of work. The Designer shall review the Contractor's estimate and either approve it or provide an independent estimate for all such items. If the Contractor fails to complete the remaining items within the time specified in the Certificate, the Owner may terminate the contract and go to the surety for project completion in accordance with Article 7.2 or release the contract balance to the Contractor less 150% of the

approved estimate to complete the outstanding items. Upon completion of the outstanding items, when a final cost has been established, any monies remaining shall be paid to the Contractor. Failure to complete items of work does not relieve the Contractor from the obligation to complete the administrative requirements of the contract, such as the provisions of Article 5.3 FAILURE TO COMPLETE ALL ITEMS OF WORK UNDER THE CONTRACT SHALL BE CONSIDERED A DEFAULT AND BE GROUNDS FOR CONTRACT TERMINATION AND DEBARMENT.

- D. Liquidated Damages. Contractor agrees that the Owner may deduct from the contract price and retain as liquidated damages, and not as penalty or forfeiture, the sum stipulated in this contract for each work day after the Contract Completion Day on which work is not Substantially Complete. Assessment of Liquidated Damages shall not relieve the Contractor or the surety of any responsibility or obligation under the Contract. In addition, the Owner may, without prejudice to any other rights, claims, or remedies the Owner may have including the right to Liquidated Damages, charge the Contractor for all additional expenses incurred by the Owner and/or Designer as the result of the extended contract period through Final Completion. Additional Expenses shall include but not be limited to the costs of additional inspections.
- E. Early Completion. The Contractor has the right to finish the work before the contract completion date; however, the Owner assumes no liability for any hindrances to the Contractor unless Owner caused delays result in a time extension to the contract completion date. The Contractor shall not be entitled to any claims for lost efficiencies or for delay if a Certificate of Substantial Completion is given on or before the Contract Completion Date.

#### **ARTICLE 5.4 -- PAYMENT TO CONTRACTOR**

- A. Payments on account of this contract will be made monthly in proportion to the work which has been completed. Request for payment must be submitted on the Owner's forms. No other pay request will be processed. Supporting breakdowns must be in the same format as Owner's forms and must provide the same level of detail. The Designer will, within 5 working days from receipt of the contractor's request for payment either issue a Certificate for Payment to the Owner, for such amount as the Designer determines is properly due, or notify the Contractor in writing of reasons for withholding a Certificate. The Owner shall make payment within 30 calendar days after the

"Application and Certification for Payment" has been received and certified by the Designer. The following items are to be attached to the contractor's pay request:

1. Updated construction schedule
  2. Certified payrolls consisting of name, occupation and craft, number of hours worked and actual wages paid for each individual employee, of the Contractor and all subcontractors working on the project
- B. The Owner shall retain 5 percent of the amount of each such payment application, except as allowed by Article 5.4, until final completion and acceptance of all work covered by this contract.
- C. Each payment made to Contractor shall be on account of the total amount payable to Contractor and all material and work covered by paid partial payment shall thereupon become the sole property of Owner. This provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made or restoration of any damaged work or as a waiver of the right of Owner to require fulfillment of all terms of this contract.
- D. Materials delivered to the work site and not incorporated in the work will be allowed in the Application and Certification for Payment on the basis of one hundred (100%) percent of value, subject to the 5% retainage providing that they are suitably stored on the site or in an approved warehouse in accordance with the following requirements:
1. Material has previously been approved through submittal and acceptance of shop drawings conforming to requirements of Article 3.2 of General Conditions.
  2. Delivery is made in accordance with the time frame on the approved schedule.
  3. Materials, equipment, etc., are properly stored and protected from damage and deterioration and remain so - if not, previously approved amounts will be deleted from subsequent pay applications.
  4. The payment request is accompanied by a breakdown identifying the material equipment, etc. in sufficient detail to establish quantity and value.
- E. The Contractor shall be allowed to include in the Application and Certification for Payment, one hundred (100%) of the value, subject to retainage,

of major equipment and material stored off the site if all of the following conditions are met:

1. The request for consideration of payment for materials stored off site is made at least 15 working days prior to submittal of the Application for Payment including such material. Only materials inspected will be considered for inclusion on Application for Payment requests.
  2. Materials stored in one location off site are valued in excess of \$25,000.
  3. That a Certificate of Insurance is provided indicating adequate protection from loss, theft conversion or damage for materials stored off site. This Certificate shall show the State of Missouri as an additional insured for this loss.
  4. The materials are stored in a facility approved and inspected, by the Construction Representative.
  5. Contractor shall be responsible for, Owner costs to inspect out of state facilities, and any delays in the completion of the work caused by damage to the material or for any other failure of the Contractor to have access to this material for the execution of the work.
- F. The Owner shall determine the amount, quality and acceptability of the work and materials which are to be paid for under this contract. In the event any questions shall arise between the parties, relative to this contract or specifications, determination or decision of the Owner or the Construction Representative and the Designer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this contract affected in any manner or to any extent by such question.
- G. Payments Withheld: The Owner may withhold or nullify in whole or part any certificate to such extent as may be necessary to protect the Owner from loss on account of:
1. Defective work not remedied. When a notice of noncompliance is issued on an item or items, corrective action shall be undertaken immediately. Until corrective action is completed, no monies will be paid and no additional time will be allowed for the item or items. The cost of corrective action(s) shall be borne by the Contractor.
  2. A reasonable doubt that this contract can be completed for the unpaid balance.

3. Failure of the Contractor to update as-built drawings monthly for review by the Construction Representative.
4. Failure of the Contractor to update the construction schedule.

When the Construction Representative is satisfied the Contractor has remedied above deficiencies, payment shall be released.

- H. Final Payment: Upon receipt of written notice from the Contractor to the Designer and Project Representative that the work is ready for final inspection and acceptance, the Designer and Project Representative, with the Contractor, shall promptly make such inspection. If the work is acceptable and the contract fully performed, the Construction Representative shall complete a final acceptance report and the Contractor will be directed to submit a final Application and Certification for Payment. If the Owner approves the same, the entire balance shall be due and payable, with the exception of deductions as provided for under Article 5.4.
1. Where the specifications provide for the performance by the Contractor of (certain tests for the purpose of balancing and checking the air conditioning and heating equipment and the Contractor shall have furnished and installed all such equipment in accordance with the specifications, but said test cannot then be made because of climatic conditions, such test shall may be considered as required under the provisions of the specifications, Section 013300 and this contract may be substantial Full payment will not be made until the tests have been made and the equipment and system is finally accepted. If the tests are not completed when scheduled, the Owner may deduct 150% of the value of the tests from the final payment.
  2. The final payment shall not become due until the Contractor delivers to the Construction Representative:
    - a) A complete file of releases, on the standard form included in the contract documents as "Final Receipt of Payment and Release Form", from subcontractors and material suppliers evidencing payment in full for services, equipment and materials, as the case may require, if the Owner approves, or a consent from the Surety to final payment accepting liability for any unpaid amounts.

- b) An Affidavit of Compliance with Prevailing Wage Law, in the form as included in this contract specifications, properly executed by each subcontractor, and the Contractor
  - c) Certified copies of all payrolls
  - d) As-built drawings
3. If any claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a claim including all costs and a reasonable attorney's fee.
  4. Missouri statute requires prompt payment from the Owner to the Contractor within thirty calendar days and from the Contractor to his subcontractors within fifteen calendar days. Failure to make payments within the required time frame entitles the receiving party to charge interest at the rate of one and one half percent per month calculated from the expiration of the statutory time period until paid.
  5. The value of all unused unit price allowances and/or 150% of the value of the outstanding work items, and/or liquidated damages may be deducted from the final pay request without executing a Contract Change. Any unit price items which exceed the number of units in the contract may be added by Contract Change.

**ARTICLE 6 -- INSURANCE AND BONDS**

**ARTICLE 6.1 -- BOND**

- A. Contractor shall furnish a performance/payment bond in an amount equal to 100% of the contract price to guarantee faithful performance of the contract and 100% of the contract price to guarantee the payment of all persons performing labor on the project and furnishing materials in connection therewith under this contract as set forth in the standard form of performance and payment bond included in the contract documents. The surety on such bond shall be issued by a surety company authorized by the Missouri Department of Insurance to do business in the state of Missouri.
- B. All Performance/Payment Bonds furnished in response to this provision shall be provided by a bonding company with a rating of B+ or higher as established by A.M. Best Company, Inc. in their most recent publication.

**ARTICLE 6.2 – INSURANCE**

- A. The successful Contractor shall procure and maintain for the duration of the contract issued a policy or policies of insurance for the protection of both the Contractor and the Owner and their respective officers, officials, agents, consultants and employees. The Owner requires certification of insurance coverage from the Contractor prior to commencing work.
- B. Minimum Scope and Extent of Coverage
  1. General Liability
 

Commercial General Liability, ISO coverage form number or equivalent CG 00 01 ("occurrence" basis), or I-SO coverage form number CG 00 02, or ISO equivalent.

If ISO equivalent or manuscript general liability coverage forms are used, minimum coverage will be as follows: Premises/Operations; Independent Contractors; Products/Completed Operations; personal Injury; Broad Form Property Damage including Completed Operations; Broad Form Contractual Liability Coverage to include Contractor's obligations under Article 1.11 Indemnification and any other Special Hazards required by the work of the contract.
  2. Automobile Liability
 

Business Automobile Liability Insurance, ISO Coverage form number or equivalent CA 00 01 covering automobile liability, code 1 "ANY AUTO".
  3. Workers' Compensation and Employer's Liability
 

Statutory Workers' Compensation Insurance for Missouri and standard Employer's Liability Insurance, or the authorization to self-insure for such liability from the Missouri Division of Workers' Compensation.
  4. Builder's Risk or Installation Floater Insurance
 

Insurance upon the work and all materials, equipment, supplies, temporary structures and similar items which may be incident to the performance of the work and located at or adjacent to the site, against loss or damage from fire and such other casualties as are included in extended coverage in broad "All Risk" form, including coverage for Flood and Earthquake, in an amount not less than the replacement cost of the work or this contract price, whichever is greater, with loss payable

to Contractor and Owner as their respective interests may appear.

Contractor shall maintain sufficient insurance to cover the full value of the work and materials as the work progresses, and shall furnish Owner copies of all endorsements. If Builder's Risk Reporting- Form of Endorsement is used, Contractor shall make all reports as required therein so as to keep in force an amount of insurance which will equal the replacement cost of the work, materials, equipment, supplies, temporary structures, and other property covered thereby; and if, as a result of Contractor's failure to make any such report, the amount of insurance so recoverable shall be less than such replacement cost, Contractor's interest in the proceeds of such insurance, if any, shall be subordinated to Owner's interest to the end that Owner may receive full reimbursement for its loss.

C. Minimum Limits of Insurance

1. General Liability

Contractor

\$2,000,000 combined single limit per occurrence for bodily injury, personal injury, and property damage

\$2,000,000 annual aggregate

2. Automobile Liability

\$2,000,000 combined single limit per occurrence for bodily injury and property damage

3. Workers' Compensation and Employers Liability

Workers' Compensation limits as required by applicable State Statutes (generally unlimited) and minimum of \$1,000,000 limit per accident for Employer's Liability.

General Liability and Automobile Liability insurance may be arranged under individual policies for the full limits required or by a combination of underlying policies with the balance provided by a form-following Excess or Umbrella Liability policy.

D. Deductibles and Self-Insured Retentions

All deductibles, co-payment clauses, and self-insured retentions must be declared to and approved by the Owner. The Owner reserves the right to request the reduction or elimination of unacceptable deductibles or self-insured retentions,

as they would apply to the Owner, and their respective officers, officials, agents, consultants and employees. Alternatively, the Owner may request Contractor to procure a bond guaranteeing payment of losses and related investigations, claims administration, and defense expenses.

E. Other Insurance Provisions and Requirements

The respective insurance policies and coverage, as specified below, must contain, or be endorsed to contain the following conditions or provisions:

1. General Liability

The Owner, and its respective commissioners, officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 Additional Insured - Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance of self-insurance programs maintained by the designated additional -insured's shall be excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's general liability insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner, or for any of their officers, officials, agents, consultants or employees.

2. Automobile Insurance

The Owner, and their respective officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 - Additional Insured Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the

performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance or self-insurance programs maintained by the designated additional insured's shall be in excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's automobile insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner or for any of its officers, officials, agents, consultants or employees.

3. Workers' Compensation/Employer's Liability

Contractor's workers' compensation insurance shall be endorsed with NCCI form WC 00 03 01 A - Alternative Employer Endorsement. The Alternative Employer Endorsement shall designate the Owner as "alternate employers."

4. All Coverages

Each insurance policy required by this section of the Contract shall contain a stipulation, endorsed if necessary, that the Owner will receive a minimum of a thirty (30) calendar day advance notice of any policy cancellation. Ten (10) calendar days advance notice is required for policy cancellation due to non-payment of premium.

F. Insurer Qualifications and Acceptability

Insurance required hereunder shall be issued by an A.M. Best, "B+" rated, Class IX insurance company approved to conduct insurance business in the state of Missouri.

G. Verification of Insurance Coverage

Prior to Owner issuing a Notice to Proceed, the Contractor shall furnish the Owner with Certificate(s) of Insurance and with any applicable original endorsements evidencing the required insurance coverage. The insurance certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its

behalf. All certificates and endorsements received by the Owner are subject to review and approval by the Owner. The Owner reserves the right to require certified copies of all required policies at any time. If the scope of this contract will exceed one (1) year - or, if any of Contractor's applicable insurance coverage expires prior to completion of the work or services required under this contract - the Contractor will provide a renewal or replacement certificate before continuing work or services hereunder. If the Contractor fails to provide documentation of required insurance coverage, the Owner may issue a stop work order and no additional contract completion time and/or compensation shall be granted as a result thereof.

**ARTICLE 7 – SUSPENSION OR TERMINATION OF CONTRACT**

**ARTICLE 7.1 - FOR SITE CONDITIONS**

When conditions at the site of the proposed work are considered by the Owner to be unsatisfactory for prosecution of the work, the Contractor may be ordered in writing to suspend the work or any part thereof until reasonable conditions exist. When such suspension is not due to fault or negligence of the Contractor, time allowed for completion of such suspended work will be extended by a period of time equal to that lost due to delay occasioned by ordered suspension. This will be a no cost time extension.

**ARTICLE 7.2 - FOR CAUSE**

A. Termination or Suspension for Cause:

1. If the Contractor shall file for bankruptcy, or should make a general assignment for the benefit of the creditors, or if a receiver should be appointed on account of insolvency, or if the contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials, or if the contractor should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of this contract, then the Owner may serve notice on the Contractor and the surety setting forth the violations and demanding compliance with this contract. Unless within ten (10) consecutive calendar days after serving such notice, such violations shall cease and satisfactory arrangements for correction be made, the Owner may suspend the Contractor's right to proceed with the work or terminate this contract.

2. In the event the Owner suspends Contractor's right to proceed with the work or terminates the contract, the Owner may demand that the Contractor's surety take over and complete the work on this contract, after the surety submits a written proposal to the Owner and receives written approval and upon the surety's failure or refusal to do so within ten (10) consecutive calendar days after demand therefore, the Owner may take over the work and prosecute the same to completion by bid or negotiated contract, or the Owner may elect to take possession of and utilize in completing the work such materials, supplies, appliances and plant as may be on the site of the work, and all subcontractors, if the Owner elects, shall be bound to perform their contracts.
- B. The Contractor and its surety shall be and remain liable to the Owner for any excess cost or damages occasioned to the Owner as a result of the actions above set forth.
- C. The Contractor in the event of such suspension or termination shall not be entitled to receive any further payments under this contract until the work is wholly finished. Then if the unpaid balance under this contract shall exceed all expenses of the Owner as certified by the Director, such excess shall be paid to the Contractor; but, if such expenses shall exceed the unpaid balance as certified by the Director, the Contractor and their surety shall be liable for and shall pay the difference and any damages to the Owner.
- D. In exercising Owner's right to secure completion of the work under any of the provisions hereof, the Director shall have the right to exercise Owner's sole discretion as to the manner, methods and reasonableness of costs of completing the work.
- E. The rights of the Owner to suspend or terminate as herein provided shall be cumulative and not exclusive and shall be in addition to any other remedy provided by law.
- F. The Contractor in the event of such suspension or termination may be declared ineligible for Owner contracts for a minimal period of twelve (12) months. Further, no contract will be awarded to any Contractor who lists in their bid form any subcontractor whose prior performance has contributed, as determined by the Owner, to a breach of a contract. In order to be considered for state-awarded contracts after this period, the Contractor/subcontractor will be required to forward acceptance reports to the Owner regarding successful completion of non-state projects during the intervening twelve (12) months from the date

of default. No contracts will be awarded to a subcontractor/Contractor until the ability to perform responsibly in the private sector has been proven to the Owner.

#### **ARTICLE 7.3 -- FOR CONVENIENCE**

- A. The Owner may terminate or suspend the Contract or any portion of the Work without cause at any time, and at the Owner's convenience. Notification of a termination or suspension shall be in writing and shall be given to the Contractor and their surety. If the Contract is suspended, the notice will contain the anticipated duration of the suspension or the conditions under which work will be permitted to resume. If appropriate, the Contractor will be requested to demobilize and re-mobilize and will be reimbursed time and costs associated with the suspension.
- B. Upon receipt of notification, the Contractor shall:
  1. Cease operations when directed.
  2. Take actions to protect the work and any stored materials.
  3. Place no further subcontracts or orders for material, supplies, services or facilities except as may be necessary to complete the portion of the Contract that has not been terminated. No claim for payment of materials or supplies ordered after the termination date shall be considered.
  4. Terminate all existing subcontracts, rentals, material, and equipment orders.
  5. Settle all outstanding liabilities arising from termination with subcontractors and suppliers.
  6. Transfer title and deliver to the Owner, work in progress, completed work, supplies and other material produced or acquire for the work terminated, and completed or partially completed plans, drawings information and other property that, if the Contract had been completed, would be required to be furnished to the Owner.
- C. For termination without cause and at the Owner's convenience, in addition to payment for work completed prior to date of termination, the Contractor may be entitled to payment of other documented costs directly associated with the early termination of the contract. Payment for anticipated profit and unapplied overhead will not be allowed.



## SECTION 007300 - SUPPLEMENTARY CONDITIONS

### 1.0 GENERAL:

A. These Supplementary General Conditions clarify, add, delete, or otherwise modify standard terms and conditions of DIVISION 0, BIDDING AND CONTRACTING REQUIREMENTS.

### 2.0 CONTACTS:

Designer: Ken Campbell  
Archer – Elgin  
310 East 6<sup>th</sup> Street  
Rolla, MO 65401  
Telephone: 573-364-6362  
Email: [kcambell@cmarcher.com](mailto:kcambell@cmarcher.com)

Construction Representative: Randy Duncan  
Division of Facilities Management, Design and Construction  
301 West High Street, Room 730  
Jefferson City, Missouri 65101  
Telephone: 573-526-0582  
Email: [Randy.Duncan@oa.mo.gov](mailto:Randy.Duncan@oa.mo.gov)

Project Manager: Eric Hibdon  
Division of Facilities Management, Design and Construction  
301 West High Street, Room 730  
Jefferson City, Missouri 65101  
Telephone: 573-508-3666  
Email: [Eric.Hibdon@oa.mo.gov](mailto:Eric.Hibdon@oa.mo.gov)

Contract Specialist: April Howser  
Division of Facilities Management, Design and Construction  
301 West High Street, Room 730  
Jefferson City, Missouri 65101  
Telephone: 573-751-0053  
Email: [April.Howser@oa.mo.gov](mailto:April.Howser@oa.mo.gov)

### 3.0 NOTICE: ALL BID MATERIALS ARE DUE AT THE TIME OF BID SUBMITTAL. THERE IS NO SECOND SUBMITTAL FOR THIS PROJECT.

### 4.0 FURNISHING CONSTRUCTION DOCUMENTS:

- A. The Owner will furnish the Contractor with approximately 3 complete sets of drawings and specifications at no charge.
- B. The Owner will furnish the Contractor with approximately 3 sets of explanatory or change drawings at no charge.
- C. The Contractor may make copies of the documents as needed with no additional cost to the Owner.

### 5.0 SAFETY REQUIREMENTS

Contractor and subcontractors at any tier shall comply with RSMo 292.675 and Article 1.3, E, of Section 007213, General Conditions.

**SUPPLEMENTARY GENERAL CONDITIONS**  
**FOR FEDERALLY FUNDED/ASSISTED CONSTRUCTION PROJECTS**

**(American Rescue Plan Act (ARPA) Projects)**

**1.0 Notice of Federal Funding**

This project is being performed in whole or in part using federal funds. Therefore, all work or services performed by the Contractor and its subcontractors shall be subject to the terms and conditions set forth below in addition to all terms and conditions in the Construction Contract, General Conditions, and other contract documents. The concepts, rules, and guidelines set forth in 2 C.F.R. 200 describing allowable costs and administrative requirements apply.

**2.0 Definitions**

As used herein, “Federal Government” means the government of the United States of America. “Federal Agency” means an agency, entity, department or division of the Federal Government that is providing funding for this project. All other terms shall have the meanings established in the Construction Contract, General Conditions, and/or Project Manual, unless such definitions conflict with a definition provided in an applicable statute or regulation.

**3.0 Conflicting Terms or Conditions**

To the extent that any terms or conditions set forth herein conflict with the Construction Contract or its General Conditions, the more stringent of the two terms and conditions shall govern.

**4.0 No Obligation by Federal Government**

The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, Contractor, or any other party pertaining to any matter resulting from the contract.

**5.0 Compliance with Federal Laws, Regulations and Executive Orders**

The Contractor and its subcontractors and suppliers are required to comply with all applicable Federal laws, regulations, and executive orders, regardless of whether set forth herein. The Contractor shall assist and enable the State of Missouri in complying with any requirements imposed by the Federal Agency as a condition of funding.

**6.0 Compliance with Civil Rights Provisions**

The Contractor shall comply with all Federal statutes, executive orders, and regulations relating to nondiscrimination. These include, but are not limited to the following:

Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin;

Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex;

Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps;

The Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age;

Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing;

Title VII of the Civil Rights Act of 1964 (42 U.S.C. part 2000(e)), which prohibits discrimination against employees on the basis of religion;

Any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and

The requirements of any other nondiscrimination statute(s) that may apply to the application.

#### **7.0 Equal Employment Opportunity (41 C.F.R. 60-1.4(b)).**

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

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

- (2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (3) The Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicants or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Contractor's legal duty to furnish information.
- (4) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

- (5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (8) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

*Provided*, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and sub contractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and sub contractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any

further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

**8.0 Notice of Requirement for Affirmative Action To Ensure Equal Employment Opportunity**  
(Executive Order 11246, 41 C.F.R. 60-4.2)

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

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

Time-tables	Goals for minority participation for each trade	Goals for female participation in each trade
107	11.4%	6.9%

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

The Contractor's compliance with the Executive Order and the regulations in 41 C.F.R. pt. 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 C.F.R. 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 C.F.R. pt. 60-4. Compliance with the goals will be measured against the total work hours performed.

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

(4) As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any).

**9.0 Standard Federal Equal Employment Opportunity Construction Contract Specifications**  
(Executive Order 11246 - 41 C.F.R. 60-4.3)

(1) As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

(3) If the Contractor is participating (pursuant to 41 C.F.R. 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

(4) The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the FEDERAL REGISTER in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement

contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

(5) Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

(6) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(7) The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 C.F.R. pt. 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.



p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

(8) Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

(9) A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

(10) The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender identity, or national origin.

(11) The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

(12) The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

(13) The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 C.F.R. 60-4.8.

(14) The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily

understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

(15) Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

#### **10.0 Prohibition of Segregated Facilities**

- (1) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.
- (2) “Segregated facilities,” as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.
- (3) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

#### **11.0 Davis-Bacon Act (40 U.S.C. §§ 3141-3144, and §§ 3146-3148, and 29 C.F.R. pt. 5)**

*\*The requirements of the Davis-Bacon Act and this section are not applicable to this project, which is funded solely by Coronavirus State and Local Fiscal Recover Funds (SLFRF) under the American Rescue Plan Act (ARPA).*

- (1) Minimum wages.
  - (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 C.F.R. pt. 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis–Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill,

except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis–Bacon poster (WH–1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- (ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
  - (2) The classification is utilized in the area by the construction industry; and
  - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.
- (C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30–day period that additional time is necessary.
- (D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has

found, upon the written request of the Contractor, that the applicable standards of the Davis–Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The (write in name of Federal Agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other federally-assisted contract subject to Davis–Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis–Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 C.F.R. 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis–Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 C.F.R. 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered

worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime Contractor to require a subcontractor to provide addresses and social security numbers to the prime Contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

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

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 C.F.R. pt. 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 C.F.R. pt. 5, and that such information is correct and complete;

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

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

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

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

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

(4) Apprentices and trainees—

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary

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

- (ii) Trainees. Except as provided in 29 C.F.R. 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 C.F.R. pt. 30.

- (5) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 C.F.R. pt. 3, which are incorporated by reference in this contract.
- (6) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 C.F.R. 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal Agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 C.F.R. 5.5.
- (7) Contract termination: debarment. A breach of the contract clauses in 29 C.F.R. 5.5 may be grounds for termination of the contract, and for debarment as a Contractor and a subcontractor as provided in 29 C.F.R. 5.12.
- (8) Compliance with Davis–Bacon and Related Act requirements. All rulings and interpretations of the Davis–Bacon and Related Acts contained in 29 C.F.R. pts. 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 C.F.R. pt.s 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
- (10) Certification of eligibility.
  - (i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis–Bacon Act or 29 C.F.R. 5.12(a)(1).
  - (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis–Bacon Act or 29 C.F.R. 5.12(a)(1).
  - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. § 1001.

### **12.0 Copeland “Anti-Kickback” Act**

- (1) The Contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract. The Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled.
- (2) The Contractor or subcontractor shall insert in any subcontracts the clause above, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.
- (3) A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 C.F.R. 5.12.

### **13.0 Contract Work Hours and Safety Standards Act (40 U.S.C. 3701 to 3708, 29 C.F.R. 5.5)**

- (1) Overtime requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1) of this section the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.
- (3) Withholding for unpaid wages and liquidated damages. The Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.
- (4) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

#### **14.0 Suspension and Debarment (Executive Orders 12549 and 12689, 2 C.F.R. pt. 180)**

- (1) A contract award (see 2 C.F.R. 180.220) must not be made to parties listed on the government-wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 C.F.R. 180 that implement Executive Orders 12549 (3 C.F.R. pt. 1986 Comp., p. 189) and 12689 (3 C.F.R. pt. 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.
- (2) The contractor is required to verify that none of the contractor’s principals (defined at 2 C.F.R. 180.995) or its affiliates (defined at 2 C.F.R. 180.905) are excluded (defined at 2 C.F.R. 180.940) or disqualified (defined at 2 C.F.R. 180.935).
- (3) The contractor must comply with 2 C.F.R. pt. 180, subpart C and the regulations of the granting Federal Agency regarding suspension and debarment, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.



- (4) This certification is a material representation of fact relied upon by the Owner. If it is later determined that the Contractor did not comply with 2 C.F.R. pt. 180, subpart C in addition to remedies available to the Owner, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
- (5) By submitting a bid, the bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

#### **15.0 Byrd Anti-Lobbying Amendment (31 U.S.C. § 1352)**

- (1) Contractors that apply or bid for an award exceeding \$100,000 agree to file the required certification (set forth below), in compliance with 31 U.S.C. § 1352 (as amended).
- (2) Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352.
- (3) Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

#### CERTIFICATION REGARDING LOBBYING

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

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

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required

certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

#### **16.0 Procurement of Recovered Materials**

The Contractor shall comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (42 U.S.C. § 6962). The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

Information about this requirement, along with the list of EPA designated items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>.

#### **17.0 Fair Labor Standards Act**

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 C.F.R. pt. 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers. The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

#### **18.0 Access to Records and Reports**

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Owner, the Federal Agency and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

#### **19.0 Occupational Health and Safety Act**

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 C.F.R. pt. 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (29 C.F.R. pt. 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

#### **20.0 Rights to Inventions**

Contracts or agreements that include the performance of experimental, developmental, or research work must provide for the rights of the Federal Government and the Owner in any resulting invention as established by 37 C.F.R. pt. 401, Rights to Inventions Made by Non-profit Organizations and Small

Business Firms under Government Grants, Contracts, and Cooperative Agreements. This contract incorporates by reference the patent and inventions rights as specified within 37 C.F.R. 401.14. Contractor must include this requirement in all sub-tier contracts involving experimental, developmental, or research work.

### **21.0 Energy Conservation**

The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. § 6201 et seq.).

### **22.0 Clean Air Act and Federal Water Pollution Control Act**

- (1) If the amount of the Contract exceeds \$150,000, the Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq. and the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 1251 et seq.
- (2) The Contractor agrees to report each violation to the Owner, and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the Federal Agency and the appropriate Environmental Protection Agency Regional Office.
- (3) The Contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance.

### **23.0 Contractor Employee Whistleblower Rights and Requirement to Inform Employees of Whistleblower Rights**

- (1) This contract and employees working on this contract will be subject to the whistleblower rights and remedies in the pilot program on contractor employee whistleblower protections established at 41 U.S.C. § 4712 by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112-239) and FAR 3.908.
- (2) The Contractor shall inform its employees in writing, in the predominant language of the workforce, of employee whistleblower rights and protections under 41 U.S.C. § 4712, as described in section 3.908 of the Federal Acquisition Regulation.
- (3) The Contractor shall insert the substance of this clause, including this paragraph (c), in all subcontracts over the simplified acquisition threshold.

### **24.0 Veteran's Preference**

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. § 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

### **25.0 Drug Free Workplace Act**

The Contractor shall provide a drug free workplace in accordance with the Drug Free Workplace Act of 1988, 41 U.S.C. Chapter 81, and all applicable regulations. The Contractor shall report any conviction of the Contractor's personnel under a criminal drug statute for violations occurring on the Contractor's premises or off the Contractor's premises while conducting official business. A report of a conviction shall be made to the state agency within five (5) working days after the conviction.

## **26.0 Access Requirements for Persons with Disabilities**

Contractor shall comply with 49 U.S.C. § 5301(d), stating Federal policy that the elderly and persons with disabilities have the same rights as other persons to use mass transportation services and facilities and that special efforts shall be made in planning and designing those services and facilities to implement that policy. Contractor shall also comply with all applicable requirements of Sec. 504 of the Rehabilitation Act (1973), as amended, 29 U.S.C. § 794, which prohibits discrimination on the basis of handicaps, and the Americans with Disabilities Act of 1990 (ADA), as amended, 42 U.S.C. § 12101 et seq., which requires that accessible facilities and services be made available to persons with disabilities, including any subsequent amendments thereto.

## **27.0 Seismic Safety**

The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Guidelines for Contract Provisions for Obligated Sponsors and Airport Improvement Program Projects Issued on June 19, 2018 Page 61 Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

## **28.0 Required Use of American Iron, Steel, Manufactured Products, and Construction Materials – Build America, Buy America (Pub. L. No. 117-58, §§ 70901-52)**

*\*The requirements of the Build America, Buy America Act and this section are not applicable to projects funded solely by Coronavirus State and Local Fiscal Recover Funds (SLFRF) under the American Rescue Plan Act (ARPA). The Contractor will be subject to the requirements of the Build America, Buy America Act only if SLFRF funds are used in conjunction with funds from another federal program that requires enforcement of the Build America, Buy America Act. Information about federal funding sources is provided in the Invitation for Bid.*

The Owner is the recipient of an award of Federal financial assistance from a program for infrastructure for this project. Pursuant to the Build America, Buy America Act of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. No. 117-58, none of the funds provided under the Federal award may be used unless the requirements of the domestic content procurement preference outlined below are met. Therefore, the Contractor shall ensure the following:

- (1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;
- (2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another

standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

(3) all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

### *Waivers*

When necessary, recipients of Federal financial assistance may apply for, and the awarding agency may grant, a waiver from the domestic content procurement preference.

When the Federal agency has made a determination that one of the following exceptions applies, the awarding official may waive the application of the domestic content procurement preference in any case in which the agency determines that:

(1) applying the domestic content procurement preference would be inconsistent with the public interest;

(2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or

(3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent. A request to waive the application of the domestic content procurement preference must be in writing. The agency will provide instructions on the format, contents, and supporting materials required for any waiver request. Waiver requests are subject to public comment periods of no less than 15 days and must be reviewed by the Made in America Office.

There may be instances where an award qualifies, in whole or in part, for an existing waiver described on the awarding agency web site.

If the Contractor determines that an application for a waiver is necessary or an existing waiver is applicable to this project, the Contractor shall timely notify the Owner. The Owner will make a determination if a waiver is applicable or if a waiver application is necessary. The Contractor shall not submit any waiver application or information directly to the Federal agency without prior approval by the Owner.

### *Definitions*

“Construction materials” includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of: • non-ferrous metals; • plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); • glass (including optic glass); • lumber; or • drywall.

“Domestic content procurement preference” means all iron and steel used in the project are produced in the United States; the manufactured products used in the project are produced in the United States; or the construction materials used in the project are produced in the United States.

“Infrastructure” includes, at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. Infrastructure includes facilities that generate, transport, and distribute energy.

“Project” means the construction, alteration, maintenance, or repair of infrastructure in the United States.

### **29.0 Prohibition on Certain Telecommunication and Video Surveillances Services or Equipment (Pub. L. 115-232, Section 889)**

Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of a Federal executive agency and recipients or subrecipients of funds from such agencies from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons. Pursuant to such provisions, the Contractor understands and agrees that the Contractor and its subcontractors shall not obligate or expend loan or grant funds from the Federal Agency under this Contract to:

(1) Procure or obtain;

(2) Extend or renew a contract to procure or obtain; or

(3) Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in [Public Law 115–232](#), section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

(i) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

(ii) Telecommunications or video surveillance services provided by such entities or using such equipment.

(iii) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

**TERMS AND CONDITIONS FOR CONTRACTOR**  
**RECEIPT OF FEDERAL ARPA SFRF FUNDS**

**I. Use of Funds:** \_\_\_\_\_ (“Contractor”) understands and agrees that the State of Missouri has received funds for this project under section 602(c) of the Social Security Act (“Act”), as added by Section 9901 of the American Rescue Plan Act (“ARPA”), Pub. L. No. 117-2 (March 11, 2021), 135 Stat. 4, 223–26, and the funds disbursed under such grant may only be used in compliance with the ARPA and the U.S. Department of the Treasury (“Treasury”)’s regulations implementing that section and guidance, and in compliance with all other restrictions and specifications on use set forth in or applicable through this agreement.

**Period of Performance:** The period of performance for the award begins on the date hereof and ends no later than December 31, 2026. Contractor may use funds granted under this agreement to cover eligible costs incurred during the period of performance, but no later than December 31, 2024.

**Reporting:** Contractor agrees to comply with any reporting obligations established by Treasury or the State of Missouri (“State”), as it relates to this agreement.

**Maintenance of and Access to Records:** Contractor shall maintain records and financial documents sufficient to evidence compliance with section 602(c) of the Act and Treasury’s regulations implementing that section and guidance regarding the eligible uses of funds. Contractor shall also maintain records and financial documents: 1. sufficient for the State, with respect to Contractor’s participation in this grant agreement, to evidence compliance with section 602(c) of the Act and Treasury’s regulations implementing that section and guidance regarding the eligible uses of funds; and 2. necessary for the State, with respect to Contractor’s participation in this agreement, to comply with obligations under 2 C.F.R. Part 200 and any other applicable law. The Treasury Office of Inspector General, the Government Accountability Office, their authorized representatives, the State, or its authorized representatives, shall have the right of access to records and documents (electronic and otherwise) of Contractor in order to conduct audits or other investigations or reviews. Records shall be maintained by Contractor for a period of five (5) years after the end of the period of performance. Wherever practicable, records should be collected, transmitted, and stored in open and machine-readable formats. Contractor’s obligations under this section shall include, without limitation, maintenance of the following specified types of records and financial documents: contracts, invoices, receipts, payrolls, and financial statements.

**Pre-award Costs:** Pre-award costs, as defined at 2 C.F.R. § 200.458, may not be paid with funding from this agreement.

**Compliance with Applicable Law and Regulations:** Contractor agrees to comply with the requirements of section 602 of the Act, regulations adopted by Treasury pursuant to section 602(f) of the Act, guidance issued by Treasury regarding the foregoing, and all other restrictions and specifications set forth in or applicable through this agreement. Contractor also agrees to comply with all other applicable state and federal statutes, regulations, and executive orders, and

Contractor shall provide for such compliance by other parties in any agreements it enters into with other parties relating to this grant.

Federal regulations applicable to this agreement include, without limitation, the following:

i. If the amount of this agreement is expected to equal or exceed \$25,000, or if this agreement is for federally-required audit services, OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement), 2 C.F.R. Part 180, and Treasury's implementing regulation at 31 C.F.R. Part 19, including both the requirement to comply with that part's Subpart C as a condition of participation in this transaction, and the requirement to pass the requirement to comply with that subpart to each person with whom the participant enters into a covered transaction at the next lower tier;

ii. Recipient Integrity and Performance Matters, pursuant to which the award term set forth at 2 C.F.R. Part 200, Appendix XII, is hereby incorporated by reference;

iii. Uniform Relocation Assistance and Real Property Acquisitions Act of 1970 (42 U.S.C. §§ 4601–4655) and implementing regulations; and

iv. Generally applicable federal environmental laws and regulations.

Federal statutes and regulations prohibiting discrimination applicable to this agreement include, without limitation, the following:

i. Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d *et seq.*) and Treasury's implementing regulations at 31 C.F.R. Part 22, which prohibit discrimination on the basis of race, color, or national origin under programs or activities receiving federal financial assistance;

ii. the Fair Housing Act, Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§ 3601 *et seq.*) which prohibits discrimination in housing on the basis of race, color, religion, national origin, sex, familial status, or disability;

iii. Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of disability under any program or activity receiving federal financial assistance;

iv. the Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101 *et seq.*) and Treasury's implementing regulations at 31 C.F.R. Part 23, which prohibit discrimination on the basis of age in programs or activities receiving federal financial assistance; and

v. For local governments only, Title II of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. §§ 12101 *et seq.*), which prohibits discrimination on the basis of disability under programs, activities, and services provided or made available by state and local governments or instrumentalities or agencies thereto.



Remedial Actions: The State reserves the right to impose additional conditions or requirements on Contractor's receipt of this funds under this agreement, as the State deems necessary or advisable, in order to facilitate compliance with any existing or additional conditions or requirements imposed upon the State by Treasury for the State's receipt of ARPA funds. The State also reserves the right to seek recoupment or repayment of funds under this agreement in whole or in part, in the event that Treasury seeks recoupment or repayment of payments made to the State, for reasons relating to Contractor's acts or omissions respecting this agreement. These reservations are expressed without limitation to any other rights the State may hold, either to impose additional conditions or requirements on Contractor's receipt of funds under this agreement or to recoup such funds in whole or in part, under this agreement or other applicable law.

Hatch Act: Contractor agrees to comply, as applicable, with requirements of the Hatch Act (5 U.S.C. §§ 1501–1508 and 7324–7328), which limit certain political activities of State or local government employees whose principal employment is in connection with an activity financed in whole or in part by this federal assistance.

False Statements: Contractor understands that making false statements or claims in connection with this award is a violation of federal law and may result in criminal, civil, or administrative sanctions, including fines, imprisonment, civil damages and penalties, debarment from participating in federal awards or contracts, and/or any other remedy available by law.

Publications: Any publications produced with funds from this agreement must display the following language: "This product [is being] [was] supported, in whole or in part, by federal award number [enter project FAIN] awarded to State of Missouri by the U.S. Department of the Treasury."

Debts Owed State and Federal Government: Any funds paid to Contractor (1) in excess of the amount to which Contractor is finally determined to be authorized to retain under the terms of this agreement; (2) that are determined by the Treasury Office of Inspector General to have been misused; or (3) that are determined by Treasury to be subject to a repayment obligation pursuant to sections 602(e) and 603(b)(2)(D) of the Act and have not been repaid by Contractor shall constitute a debt owed by the State to the federal government. In such instance, the funds constituting the State's debt to the federal government shall also constitute Contractor's debt to the State. Debts owed by Contractor to the State must be paid promptly by Contractor. A debt owed the State by Contractor under this agreement is delinquent if it has not been paid by the date specified in the State's initial demand for payment, unless other satisfactory arrangements have been made or if Contractor knowingly or improperly retains funds that are a debt as defined in this paragraph. The State will take any actions available to it to collect such a debt, including but not limited to actions available to it under the "Remedial Actions" paragraph found in this same section (I) above. The rights of the State as expressed in this paragraph are in addition to, and do not imply the exclusion of, any other rights the State may have under applicable law to collect a debt or seek damages from Contractor.

Disclaimer: In its award of federal financial assistance to the State, Treasury provides that the United States expressly disclaims any and all responsibility or liability to the State or third

persons for the actions of the State or third persons resulting in death, bodily injury, property damages, or any other losses resulting in any way from the performance of this award or any other losses resulting in any way from the performance of this award or any contract or subcontract under this award. Furthermore, in its award of federal financial assistance to the State, Treasury also states that the acceptance of this award by the State does not in any way establish an agency relationship between the United States and the State. This disclaimer applies with equal force to this agreement.

Increasing Seat Belt Use in the United States: Pursuant to Executive Order 13043, 62 FR 19217 (Apr. 18, 1997), Contractor is hereby encouraged to adopt and enforce on-the-job seat belt policies and programs for its employees when operating company-owned, rented or personally owned vehicles, and to encourage any subcontractors to do the same.

Reducing Text Messaging While Driving: Pursuant to federal Executive Order 13513, 74 FR 51225 (Oct. 6, 2009), the State hereby encourages Contractor to adopt and enforce policies that ban text messaging while driving, and to encourage any subcontractors to do the same.<sup>1</sup>

**II.** By entering into this agreement, Contractor ensures its current and future compliance with Title VI of the Civil Rights Act of 1964, as amended, which prohibits exclusion from participation, denial of the benefits of, or subjection to discrimination under programs and activities receiving federal funds, of any person in the United States on the ground of race, color, or national origin (42 U.S.C. § 2000d et seq.), as implemented by Treasury Title VI regulations at 31 C.F.R. Part 22 and other pertinent executive orders such as federal Executive Order 13166; directives; circulars; policies; memoranda and/or guidance documents.

Contractor acknowledges that federal Executive Order 13166, “Improving Access to Services for Persons with Limited English Proficiency,” seeks to improve access to federally assisted programs and activities for individuals who, because of national origin, have Limited English Proficiency (“LEP”). Contractor understands that denying a person access to its programs, services, and activities because of LEP is a form of national origin discrimination prohibited under Title VI of the Civil Rights Act of 1964 and Treasury’s implementing regulations. Accordingly, Contractor shall initiate reasonable steps, or comply with Treasury’s directives, to ensure that LEP persons have meaningful access to its programs, services, and activities. Contractor understands and agrees that meaningful access may entail providing language assistance services, including oral interpretation and written translation where necessary, to ensure effective communication in Contractor’s programs, services, and activities.

Contractor agrees to consider the need for language services for LEP persons during development of applicable budgets and when conducting programs, services, and activities. As a resource, Treasury has published its LEP guidance at 70 FR 6067. For more information on LEP, please visit <http://www.lep.gov>.

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<sup>1</sup> Section I is based on requirements set forth in Treasury’s Coronavirus State Fiscal Recovery Fund Award Terms and Conditions document, executed by the State on July 26, 2021.

Contractor acknowledges and agrees that compliance with this assurance constitutes a condition of continued receipt of federal financial assistance and is binding upon Contractor and Contractor's successors, transferees, and assignees for the period in which such assistance is provided.

*Contractor shall comply with Title VI of the Civil Rights Act of 1964, which prohibits recipients of federal financial assistance from excluding from a program or activity, denying benefits of, or otherwise discriminating against a person on the basis of race, color, or national origin (42 U.S.C. § 2000d et seq.), as implemented by the Department of the Treasury's Title VI regulations, 31 C.F.R. Part 22, which are herein incorporated by reference and made a part of this agreement. Title VI also includes protection to persons with "Limited English Proficiency" in any program or activity receiving federal financial assistance, 42 U.S.C. § 2000d et seq., as implemented by the Department of the Treasury's Title VI regulations 31 C.F.R. Part 22, and herein incorporated by reference and made a part of this agreement.*

Contractor shall cooperate in any enforcement or compliance review activities by Treasury or the State of the aforementioned obligations. Enforcement may include investigation, arbitration, mediation, litigation, and monitoring of any settlement agreements that may result from these actions. That is, Contractor shall comply with information requests, on-site compliance review, and reporting requirements.

Contractor shall maintain and provide to applicants, beneficiaries, their representatives, or any other party requesting the same, information on how to file a Title VI complaint of discrimination with the State of Missouri.

Contractor shall provide to the State documentation of an administrative agency's or court's findings of non-compliance of Title VI and efforts to address the non-compliance, including any voluntary compliance or other agreements between Contractor and the administrative agency that makes any such finding. If Contractor settles a case or matter alleging such discrimination, Contractor must provide to the State documentation of the settlement. If Contractor has not been the subject of any court or administrative agency finding of discrimination, Contractor shall so state.

The United States of America has the right to seek judicial enforcement of the terms of this assurance section and nothing in this section alters or limits the federal enforcement measures that the United States may take in order to address violations of this section or applicable federal law.

Under penalty of perjury, the undersigned certifies that he/she has read and understood this section's obligations as herein described, that any information submitted in conjunction with this assurance document is accurate and complete, and that Contractor is in compliance with the aforementioned nondiscrimination requirements.

By signing this certification, the undersigned represents his or her intention, and legal authorization, to do so on behalf of Contractor.<sup>2</sup>

\_\_\_\_\_  
Signature of Contractor's Authorized Representative

Date: \_\_\_\_\_

\_\_\_\_\_  
Printed Name of Contractor's Authorized Representative

Contractor's Unique Entity Identifier: \_\_\_\_\_  
(\*Name associated with the Unique Entity Identifier must match the Contractor's name on contract documents)

**III.** This agreement shall be conducted in accordance with the standards set forth at 2 C.F.R. §§ 200.317 through 200.327, as applicable. Pursuant to 2 C.F.R. § 200.327 and Appendix II to Part 200 of Title 2 of the C.F.R.:

i. Contracts for more than \$250,000 must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

ii. All contracts in excess of \$10,000 must address termination for cause and for convenience by the State, including the manner by which it will be effected and the basis for settlement.

iii. Except as otherwise provided under 41 C.F.R. Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 C.F.R. Part 60-1.3 must include the equal opportunity clause provided under 41 C.F.R. 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p.339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 C.F.R. Part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

iv. When required by federal program legislation, all prime construction contracts in excess of \$2,000 awarded by non-federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 C.F.R. Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute,

<sup>2</sup> Section II is based on requirements set forth in Treasury's Assurance of Compliance with Civil Rights Requirements document, executed by the State on July 26, 2021.

contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract must be conditioned upon the acceptance of the wage determination. The non-federal entity must report all suspected or reported violations to the federal awarding agency. The contracts must also include a provision for compliance with the Copeland “Anti-Kickback” Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 C.F.R. Part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). The Act provides that each contractor must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-federal entity must report all suspected or reported violations to the federal awarding agency.

v. Where applicable, all contracts awarded by the non-federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Contract Work Hours and Safety Standards Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.<sup>3</sup>

vi. If the State or Contractor wishes to enter into a contract or subcontract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under the State’s award of ARPA funds or this agreement, the State and/or Contractor must comply with the requirements of 37 C.F.R. Part 401, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” and any implementing regulations issued by the awarding agency.

vii. Contracts and subgrants of amounts in excess of \$150,000 must contain a provision that requires the non-federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the

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<sup>3</sup> Additionally, “in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in [29 C.F.R.] § 5.1,” 29 C.F.R. § 5.5(c) requires that another clause be included “in any such contract,” *id.* For language appropriate to construction of this additional clause, see 29 C.F.R. § 5.5(c).

Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA). [

viii. A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 C.F.R. 180 that implement Executive Orders 12549 (3 C.F.R. Part 1986 Comp., p. 189) and 12689 (3 C.F.R. Part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549. This requirement applies when the amount of the agreement is expected to equal or exceed \$25,000, or if the agreement is for federally-required audit services. 2 C.F.R. § 180.220.]

ix. Contractors that apply or bid for an award exceeding \$100,000 must file the certification required by 31 U.S.C. § 1352, the Byrd Anti-Lobbying Amendment. Under that law, each tier certifies to the tier above that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal contract, grant or any other award covered by 31 U.S.C. § 1352. Each tier must also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the non-federal award.

x. A non-federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines. In the performance of this agreement, Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired: 1. competitively within a timeframe providing for compliance with this agreement’s performance schedule; 2. meeting this agreement’s performance requirements; or 3. at a reasonable price. Information about this requirement, along with the list of EPA-designated items, is available at EPA’s Comprehensive Procurement Guidelines webpage: <http://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>. Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

xi. Pursuant to Pub. L. No. 115-232, H.R. 5515 (115<sup>th</sup> Congress, 2018), and 2 C.F.R. § 200.216, funds provided by this agreement shall not be obligated or expended to: 1. Procure or obtain; 2. Extend or renew a contract to procure or obtain; or 3. Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered

telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. For purposes of this prohibition, “covered telecommunications equipment or services” has the meaning as set forth at Sec. 889(f)(3) of Pub. L. No. 115-232. *See also* 2 C.F.R. § 200.216.

xii. Pursuant to 2 C.F.R. § 200.322, as appropriate and to the extent consistent with law, Contractor should, to the greatest extent practicable under this agreement, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). For purposes of this provision: 1. “produced in the United States” means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States. 2. “manufactured products” means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

# Missouri

## Division of Labor Standards

### WAGE AND HOUR SECTION



MICHAEL L. PARSON, Governor

# Annual Wage Order No. 31

Section 081  
**PHELPS COUNTY**

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by \_\_\_\_\_

Todd Smith, Director  
Division of Labor Standards

Filed With Secretary of State: \_\_\_\_\_ **March 8, 2024**

Last Date Objections May Be Filed: **April 8, 2024**

Prepared by Missouri Department of Labor and Industrial Relations



OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Asbestos Worker	\$61.37
Boilermaker	\$27.46*
Bricklayer-Stone Mason	\$55.63
Carpenter	\$62.01
Lather	
Linoleum Layer	
Millwright	
Pile Driver	
Cement Mason	\$57.93
Plasterer	
Communication Technician	\$27.46*
Electrician (Inside Wireman)	\$58.12
Electrician Outside Lineman	\$27.46*
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Elevator Constructor	\$27.46*
Glazier	\$25.90
Ironworker	\$27.46*
Laborer	\$46.97
General Laborer	
First Semi-Skilled	
Second Semi-Skilled	
Mason	\$27.46*
Marble Mason	
Marble Finisher	
Terrazzo Worker	
Terrazzo Finisher	
Tile Setter	
Tile Finisher	
Operating Engineer	\$70.56
Group I	
Group II	
Group III	
Group III-A	
Group IV	
Group V	
<b>Painter</b>	<b>\$48.22</b>
Plumber	\$71.18
Pipe Fitter	
Rofer	\$55.31
Sheet Metal Worker	\$70.63
Sprinkler Fitter	\$65.89
Truck Driver	\$27.46*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

\*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

\*\*The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in RSMo Section 290.210.

Heavy Construction Rates for  
PHELPS County

Section 081

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Carpenter	\$27.46*
Millwright	
Pile Driver	
Electrician (Outside Lineman)	\$77.46
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Laborer	\$48.26
General Laborer	
Skilled Laborer	
Operating Engineer	\$63.22
Group I	
Group II	
Group III	
Group IV	
Truck Driver	\$27.46*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

\*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

\*\*The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.

# OVERTIME and HOLIDAYS

## OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "**overtime work**" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

## HOLIDAYS

January first;  
The last Monday in May;  
July fourth;  
The first Monday in September;  
November eleventh;  
The fourth Thursday in November; and  
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

## SECTION 01 10 00

### SUMMARY OF WORK

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of replacing and realigning the existing waterline, isolation valves, and fire hydrants on site. A portion of the sanitary sewer line is to be replaced and realigned.
  - 1. Project Location: 620 N Jefferson St. St James, MO 65559.
  - 2. Owner: State of Missouri, Office of Administration, Division of Facilities Management, Design and Construction, Harry S Truman State Office Building, Post Office Box 809, 301 West High Street, Jefferson City, Missouri 65102.
- B. Contract Documents, dated 05/03/2024 were prepared for the Project by C.M. Archer Group P.C. Located at 310 E. 6th St, Rolla, MO 65401.
- C. The Work consists of coordinating, scheduling, incorporating, and providing materials and labor necessary to, connect and install a new 8" AWWA C-900 DR-18 PVC water line, gate valve assemblies, fire hydrant assemblies, backflow preventer, and all associated appurtenances. Also, coordinate, schedule, incorporate, and provide materials and labor necessary to, connect and install a new 8" ASTM D3034 SDR-26 PVC sanitary sewer line, manholes, and all associated appurtenances. The scope of work includes, but is not limited to; trenching, laying, connecting, filling, testing, backfilling, pavement repair, and all materials necessary to afford a complete and functional installation. Contractor coordination of construction activities to afford continuity of owner operation.
- D. The work will be constructed under a single prime contract.

#### WORK SEQUENCE

##### 1.03

- A. General: Construction sequence shall be in accordance with requirements herein subject to Owner's need for continuous operation of existing facilities:
  - 1. Contractor(s) shall submit a proposed schedule and construction sequence in accordance with the general conditions relating to preliminary matters at the project preconstruction meeting, but shall generally follow this construction sequencing: Obtain all required permitting, mobilization, excavate and install water main, valves, and hydrants, make main to main connection to fill pipe and test main, connect service taps, cap existing main and make any remaining main to main connections, finish backfilling, pave road crossings, topsoil, seed, and mulch, reapply pavement markings.

- B. Continuous Service of Existing Facilities: Where the Work is on or adjacent to existing facilities, exercise caution and schedule operations to ensure that functioning of present facilities will not be endangered. Shutdown of Owner's operating facilities to perform the Work shall be held to a minimum length of time and shall be coordinated with Owner who shall have control over the timing and schedules of such shutdowns.
- C. Completed Areas: Owner intends to place in service, in accordance with the provisions for use of completed Work set forth in the General Conditions, the facilities as soon as they are sufficiently complete and ready for their intended use.
- D. Coordination: The Contractor shall be required to provide at least a seventy-two (72) hour notification of the shutdown of any facilities necessary for him to perform his work. He shall also provide to the Owner, at least 2-3 weeks in advance, a written plan of work which identifies the stages, length of shutdown time, and other contingency plans for review and approval by the Engineer and Owner.

#### **1.04 CONTRACTOR USE OF PREMISES**

- A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.
- B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
  - 1. Owner Occupancy: Allow for Owner occupancy and use by the public.
  - 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

#### **1.05 OCCUPANCY REQUIREMENTS**

- A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.
- B. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
  - 1. The Designer will prepare a Certificate of Partial Occupancy for each specific portion of the Work to be occupied prior to substantial completion.
  - 2. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions for the building.
  - 3. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions for the building.

## **PART 2 - PRODUCTS (Not Applicable)**

## **PART 3 - EXECUTION**

### **3.01 WORK RESTRICTIONS**

- A. General: The Contractor shall limit his use of the premises to the work indicated, so as to allow for Owner occupancy and use by the public.
  
- B. Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.
  - 1. Keep existing driveways and roadways open to traffic at all times. Coordinate open-cut crossings of roads to allow at least one lane of through traffic at all times.
  - 2. At all times fire lanes are to remain unblocked and accessible.
  - 3. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off-site.
  - 4. Excavation areas cannot be left open when not being worked and must be closed off at the close of business. In lieu of daily backfill, place adequate construction barriers and/or fencing conforming to federal Occupation Safety and Health Administration (OSHA) Regulation 29 CFR, Part 1910, Subpart D, Occupational Safety and Health Standards, General Industry Standards.) around the excavated area.
  - 5. Water and/or fire service for the facility shall not be disturbed, and construction shall be staged to afford continuous water service for the facility.
  - 6. Where disruption to water and or fire service must occur to make process/utility interconnection, submit a written plan documenting construction activities to be performed and the anticipated duration of the outage. Make every effort to minimize interruptions of service. Construction activities may proceed only after the owner's written approval of the proposed sequencing plan.
  - 7. Lock automotive-type vehicles, such as passenger cars and trucks and other mechanized or motorized equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.

END OF SECTION

## **SECTION 012100 – ALLOWANCES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Weather allowances.
- C. Related Sections include the following:
  - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders for allowances.
  - 2. Division 1 Section "Unit Prices" for procedures for using unit prices.

#### **1.3 WEATHER ALLOWANCE**

- A. Included within the completion period for this project are a specified number of “bad weather” days (see Schedule of Allowances).
- B. The Contractor’s progress schedule shall clearly indicate the bad weather day allowance as an “activity” or “activities”. In the event weather conditions preclude performance of critical work activities for 50% or more of the Contractor’s scheduled workday, that day shall be declared unavailable for work due to weather (a “bad weather” day) and charged against the above allowance. Critical work activities will be determined by review of the Contractor’s current progress schedule.
- C. The Contractor’s Representative and the Construction Representative shall agree monthly on the number of “bad weather” days to be charged against the allowance. This determination will be documented in writing and be signed by the Contractor and the Construction Representatives. If there is a failure to agree on all or part of the “bad weather” days for a particular month, that disagreement shall be noted on this written document and signed by each party’s representative. Failure of the Contractor’s representative to sign the “bad weather” day documentation after it is presented, with or without the notes of disagreement, shall constitute agreement with the “bad weather” day determination contained in that document.
- D. There will be no modification to the time of contract performance due solely to the failure to deplete the “bad weather” day allowance.

- E. Once this allowance is depleted, a no cost Change Order time extension will be executed for “bad weather” days, as defined above, encountered during the remainder of the Project.

#### **1.4 SELECTION AND PURCHASE**

- A. At the earliest practical date after award of the Contract, Designer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Designer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Designer from the designated supplier.

#### **1.5 SUBMITTALS**

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### **1.6 COORDINATION**

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

#### **3.2 PREPARATION**

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

#### **3.3 SCHEDULE OF ALLOWANCES**

- A. Weather Allowance: Included within the completion period for this Project 10 “bad weather” days.

### **END OF SECTION 012100**



## SECTION 01 26 00

### CONTRACT MODIFICATION PROCEDURES

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract Modifications.
- B. Related Sections include the following:
  - 1. Division 1, Section 013115 "Project Management Communications" for administrative requirements for communications.
  - 2. Division 0, Section 007213, Article 3.1 "Acceptable Substitutions" for administrative procedures for handling Requests for Substitutions made after Contract award.
  - 3. Division 0, Section 007213, Article 4.0 "Changes in the Work" for Change Order requirements.

##### 1.03 REQUESTS FOR INFORMATION

- A. In the event that the Contractor or Subcontractor, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Documents requires clarification or interpretation, the Contractor shall submit a "Request for Information" (RFI) in writing to the Designer. A RFI may only be submitted by the Contractor and shall only be submitted on the RFI forms provided by the Owner. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed. In the RFI, the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- B. Responses to RFI shall be issued within ten (10) working days of receipt of the Request from the Contractor unless the Designer determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Designer, the Designer will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a RFI on a time sensitive activity on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Designer to respond to the request provided that the Designer responds within the ten (10) working days set forth above.
- C. Responses from the Designer will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Document, the Contractor shall give written notice to the Designer requesting a Change Order for the work. Failure to give such written notice within ten (10) working days, shall waive the Contractor's right to seek additional time or cost under Article 4, "Changes in the Work" of the General Conditions.

#### **1.04 MINOR CHANGES IN THE WORK**

- A. Designer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Amount or the Contract Time, on "Designer's Supplemental Instructions" (DSI).

#### **1.05 PROPOSAL REQUESTS**

- A. The Designer or Owner Representative will issue a detailed description of proposed Changes in the Work that may require adjustment to the Contract Amount or the Contract Time. The proposed Change Description will be issued using the "Request for Proposal" (RFP) form. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal Requests issued by the Designer or Owner Representative are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
  - 2. Within ten (10) working days after receipt of Proposal Request, submit a proposal for the cost adjustments to the Contract Amount and the Contract Time necessary to execute the Change. The Contractor shall submit his proposal on the appropriate Change Order Detailed Breakdown form. Subcontractors may use the appropriate Change Order Detailed Breakdown form or submit their proposal on their letterhead provided the same level of detail is included. All proposals shall include:
    - a. A detailed breakdown of costs per Article 4.1 of the General Conditions.
    - b. If requesting additional time per Article 4.2 of the General Conditions, include an updated Contractor's Construction Schedule that indicates the effect of the Change including, but not limited to, changes in activity duration, start and finish times, and activity relationship.

#### **1.06 CHANGE ORDER PROCEDURES**

- A. On Owner's approval of a Proposal Request, the Designer or Owner Representative will issue a Change Order for signatures of Owner and Contractor on the "Change Order" form.

#### **PART 2 - PRODUCTS (Not Used)**

#### **PART 3 - EXECUTION (Not Used)**

END OF SECTION

## SECTION 01 31 00

### COORDINATION

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Projects including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Administrative and supervisory personnel.
  - 3. Project meetings.
- B. Each Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific Contractor.
- C. Related Sections include the following:
  - 1. Division 1, Section 013200 "Schedules" for preparing and submitting Contractor's Construction Schedule.
  - 2. Articles 1.8.B and 1.8.C of Section 007213 "General Conditions" for coordinating meetings onsite.
  - 3. Article 5.4.H of Section 007213 "General Conditions" for coordinating Closeout of the Contract.

##### 1.03 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections, which depend on each other for proper installation, connection, and operation.
- B. Coordination: Each Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components including mechanical and electrical.

- C. Prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate Contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Startup and adjustment of systems.
  - 8. Project Closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

#### **1.04 SUBMITTALS**

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
- B. Key Personnel Names: Within fifteen (15) work days of starting construction operations, submit a list of key personnel assignments including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
  - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### **1.05 PROJECT MEETINGS**

- A. The Owner's Construction Representative will schedule a Pre-Construction Meeting prior to beginning of construction. The date, time, and exact place of this meeting will be determined after Contract Award and notification of all interested parties. The Contractor shall arrange to have the Job Superintendent and all prime Subcontractors present at the meeting. During the Pre-Construction Meeting, the construction procedures and information necessary for submitting payment requests will be discussed and materials distributed along with any other pertinent information.
  - 1. Minutes: Designer will record and distribute meeting minutes.

- B. Progress Meetings: The Owner's Construction Representative will conduct Monthly Progress Meetings as stated in Articles 1.8.B and 1.8.C of Section 007213 "General Conditions".
1. Minutes: Designer will record and distribute to Contractor the meeting minutes.
- C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of Manufacturers and Fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Designer and Construction Representative of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration including requirements for the following:
    - a. Contract Documents
    - b. Options
    - c. Related RFIs
    - d. Related Change Orders
    - e. Purchases
    - f. Deliveries
    - g. Submittals
    - h. Review of mockups
    - i. Possible conflicts
    - j. Compatibility problems
    - k. Time schedules
    - l. Weather limitations
    - m. Manufacturer's written recommendations
    - n. Warranty requirements
    - o. Compatibility of materials
    - p. Acceptability of substrates
    - q. Temporary facilities and controls
    - r. Space and access limitations
    - s. Regulations of authorities having jurisdiction
    - t. Testing and inspecting requirements
    - u. Installation procedures
    - v. Coordination with other Work
    - w. Required performance results
    - x. Protection of adjacent Work
    - y. Protection of construction and personnel
  3. Contractor shall record significant conference discussions, agreements, and disagreements including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
6. Revise paragraph below if Project requires holding progress meetings at different intervals. Insert special intervals such as "every third Tuesday" to suit special circumstances.
7. Project name
8. Name and address of Contractor
9. Name and address of Designer
10. RFI number including RFIs that were dropped and not submitted
11. RFI description
12. Date the RFI was submitted
13. Date Designer's response was received
14. Identification of related DSI or Proposal Request, as appropriate

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

END OF SECTION

## SECTION 01 31 15

### PROJECT MANAGEMENT COMMUNICATIONS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.
- B. Division 1, Section 013300 - Submittals
- C. Division 1, Section 012600 – Contract Modification Procedures

##### 1.02 SUMMARY

- A. Project Management Communications: The Contractor shall use the Internet web based project management communications tool, E-Builder® ASP software, and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.
  - 1. Project management communications is available through E-Builder® as provided by "e-Builder®" in the form and manner required by the Owner.
  - 2. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited
- B. Support: E-Builder® will provide on-going support through on-line help files.
- C. Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.
- D. Purpose: The intent of using E-Builder® is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files
- E. Authorized Users: Access to the web site will be by individuals who are authorized users.
  - 1. Individuals shall complete the E-Builder New Company/User Request Form located at the following web site: <https://oa.mo.gov/facilities/vendor-links/contractor-forms>. Completed forms shall be emailed to the following email address: [OA.FMDCE-BuilderSupport@oa.mo.gov](mailto:OA.FMDCE-BuilderSupport@oa.mo.gov).
  - 2. Authorized users will be contacted directly and assigned a temporary user password.
  - 3. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.
- F. Administrative Users: Administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE! Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).

- G. Communications: The use of fax, email and courier communication for this project is discouraged in favor of using E-Builder® to send messages. Communication functions are as follows:
1. Document Integrity and Revisions:
    - a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
    - b. The system shall make it easy to identify revised or superseded documents and their predecessors.
    - c. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
  2. Document Security:
    - a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties communication except for Administrative Users. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!**
  3. Document Integration:
    - a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.
  4. Reporting:
    - a. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.
  5. Notifications and Distribution:
    - a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.
  6. Required Document Types:
    - a. RFI, Request for Information.
    - b. Submittals, including record numbering by drawing and specification section.
    - c. Transmittals, including record of documents and materials delivered in hard copy.
    - d. Meeting Minutes.
    - e. Application for Payments (Draft or Pencil).
    - f. Review Comments.
    - g. Field Reports.
    - h. Construction Photographs.
    - i. Drawings.
    - j. Supplemental Sketches.
    - k. Schedules.
    - l. Specifications.
    - m. Request for Proposals
    - n. Designer's Supplemental Instructions
    - o. Punch Lists
- H. Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 8½ x 11 inches), all other 8½ x 11 inches documents shall be submitted by transmission in electronic form to the E-Builder® web site by licensed users.
- a. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier shall respond to



documents received in electronic form on the web site, and consider them as if received in paper document form.

- b. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.
  - c. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall copy any paper document into electronic form and make same available on the web site.
- I. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier required to have a user license(s) shall be responsible for the following:
- 1. Providing suitable computer systems for each licensed user at the users normal work location<sup>1</sup> with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.
  - 2. Each of the above referenced computer systems shall have the following minimum system<sup>2</sup> and software requirements:
    - a. Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.)
      - 1) Operating System: Windows XP or newer
      - 2) Internet Browser: Internet Explorer 6.01SP2+ (Recommend IE7.0+)
      - 3) Minimum Recommend Connection Speed: 256K or above
      - 4) Processor Speed: 1 Gigahertz and above
      - 5) RAM: 512 mb
      - 6) Operating system and software shall be properly licensed.
      - 7) Internet Explorer version 7 (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.
      - 8) Adobe Acrobat Reader (current version is a free distribution for download).
      - 9) Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

## **PART 2 - PRODUCTS (Not Applicable)**

## **PART 3 - EXECUTION (Not Applicable.)**

END OF SECTION

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<sup>1</sup> The normal work location is the place where the user is assigned for more than one-half of his time working on this project.

<sup>2</sup> The minimum system herein will not be sufficient for many tasks and may not be able to process all documents and files stored in the E-Builder® Documents area.

## SECTION 01 32 00

### SCHEDULE – BAR CHART

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUMMARY

- A. This Section includes requirements for a Bar Chart Schedule for the project construction activities, schedule of submittals, and schedule for testing.

#### PART 2 - PRODUCTS – (Not Applicable)

#### PART 3 - EXECUTION

##### 3.01 SUBMITTAL PROCEDURES

- A. The Contractor shall submit to the Designer, within ten (10) working days following the Notice to Proceed, a Progress Schedule including Schedule of Values showing the rate of progress the Contractor agrees to maintain and the order in which he proposed to carry out the various phases of Work. No payments shall be made to the Contractor until the Progress Schedule has been approved by the Owner.
  - 1. The Schedule of Values must have the following line items included with the value of the item as indicated below:
    - a. O&M's (Owner's Manual)
      - 1) \$1,000,000.00 (One million) and under – 2% of the total contract amount
      - 2) Over \$1,000,000.00 (One million) – 1% of the total contract amount
    - b. Close Out Documents
      - 1) \$1,000,000.00 (One million) and under – 2% of the total contract amount
      - 2) Over \$1,000,000.00 (One million) – 1% of the total contract amount
    - c. General Conditions
      - 1) No more than 10%
- B. The Contractor shall submit an updated Schedule for presentation at each Monthly Progress Meeting. The Schedule shall be updated by the Contractor as necessary to reflect the current Schedule and its relationship to the original Schedule. The updated Schedule shall reflect any changes in the logic, sequence, durations, or completion date. Payments to the Contractor shall be suspended if the Progress Schedule is not adequately updated to reflect actual conditions.
- C. The Contractor shall submit Progress Schedules to Subcontractors to permit coordinating their Progress Schedules to the general construction Work. The Contractor shall coordinate preparation and processing of Schedules and reports with performance of other construction activities.

### 3.02 CONSTRUCTION PROGRESS SCHEDULE – BAR CHART SCHEDULE

- A. Bar-Chart Schedule: The Contractor shall prepare a comprehensive, fully developed, horizontal bar chart-type Contractor's Construction Schedule. The Contractor for general construction shall prepare the Construction Schedule for the entire Project. The Schedule shall show the percentage of work to be completed at any time, anticipated monthly payments by Owner, as well as significant dates (such as completion of excavation, concrete foundation work, underground lines, superstructure, rough-ins, enclosure, hanging of fixtures, etc.) which shall serve as check points to determine compliance with the approved Schedule. The Schedule shall also include an activity for the number of "bad" weather days specified in Section 012100 – Allowances.
1. The Contractor shall provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.
    - a. If practical, use the same Schedule of Values breakdown for schedule time bars.
  2. The Contractor shall provide a base activity time bar showing duration for each construction activity. Each bar is to indicate start and completion dates for the activity. The Contractor is to place a contrasting bar below each original schedule activity time for indicating actual progress and planned remaining duration for the activity.
  3. The Contractor shall prepare the Schedule on a minimal number of separate sheets to readily show the data for the entire construction period.
  4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on schedule with other construction activities. Include minor elements involved in the overall sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
  5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other required schedules and reports.
  6. Indicate the Intent to Award and the Contract Substantial Completion dates on the schedule.
- B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by the following:
1. Requirement for Phased completion
  2. Work by separate Contractors
  3. Work by the Owner
  4. Pre-purchased materials
  5. Coordination with existing construction
  6. Limitations of continued occupancies
  7. Un-interruptible services
  8. Partial Occupancy prior to Substantial Completion
  9. Site restrictions
  10. Provisions for future construction
  11. Seasonal variations
  12. Environmental control

- C. Work Stages: Use crosshatched bars to indicate important stages of construction for each major portion of the Work. Such stages include, but are not necessarily limited to, the following:
1. Subcontract awards
  2. Submittals
  3. Purchases
  4. Mockups
  5. Fabrication
  6. Sample testing
  7. Deliveries
  8. Installation
  9. Testing
  10. Adjusting
  11. Curing
  12. Startup and placement into final use and operation
- D. Area Separations: Provide a separate time bar to identify each major area of construction for each major portion of the Work. For the purposes of this Article, a "major area" is a story of construction, a separate building, or a similar significant construction element.
1. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. Structural completion.
    - b. Permanent space enclosure
    - c. Completion of mechanical installation
    - d. Completion of the electrical portion of the Work
    - e. Substantial Completion

### **3.03 SCHEDULE OF SUBMITTALS**

- A. Upon acceptance of the Construction Progress Schedule, prepare and submit a complete schedule of submittals. Coordinate the submittal schedule with Section 013300 SUBMITTALS, the approved Construction Progress Schedule, list of subcontracts, Schedule of Values and the list of products.
- B. Prepare the schedule in chronological order. Provide the following information
1. Scheduled date for the first submittal
  2. Related Section number
  3. Submittal category
  4. Name of the Subcontractor
  5. Description of the part of the Work covered
  6. Scheduled date for resubmittal
  7. Scheduled date for the Designer's final release or approval
- C. Distribution: Following the Designer's response to the initial submittal schedule, print and distribute copies to the Designer, Owner, subcontractors, and other parties required to comply with submittal dates indicated.

1. Post copies in the Project meeting room and temporary field office.
  2. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned part of the Work and are no longer involved in construction activities.
- D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

### **3.04 SCHEDULE OF INSPECTIONS AND TESTS**

- A. Prepare a schedule of inspections, tests, and similar services required by the Contract Documents. Submit the schedule with (15) days of the date established for commencement of the Contract Work. The Contractor is to notify the testing agency at least (5) working days in advance of the required tests unless otherwise specified.
- B. Form: This schedule shall be in tabular form and shall include, but not be limited to, the following:
1. Specification Section number
  2. Description of the test
  3. Identification of applicable standards
  4. Identification of test methods
  5. Number of tests required
  6. Time schedule or time span for tests
  7. Entity responsible for performing tests
  8. Requirements for taking samples
  9. Unique characteristics of each service
- C. Distribution: Distribute the schedule to the Owner, Architect, and each party involved in performance of portions of the Work where inspections and tests are required.

END OF SECTION

## SECTION 013300

### SUBMITTALS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.
- B. Division 1, Section 013115 "Project Management Communications" for administrative requirements for communications.

##### 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work including the following:
  - 1. Shop Drawings
  - 2. Product Data
  - 3. Samples
  - 4. Quality Assurance Submittals
  - 5. Construction Photographs
  - 6. Operating and Maintenance Manuals
  - 7. Warranties
- B. Administrative Submittals: Refer to General and Supplementary Conditions other applicable Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
  - 1. Construction Progress Schedule including Schedule of Values
  - 2. Performance and Payment Bonds
  - 3. Insurance Certificates
  - 4. Applications for Payment
  - 5. Certified Payroll Reports
  - 6. Partial and Final Receipt of Payment and Release Forms
  - 7. Affidavit – Compliance with Prevailing Wage Law
  - 8. Record Drawings
  - 9. Notifications, Permits, etc.
- C. The Contractor is obliged and responsible to check all shop drawings and schedules to assure compliance with contract plans and specifications. The Contractor is responsible for the content of the shop drawings and coordination with other contract work. Shop drawings and schedules shall indicate, in detail, all parts of an Item or Work including erection and setting instructions and integration with the Work of other trades.
- D. The Contractor shall at all times make a copy, of all approved submittals, available on site to the Construction Representative.

### **1.03 SUBMITTAL PROCEDURES**

- A. The Contractor shall comply with the General and Supplementary Conditions and other applicable sections of the Contract Documents. The Contractor shall submit, with such promptness as to cause no delay in his work or in that of any other contractors, all required submittals indicated in Part 3.1 of this section and elsewhere in the Contract Documents. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
    - a. The Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- B. Each drawing and/or series of drawings submitted must be accompanied by a letter of transmittal giving a list of the titles and numbers of the drawings. Each series shall be numbered consecutively for ready reference and each drawing shall be marked with the following information:
1. Date of Submission
  2. Name of Project
  3. Location
  4. Section Number of Specification
  5. State Project Number
  6. Name of Submitting Contractor
  7. Name of Subcontractor
  8. Indicate if Item is submitted as specified or as a substitution

### **1.04 SHOP DRAWINGS**

- A. Comply with the General Conditions, Article 3.2.
- B. The Contractor shall submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings including the following information:
1. Dimensions
  2. Identification of products and materials included by sheet and detail number
  3. Compliance with specified standards
  4. Notation of coordination requirements
  5. Notation of dimensions established by field measurement
  6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8½"x11" but no larger than 36"x48".

## **1.05 PRODUCT DATA**

- A. The Contractor shall comply with the General Conditions, Article 3.2.
- B. The Contractor shall collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
  - 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information including the following information:
    - a. Manufacturer's printed recommendations
    - b. Compliance with Trade Association standards
    - c. Compliance with recognized Testing Agency standards
    - d. Application of Testing Agency labels and seals
    - e. Notation of dimensions verified by field measurement
    - f. Notation of coordination requirements
  - 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

## **1.06 SAMPLES**

- A. The Contractor shall comply with the General Conditions, Article 3.2.
- B. The Contractor shall submit full-size, fully fabricated samples, cured and finished as specified, and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
  - 1. The Contractor shall mount or display samples in the manner to facilitate review of qualities indicated. Prepare samples to match the Designer's sample including the following:
    - a. Specification Section number and reference
    - b. Generic description of the Sample
    - c. Sample source
    - d. Product name or name of the Manufacturer
    - e. Compliance with recognized standards
    - f. Availability and delivery time
  - 2. The Contractor shall submit samples for review of size, kind, color, pattern, and texture. Submit samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.
    - b. Refer to other Specification Sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.



- c. Refer to other Sections for samples to be returned to the Contractor for incorporation in the Work. Such samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of sample submittals.
  - d. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
- 3. Field samples are full-size examples erected onsite to illustrate finishes, coatings, or finish materials and to establish the Project standard.
  - a. The Contractor shall comply with submittal requirements to the fullest extent possible. The Contractor shall process transmittal forms to provide a record of activity.

#### **1.07 QUALITY ASSURANCE DOCUMENTS**

- A. The Contractor shall comply with the General Conditions, Article 3.2
- B. The Contractor shall submit quality control submittals including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- C. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the Manufacturer certifying compliance with specified requirements.
  - 1. Signature: Certification shall be signed by an officer of the Manufacturer or other individual authorized to contractually bind the Company.
- D. Inspection and Test Reports: The Contractor shall submit the required inspection and test reports from independent testing agencies as specified in this Section and in other Sections of the Contract Documents.
- E. Construction Photographs: The Contractor shall submit record construction photographs as specified in this Section and in other Sections of the Contract Documents.
  - 1. The Contractor shall submit digital photographs. The Construction Administrator shall determine the quantity and naming convention at the preconstruction meeting.
  - 2. The Contractor shall identify each photograph with project name, location, number, date, time, and orientation.
  - 3. The Contractor shall submit progress photographs monthly unless specified otherwise. Photographs shall be taken one (1) week prior to submitting.
  - 4. The Contractor shall take four (4) site photographs from differing directions and a minimum of five (5) interior photographs indicating the relative progress of the Work.

#### **1.08 OPERATING AND MAINTENANCE MANUALS AND WARRANTIES**

- A. The Contractor shall submit all required manufacturer's operating instructions, maintenance/service manuals, and warranties in accordance with the General Conditions, Article 3.5, and Supplementary Conditions along with this and other Sections of the Contract Documents.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION**

**3.01 REQUIRED SUBMITTALS**

- A. Contractor shall submit the following information for materials and equipment to be provided under this contract.

<b>SPEC SECTION</b>	<b>TITLE</b>	<b>CATEGORY</b>
013200	Schedules	Construction Schedule
013200	Schedules	Schedule of Values
013200	Schedules	List of Subcontractors
013200	Schedules	Major Material Suppliers
033001	Concrete	Product Data
033001	Concrete Mix Design and Aggregate Gradation	Product Data
055000	Metal Fabrication	Product Data
071400	Fluid-Applied Waterproofing	Product Data
083114	Access Door with Safety Grating and Frames	Product Data
099000	Paint and Coating	Product Data
101414	Exterior Signage	Product Data
310000	Earthwork	Product Data
312513	Erosion Control	Shop Drawings
321216	Asphalt Paving	Product Data
321313	Concrete Paving	Product Data
329110	Landscape Work	Product Data
330509	Thrust Restraints	Product Data
330561	Concrete Manholes	Product Data
330597	Identification and Signage For Utilities	Product Data
331416	Site Water Utility Distribution Piping	Product Data
331419	Valves and Hydrants for Water Utility Service	Product Data
331420	Pipe Support	Product Data
333100	Sanitary Sewer Piping	Product Data

END OF SECTION

## SECTION 01 35 13

### SITE SECURITY AND HEALTH REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUBMITTALS

- A. List of required submittals:
  - 1. Materials Safety Data Sheets for all hazardous materials to be brought onsite.
  - 2. Schedule of proposed shutdowns, if applicable.
  - 3. A list of the names of all employees who will submit fingerprints for a background check, and the signed privacy documents identified below for each employee.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

##### 3.01 ACCESS TO THE SITE

- A. The Contractor shall arrange with Facility Representatives to establish procedures for the controlled entry of workers and materials into the work areas at the Facility.
- B. The Contractor shall establish regular working hours with Facility Representatives. The Contractor must report changes in working hours or overtime to Facility Representatives and obtain approval twenty-four (24) hours ahead of time. The Contractor shall report emergency overtime to Facility Representatives as soon as it is evident that overtime is needed. The Contractor must obtain approval from Facility Representatives for all work performed after dark.
- C. The Contractor shall provide the name and phone number of the Contractor's employee or agent who is in charge onsite; this individual must be able to be contacted in case of emergency. The Contractor must be able to furnish names and address of all employees upon request.
- D. All construction personnel shall visibly display issued identification cards.

##### 3.02 FIRE PROTECTION, SAFETY, AND HEALTH CONTROLS

- A. The Contractor shall take all necessary precautions to guard against and eliminate possible fire hazards.
  - 1. Onsite burning is prohibited.
  - 2. The Contractor shall store all flammable or hazardous materials in proper containers located outside the buildings or offsite, if possible.
  - 3. The Contractor shall provide and maintain, in good order, during construction fire extinguishers as required by the National Fire Protection Association. In areas of flammable liquids, asphalt, or electrical hazards, 15-pound carbon dioxide or 20-pound dry chemical extinguishers shall be provided.
- B. The Contractor shall not obstruct streets or walks without permission from the Owner's

Construction Representative and Facility Representatives.

- C. The Contractor's personnel shall not exceed the speed limit of 15 mph while at the Facility unless otherwise posted.
- D. The Contractor shall take all necessary, reasonable measures to reduce air and water pollution by any material or equipment used during construction. The Contractor shall keep volatile wastes in covered containers, and shall not dispose of volatile wastes or oils in storm or sanitary drains.
- E. The Contractor shall keep the project site neat, orderly, and in a safe condition at all times. The Contractor shall immediately remove all hazardous waste, and shall not allow rubbish to accumulate. The Contractor shall provide onsite containers for collection of rubbish and shall dispose of it at frequent intervals during the progress of the Work.
- F. Fire exits, alarm systems, and sprinkler systems shall remain fully operational at all times, unless written approval is received from the Owner's Construction Representative and the appropriate Facility Representative at least twenty-four (24) hours in advance. The Contractor shall submit a written time schedule for any proposed shutdowns.
- G. For all hazardous materials brought onsite, Material Safety Data Sheets shall be on site and readily available upon request at least a day before delivery.
- H. Alcoholic beverages or illegal substances shall not be brought upon the Facility premises. The Contractor's workers shall not be under the influence of any intoxicating substances while on the Facility premises.

### **3.03 SECURITY CLEARANCES AND RESTRICTIONS**

- A. **FMDC REQUIRED FINGERPRINTING FOR CRIMINAL BACKGROUND AND WARRANTS CHECK**
  - 1. All employees of the Contractor are required to submit fingerprints to the Missouri State Highway Patrol to enable the Office of Administration, Division of Facilities Management, Design and Construction (FMDC) to receive state and national criminal background checks on such employees. FMDC reserves the right to prohibit any employee of the Contractor from performing work in or on the premises of any facility owned, operated, or utilized by the State of Missouri for any reason.
  - 2. The Contractor shall ensure all of its employees submit fingerprints to the Missouri State Highway Patrol and pay for the cost of such background checks. The Contractor shall submit to FMDC via email to [FMDCSecurity@oa.mo.gov](mailto:FMDCSecurity@oa.mo.gov) a list of the names of the Contractor's employees who will be fingerprinted and a signed Missouri Applicant Fingerprint Privacy Notice, Applicant Privacy Rights and Privacy Act Statement for each employee. All employees of the Contractor approved by FMDC to work at a State facility must obtain a contractor ID badge from FMDC prior to beginning work on-site, unless the Director of FMDC, at the Director's discretion, waives the requirement for a contractor ID badge. The Contractor and its employees must comply with the process for background checks and contractor ID badges found on FMDC's website at: <https://oa.mo.gov/fmdc-contractor-id-badges>.
  - 3. Pursuant to section 43.540, RSMo, FMDC participates in the Missouri Rap Back and National Rap Back programs as of August 28, 2018. This means that the Missouri State Highway Patrol, Central Records Repository, and the Federal Bureau of Investigation will retain the fingerprints submitted by each of the Contractor's employees, and those fingerprints will be searched against other fingerprints on file, including latent fingerprints. While retained, an employee's fingerprints may continue to be compared against other fingerprints submitted or retained by the Federal Bureau of Investigation, including latent fingerprints.

4. As part of the Missouri and National Rap Back programs, FMDC will receive notification if a new arrest is reported for an employee whose fingerprints have been submitted for FMDC after August 28, 2018. If the employee is performing work on a State contract at the time of the arrest notification, FMDC will request and receive the employee's updated criminal history records. If the employee is no longer performing work on a State contract, FMDC will not obtain updated criminal records.
5. Pursuant to section 43.540, RSMo, the Missouri State Highway Patrol will provide the results of the employee's background check directly to FMDC. FMDC may NOT release the results of a background check to the Contractor or provide the Contractor any information obtained from a background check, either verbally or in writing. FMDC will notify the Contractor only whether an employee is approved to work on State property.
6. Each employee who submits fingerprints to the Missouri State Highway Patrol has a right to obtain a copy of the results of his or her background check. The employee may challenge the accuracy and completeness of the information contained in a background check report and obtain a determination from the Missouri State Highway Patrol and/or the FBI regarding the validity of such challenge prior to FMDC making a final decision about his or her eligibility to perform work under a State contract.
7. The Contractor shall notify FMDC via email to [FMDCSecurity@oa.mo.gov](mailto:FMDCSecurity@oa.mo.gov) if an employee is terminated or resigns from employment with the Contractor. If the Contractor does not anticipate performing work on a State contract in the future, the Contractor may request that FMDC remove its employees from the Rap Back programs. However, if removed from the Rap Back programs, employees will be required to submit new fingerprints should the contractor be awarded another State contract.
8. Upon award of a Contract, the Contractor should contact FMDC at [FMDCSecurity@oa.mo.gov](mailto:FMDCSecurity@oa.mo.gov) to determine if its employees need to provide a new background check. If a Contractor's employee has previously submitted a fingerprint background check to FMDC as part of the Missouri and National Rap Back programs, the employee may not need to submit another fingerprint search for a period of three to six years, depending upon the circumstances. The Contractor understands and agrees that FMDC may require more frequent background checks without providing any explanation to the Contractor. The fact that an additional background check is requested by FMDC does not indicate that the employee has a criminal record.

### **3.04 DISRUPTION OF UTILITIES**

- A. Water and/or fire service to the facility shall not be disturbed, and construction shall be staged to afford continuous water service for the facility.

### **3.05 PROTECTION OF PERSONS AND PROPERTY**

#### **A. SAFETY PRECAUTIONS AND PROGRAMS**

1. The Contractor shall at all times conduct operations under this Contract in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. The Contractor shall promptly take precautions which are necessary and adequate against conditions created during the progress of the Contractor's activities hereunder which involve a risk of bodily harm to persons or a risk of damage to property. The Contractor shall continuously inspect Work, materials, and equipment to discover and determine any such conditions and shall be solely responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with applicable safety laws, standards, codes, and regulations in the jurisdiction where the Work is being performed, specifically, but without limiting the generality of the foregoing, with rules regulations, and standards adopted pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 and applicable amendments.
2. All contractors, subcontractors and workers on this project are subject to the Construction Safety Training provisions 292.675 RSMo.
3. In the event the Contractor encounters on the site, material reasonably believed to be

asbestos, polychlorinated biphenyl (PCB), lead, mercury, or other material known to be hazardous, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner's Representative and the Architect in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner's Representative and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB), or when it has been rendered harmless by written agreement of the Owner's Representative and the Contractor. "Rendered Harmless" shall mean that levels of such materials are less than any applicable exposure standards, including but limited to OSHA regulations.

#### B. SAFETY OF PERSONS AND PROPERTY

1. The Contractor shall take reasonable precautions for safety of, and shall provide protection to prevent damage, injury, or loss to:
  - a. clients, staff, the public, construction personnel, and other persons who may be affected thereby;
  - b. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor or the Contractor's Subcontractors of any tier; and
  - c. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
2. The Contractor shall give notices and comply with applicable laws, standards, codes, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.
3. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including, but not limited to, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.
4. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise the highest degree of care and carry on such activities under supervision of properly qualified personnel.
5. The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in this Section caused in whole or in part by the Contractor, a Subcontractor of any tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable, and for which the Contractor is responsible under this Section, except damage or loss attributable solely to acts or omissions of Owner or the Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's other obligations stated elsewhere in the Contract.
6. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents, and the maintaining, enforcing and supervising of safety precautions and programs. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner's Representative and Architect. The Contractor shall hold regularly scheduled safety meetings to instruct Contractor personnel on safety practices, accident avoidance and prevention, and the Project Safety Program. The Contractor shall furnish safety equipment and enforce the use of such equipment by its employees and its subcontractors of any tier.
7. The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
8. The Contractor shall promptly report in writing to the Owner all accidents arising out of or in

connection with the Work which cause death, lost time injury, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately.

9. The Contractor shall promptly notify in writing to the Owner of any claims for injury or damage to personal property related to the work, either by or against the Contractor.
10. The Owner assumes no responsibility or liability for the physical condition or safety of the Work site or any improvements located on the Work site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time concerning any failure by the Contractor or any Subcontractor to comply with the requirements of this Paragraph.
11. In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.
12. The Contractor shall maintain at his own cost and expense, adequate, safe and sufficient walkways, platforms, scaffolds, ladders, hoists and all necessary, proper, and adequate equipment, apparatus, and appliances useful in carrying on the Work and which are necessary to make the place of Work safe and free from avoidable danger for clients, staff, the public and construction personnel, and as may be required by safety provisions of applicable laws, ordinances, rules regulations and building and construction codes.

END OF SECTION

## SECTION 01 40 00

### QUALITY REQUIREMENTS

#### Part 1 - GENERAL

##### 1.01. SUMMARY:

- A. General: Required inspection and testing services are intended to assist in the determination of probable compliance of the work with requirements specified or indicated. These required services do not relieve the Contractor of responsibility for compliance with these requirements or for compliance with requirements of the contract documents.
- B. Definitions: The requirements of this section relate primarily to customized fabrication and installation procedures, not to the production of standard products. Quality control services include inspections and tests and related actions including reports, performed by independent agencies and governing authorities, as well as directly by the Contractor. These services do not include Contract enforcement activities performed directly by the Engineer.
  - 1. Specific quality control requirements for individual units of work are specified in the sections of these specifications that specify the individual element of the work. These requirements, including inspections and tests, cover both production of standard products and fabrication of customized work. These requirements also cover quality control of the installation procedures.
  - 2. Inspections, tests and related actions specified in this section and elsewhere in the Contract Documents are not intended to limit the Contractor's own quality control procedures which facilitate overall compliance with requirements of the Contract Documents.
  - 3. Requirements for the Contractor to provide quality control services as required by the Engineer, the Owner, governing authorities or other authorized entities are not limited by the provisions of this section.

##### 1.02. RESPONSIBILITIES:

- A. Contractor Responsibilities: Except where they are to be provided by another identified entity, inspections, tests and similar quality control services are the Contractor's responsibility; these services also include those specified to be performed by an independent agency and not directly by the Contractor. Costs for these services shall be included in the Contract Price. The Contractor shall employ and pay an independent agency, testing laboratory, or other qualified firm to perform quality control services specified.
- B. Retest Responsibility: Where results of required inspections, tests of similar services prove unsatisfactory and do not indicate compliance of related work with the requirements of the Contract Documents, then retests are the responsibility of the Contractor, regardless of whether the original test was the Contractor's responsibility. Retesting of work revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on the original work.
- C. Responsibility for Associated Services. The Contractor is required to cooperate with the independent agencies performing required inspections, tests, and similar services. Provide such auxiliary services as are reasonably requested. Notify the testing agency sufficiently in advance of operations to permit assignment of personnel. These auxiliary services include but are not necessarily limited to the following:



1. Providing access to the work.
2. Taking samples or assistance with taking samples.
3. Delivery of samples to test laboratories.
4. Security and protection of samples and test equipment at the project site.

D. Coordination: The Contractor and each independent agency engaged to perform inspections, tests and similar services for the project shall coordinate the sequence of their activities so as to accommodate required services with a minimum of delay in the progress of the work. In addition, the Contractor and each independent testing agency shall coordinate their work so as to avoid the necessity of removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities.

**1.03. QUALITY ASSURANCE:**

A. Qualifications for Service Agencies: Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories and which are recognized in the industry as specialized in the types of inspections and tests to be performed.

**1.04. SUBMITTALS:**

A. General: Submit a certified written report of each inspection, test, or similar service, directly to the Engineer in triplicate. If Contractor is responsible for the service, submit a certified written report of each inspection, test, or similar service through the Contractor, in duplicate.

Qualifications statement for service agencies demonstration conformance to abovementioned requirements.

1. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to, the following:
  - a. Name of testing agency or test laboratory.
  - b. Dates and locations of samples and tests or inspections.
  - c. Names of individuals making the inspection or test.
  - d. Designation of the work and test method.
  - e. Complete inspection or test data.
  - f. Test results.
  - g. Interpretations of test results.
  - h. Notation of significant ambient conditions at the time of sample-taking and testing.
  - i. Comments or professional opinion as to whether inspected or tested work complies with requirements of the Contract Documents.
  - j. Recommendations on retesting, if applicable.

**1.05. SERVICES WITH EQUIPMENT AND MATERIALS FURNISHED UNDER THIS CONTRACT:**

- A. Contractor shall furnish the services of qualified field personnel from the manufacturers and suppliers of equipment and materials furnished and installed under this Contract, as required to perform all manufacturer's field services called for in the Specifications.
- B. He shall perform no work related to the installation or operation of equipment or materials furnished and installed under this Contract without direct observation and guidance of the supplier's or manufacturer's field personnel (where such service is specified) unless Engineer concurs otherwise.
- C. The supplier's or manufacturer's field personnel shall perform the following:
  - 1. Observe the erection, installation, start-up, and testing of equipment.
  - 2. Instruct and guide Contractor in proper procedures.
  - 3. Supervise pre-operational testing, start-up, and final operational check, and any required adjustments of equipment.
  - 4. Instruct Owner's designated personnel in proper operation and maintenance of all equipment.
- D. All supplier's and manufacturer's field personnel are to advise Engineer of their arrival at the site and furnish to him a written report covering all Work done at least once each week and when completed.

**1.06. PLACING EQUIPMENT IN OPERATION:**

- A. Contractor shall place all equipment and materials installed under this Contract into successful operation according to instructions of the supplier or manufacturer, including making of all required adjustments, tests, operation checks, and the following:
  - 1. Cleaning, sounding, blowing-out, flushing of lubricating oil and water systems and other pipelines.
  - 2. Lubrication (lubricants supplied by Contractor unless specified to be furnished by Owner or others).
  - 3. Tests of lubrication system safety interlocks and system performance.
  - 4. Final alignment checks and measurements made under observation of Engineer and Owner. Alignment checks shall include opening connections if required to ensure there are no abnormal stresses on equipment from pipes, ducts, or other attachments. Alignment shall be within tolerances specified by the manufacturer, and measurements shall be recorded and furnished to Engineer.
  - 5. Motor rotation checks before connecting couplings.
  - 6. Inspection of sleeve bearings for adequate contact. Include scraping bearings for at least 80-percent contact and demonstrating contact area to Owner and Engineer before final assembly of bearing caps.
  - 7. Checking of anchor-bolt tensions, grout, and shims. Anchor bolts shall be tightened with calibrated torque wrenches using care not to over-stress bolts.
- B. After run-in and acceptance of alignment, major equipment shall be affixed in place using standard tapered dowels with jack-out nuts at head end to facilitate removal.
- C. All above operations shall be recorded on forms furnished by Engineer.

- D. All necessary attendants and personnel shall be furnished as part of the work to accomplish the above operations until such time as individual items, systems, equipment, or sections of the plant are acceptable for operation by Owner.
- E. Contractor shall provide attendants on continuous basis as required to complete events.
- F. Contractor will provide fuel, electricity, water, and lubricants for placing equipment in operation.

**1.07. PERFORMANCE TESTS:**

- A. Equipment and Materials Furnished under this Contract:
  - 1. Refer to technical specification sections for acceptance testing requirements.
  - 2. No tests will be conducted on equipment or materials for which manufacturer's field service is specified unless manufacturer's Field Representative is present and declares in writing that the equipment and materials are ready for such test.
  - 3. Contractor will be notified so that he can have a representative, or manufacturer's representative, present during any tests of equipment or materials for which manufacturer's field service is not specified.
  - 4. The tests will be made as set forth in the Specifications unless the interested parties mutually agree upon some other manner of testing.

**Part 2 - PRODUCTS (Not Applicable).**

**Part 3 - EXECUTION**

**3.01. REPAIR AND PROTECTION:**

- A. General: Upon completion of inspection, testing, sample-taking, and similar services performed on the work, repair damaged work. Protect work exposed by or for quality control service activities, and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION

## **SECTION 015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

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

#### **1.3 SUBMITTALS**

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

- B. Implementation and Termination Schedule: Within (15) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

#### **1.4 QUALITY ASSURANCE**

- A. Regulations: Comply with industry standards and applicable laws and regulations including, but not limited to, the following:
  - 1. Building code requirements
  - 2. Health and safety regulations
  - 3. Utility company regulations
  - 4. Police, fire department, and rescue squad rules
  - 5. Environmental protection regulations
- B. Standards: Comply with NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations”. ANSI A10 Series standards for “Safety Requirements for Construction and Demolition”, and NECA Electrical Design Library “Temporary Electrical Facilities”.
  - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 “National Electric Code”.
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

#### **1.5 PROJECT CONDITIONS**

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist onsite.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. General: Provide new materials. If acceptable to the Designer, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of (15) or less. For temporary enclosures, provide translucent, nylon-reinforced laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- C. Water: Provide potable water approved by local health authorities.

- D. Open-Mesh Fencing: Provide 0.120" (3mm) thick, galvanized 2" (50mm) chainlink fabric fencing 6' (2m) high with galvanized steel pipe posts, 1½" (38mm) ID for line posts and 2½" (64mm) ID for corner posts.

## **2.2 EQUIPMENT**

- A. General: Provide new equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- C. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated re-circulation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers, or a combination of extinguishers of NFPA-recommended classes for the exposures.
  - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

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

### **3.2 TEMPORARY UTILITY INSTALLATION**

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
  - 1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
  - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
  - 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Change Order.
- B. Temporary Water Service: The Owner will provide water for construction purposes from the existing building system. All required temporary extensions shall be provided and removed by the Contractor. Connection points and methods of connection shall be designated and approved by the Construction Representative.
- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
  1. Install electric power service underground, except where overhead service must be used.
  2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125V, AC 20ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities.
  1. Telephone Lines: Provide telephone lines for the following:
    - a. Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.
    - b. Provide a dedicated telephone for a fax machine in the field office.
    - c. Provide a separate line for the Owner's use.
  2. At each telephone, post a list of important telephone numbers.
- E. Temporary Toilets: Install self-contained toilet units. Use of pit-type privies will not be permitted. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
  1. Shield toilets to ensure privacy.
  2. Provide separate facilities for male and female personnel.
  3. Provide toilet tissue materials for each facility.
- F. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a health and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
  1. Provide paper towels or similar disposable materials for each facility.
  2. Provide covered waste containers for used material.
  3. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
- G. Drinking-Water Facilities: Provide drinking-water fountains where indicated, including paper cup supply.

- H. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
  - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45°F to 55°F (7°C to 13°C).
- I. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

### **3.3 SUPPORT FACILITIES INSTALLATION**

- A. General: Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.
  - 1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip office as follows:
  - 1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table, plan rack, and a 6-shelf bookcase.
  - 2. Equip with a water cooler and private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.
- C. Storage facilities: Install storage sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere onsite.
- D. Storage Facilities: The Owner will provide storage onsite as designated by the Facility Representative or the Construction Representative. Areas for use by the Contractor for storage will be identified at the Pre-Bid Meeting.
- E. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Designer.
  - 1. Paving: Comply with Division 2 Section “Hot-Mixed Asphalt Paving” for construction and maintenance of temporary paving.
  - 2. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
  - 3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
  - 4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.



5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.
- F. Construction Parking: Parking at the site will be provided in the areas designated at the Pre-Construction Meeting.
- G. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
  1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and materials drying or curing requirements to avoid dangerous conditions and effects.
  2. Install tarpaulins securely with incombustible wood framing and other materials. Close openings of 25SqFt (2.3SqM) or less with plywood or similar materials.
  3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
  4. Where temporary wood or plywood enclosure exceeds 100SqFt (9.2SqM) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.
- I. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered “tools and equipment” and not temporary facilities.
- J. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
  1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
  2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- K. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- L. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

- M. Rodent Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures are regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

### **3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Designer.
- B. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting including flashing red or amber lights.
- C. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
  - 1. Storage: Where materials and equipment must be stored and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- D. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near the site.

### **3.5 OPERATION, TERMINATION AND REMOVAL**

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  - 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Designer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances as required by the governing authority.
3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
  - a. Replace air filters and clean inside of ductwork and housing.
  - b. Replace significantly worn parts and parts subject to unusual operating conditions.
  - c. Replace lamps burned out or noticeably dimmed by hours of use.

**END OF SECTION 015000**

## SECTION 017400

### CLEANING

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for cleaning during the Project.
- B. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
  - 1. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
  - 2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator for the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

#### PART 3 - EXECUTION

##### 3.01 PROGRESS CLEANING

- A. General
  - 1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
  - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
  - 3. At least once each week, and more often if necessary, completely remove all scrap, debris, and waste material from the jobsite.
  - 4. Provide adequate storage for all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the ecology.
- B. Site
  - 1. Daily, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
  - 2. Weekly, inspect all arrangements of materials stored onsite. Re-stack, tidy, or otherwise service all material arrangements.
  - 3. Maintain the site in a neat and orderly condition at all times.

C. Structures

1. Daily, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Weekly, sweep all interior spaces clean. "Clean" for the purposes of this paragraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and handheld broom.
3. In preparation for installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily while work is being performed in the space in which finish materials have been installed. "Clean" for the purposes of this subparagraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Construction Representative, may be injurious to the finish of the finish floor material.

**3.02 FINAL CLEANING**

- A. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.
1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities including landscape development areas, of rubbish, waste material, litter, and foreign substances.
  2. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  3. Remove petrochemical spills, stains, and other foreign deposits.
  4. Remove tools, construction equipment, machinery, and surplus material from the site.
  5. Remove snow and ice to provide safe access to the building.
  6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  8. Broom clean concrete floors in unoccupied spaces.
  9. Vacuum clean carpet and similar soft surfaces removing debris and excess nap. Shampoo, if required.
  10. Clean transparent material, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
  11. Remove labels that are not permanent labels.

12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  13. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  14. Clean plumbing fixtures to a sanitary condition free of stains, including stains resulting from water exposure.
  15. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  16. Clean ducts, blowers, and coils if units were operated without filters during construction
  17. Clean food-service equipment to a sanitary condition, ready and acceptable for its intended use.
  18. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs and defective and noisy starters in fluorescent and mercury vapor fixtures.
  19. Leave the Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests. Comply with regulations of local authorities.
- D. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully.
1. Where extra materials of value remain after Final Acceptance by the Owner, they become the Owner's property.

END OF SECTION

## SECTION 03 30 01

### CONCRETE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Concrete and Materials.
  - 2. Reinforcing.
  - 3. Form Work.
  - 4. Grouts.
  - 5. Related Chemicals and Compounds.
  - 6. Moisture Barriers and Stops.
  - 7. Concrete Anchors.

##### 1.02 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items including reinforcement and forming accessories, admixtures, patching compounds, water stops, joint systems, curing compounds, grouts, sealants and finishing compounds.
- B. Test Report and Mill Certifications.
- C. Shop Drawings, Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bend bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.
- D. Concrete mix design for each mix used with aggregate gradation information.

##### 1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the latest editions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:
  - 1. American Society for Testing and Materials (ASTM):
    - C31 - Making and Curing Concrete Test Specimens in the Field
    - C33 - Concrete Aggregates
    - C39 - Compressive Strength of Cylindrical Concrete Specimens
    - C40 - Organic Impurities in Sands for Concrete
    - C42 - Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
    - C88 - Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
    - C94 - Ready-Mixed Concrete
    - C143 - Slump of Portland Cement Concrete
    - C150 - Portland Cement
    - C172 - Sampling Fresh Concrete
    - C192 - Making and Curing Concrete Test Specimens in the Laboratory

- C231 - Test for Air Content of Freshly Mixed Concrete by the Pressure Method
  - C233 - Testing Air-Entraining Admixtures for Concrete
  - C260 - Air-Entraining Admixtures for Concrete
  - C309 - Liquid Membrane-Forming Compounds for Curing Concrete
  - C311 - Sampling and Testing Fly Ash or Natural Pozzolans for Use as Mineral Admixtures in Portland Cement Concrete
  - C494 - Chemical Admixtures for Concrete
  - C595 - Blended Hydraulic Cements
  - C1240 - Silica Fume for Use in Hydraulic-Cement Concrete and Mortar
  - A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
  - C618 - Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
  - D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
2. American Concrete Institute (ACI):
- 211.1 - Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete
  - 301 - Specifications for Structural Concrete Buildings
  - 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
  - 305 - Committee Report on Hot-Weather Concreting
  - 306 - Committee Report on Cold-Weather Concreting
  - 309 - Recommended Practice for Consolidation of Concrete
  - 318 - Building Code Requirements for Reinforced Concrete
3. Concrete Reinforcing Steel Institute:
- Manual of Standard Practice (CRSI).

## **PART 2 - PRODUCTS**

### **2.01 FORM MATERIALS**

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed faced plywood or other acceptable panel-type materials, to provide continuous straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on the drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.

Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

- B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will neither bond with, stain nor adversely affect (cause injury to) concrete surfaces, and will not impair



subsequent treatments of concrete surfaces. Clean forms of sawdust, dust, dirt, and other foreign materials.

- D. Form Ties: Break-back, coil, or screw-type, except where otherwise specified. Water seal coil type in walls below grade and walls of water-bearing structures. Coil type shall leave conical depression in concrete. Space ties as required against pressure of fresh concrete.
- E. Chamfer Strips: 3/4" chamfer except where otherwise indicated. Place in all forms to provide chamfer where concrete will have exposed projecting corners or exposed projecting edges, or both.

## **2.02 REINFORCING MATERIALS**

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed except as otherwise specified. Column ties and stirrups of any size shall conform to ASTM A 615, Grade 60, unless otherwise indicated.

Fabrication of Reinforcing Bars: Fabricate with cold bends conforming to the recommended dimensions shown in ACI 318. Field fabrication will be allowed only if the Contractor has equipment to properly fabricate steel. Attach metal or plastic tags with identifying mark corresponding to mark number on drawing.

- B. Steel Wire: ASTM A 82, plain, cold-drawn, steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.
- E. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications, unless otherwise specified. Metal accessories shall be plastic coated (CRSI, Class 1) or stainless steel protected (CRSI, Class 2) where legs will be exposed in finished concrete surfaces. Do not use rocks, broken bricks, wood blocks, concrete fragments, or reinforcing bars driven into the ground for support of steel reinforcement.

For slabs on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Precast concrete block bar supports may be used. Blocks shall be made with a minimum of 9 sacks of cement per cubic yard and have a minimum compressive strength of 3000 psi in 7 days. Each block shall have a minimum of 9 square inches of bearing area. Space as required by the particular condition of weight, bearing surface and rigidity of the steel reinforcement.

## **2.03 CONCRETE MATERIALS**

- A. General:
  - 1. Silica fume pozzolans will be allowed.
  - 2. Fly Ash:
    - a. Class "C" and "F" fly ashes shall conform to ASTM C618, Table 1 and 2.
    - b. Fly ash, if used, shall be at least 15 percent and no more than 25 percent of the total cementitious material, cement plus fly ash.
  - 3. Ground granulated blast-furnace slag:

- a. Slag conforming to ASTM C989 may be included in mix designs with all cement types. Slag, if used, shall be at least 25 percent and no more than 50 percent of the total cementitious material, cement plus slag.
  - b. Slag shall not be combined with fly ash in the same mix.
- B. Portland Cement:
  - 1. ASTM C150 Type II, IP, or IL cement shall be used on the following structures:
    - a. All concrete for this project
  - 2. The Portland Cement product of only one mill or any one brand shall be used on the project.
- C. Aggregates: Coarse and fine aggregates conforming to ASTM C 33 shall be separately furnished and stored. Pit-run or naturally mixed aggregates will not be accepted, nor will mixing of aggregates from different sources or alternating batches of different aggregates in one stockpile be permitted.
- D. Fine Aggregate: Conform to ASTM C33 except deleterious substances shall not exceed (by weight) 0.25 percent for clay lumps, 2.0 percent for material finer than No. 200 sieve, 0.25 percent for coal and lignite, and 0.25 percent for all other deleterious materials. Maintain fine aggregate free of ice and frozen lumps.
- E. Coarse Aggregate: Conform to ASTM C33 except that deleterious substances shall not exceed the maximum allowed in ASTM C33 for Class 4S coarse aggregates.
 

Flat particles with maximum particle dimensions of 2-1/2 times the average thickness shall not exceed 5.0 percent. Blast furnace slag will not be permitted. Maintain coarse aggregate free of ice and frozen lumps. Grading requirements shall be ASTM C33 size Number 57 (1" to No. 4) for all concrete unless approved in writing by the Engineer.
- F. Mixing Water: Drinkable and free from foreign materials in amounts harmful to concrete and embedded steel, shall be acceptable without testing. Expense of testing water shall be paid by Contractor.
- G. Air-Entraining Admixtures: Conform to ASTM C260 and manufacturer's recommendations for use. Testing of air-entraining admixtures shall conform to ASTM C233. Obtain manufacturer's recommendations for coordinating dosage with superplasticizer.
- H. Water-Reducing Admixtures: Conform to ASTM C494, Type A; contain not more than 0.1 percent chloride ions and conform to manufacturer's recommendations for use. Technical assistance of the manufacturer's field representative shall be furnished upon request.
- I. High-Range Water-Reducing Admixtures (Super Plasticizer): ASTM C494, Type F or Type G, containing not more than 0.1 percent chloride ions. Super plasticizer used to raise slump above the initial slump shall be applied to the mix at the site.
- J. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C494, Type E, and containing not more than 0.1 percent chloride ions.
- K. Water-Reducing, Retarding Admixtures: ASTM C494, Type D, containing not more than 0.1 percent chloride ions.
- L. Certification: Provide admixture manufacturer's written certification that chloride ion content complies with specified requirements.

Calcium chloride or admixtures containing more than 0.1 percent chloride ions are not permitted.

- M. Technical assistance of admixture manufacturer's field representative shall be furnished on request.

## **2.04 RELATED MATERIALS**

- A. Waterstops: Provide centerbulb-type waterstops at all construction joints below grade and all construction joints in water retaining structures unless otherwise indicated. Unless the drawings show otherwise, use polyvinyl chloride water stop #705 or #724 as manufactured by Greenstreak Plastic Products, or approved equal. Waterstop shall conform to Corps of Engineers CRD-C 572.
- B. Moisture Barrier: Provide 6 mil polyethylene moisture barrier cover where indicated on drawings. Moisture barrier shall not be used in locations other than those indicated on the drawings.
- C. Smooth Dowel Bars and Caps: Smooth dowel bars shall be 3/4" Ø A36 smooth bars with no deformations at the ends. Dowel bars shall be fitted with caps at each end to provide for 1" minimum movement.
- D. Expansion Joint Material: Non-extruding (PVC) closed cell foam expansion joint filler conforming to ASTM D-1667, thickness as shown on the drawings. Use Sonneborn Vinylfoam, or approved equal.
- E. Plain Grout: One part portland cement to 2 parts sand by volume. Keep water to a minimum as required for placing by the dry packing method. Place after the mixed grout has been allowed to stand for 2 hours. The sand and cement shall be as specified for concrete.
- F. Nonshrink Grout: CRD-C 621, factory pre-mixed grout. Required for setting handrail posts, for setting equipment recommended by the manufacturer to be set with nonshrink grout, and in other places indicated. Grout shall be non-metallic, as manufactured by one of the following:
  - 1. Sika Grout, Sika Corporation
  - 2. Crystex, L and M Construction Chemicals, Inc.
  - 3. Five Star Grout, Five Star Products, Inc.
  - 4. Masterflow 713 Grout, Master Builder's Company.
  - 5. Saurereisen F-100, Saurereisen Cements Company.
  - 6. Supreme Grout, Gifford-Hill & Company.
  - 7. Or approved equal.

Prepare and place conforming to manufacturer's printed instructions.

- G. Grout for Bonding: One part cement to 1-1/2 parts sand by weight. Keep water to a minimum. Apply immediately prior to concrete placement.
- H. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 pounds of fluosilicates per gallon.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Surfhard; Euclid Chemical Co.

- b. Lapidolith; Sonneborn-Contech.
  - c. Saniseal; Master Builders.
  - d. Burk-O-Lith; The Burke Co.
  - e. Or approved equal.
- 2. Moisture-Retaining Cover: One of the following, complying with ASTM C171:
  - a. Waterproof paper.
  - b. Polyethylene film.
  - c. Polyethylene-coated burlap.
- I. Liquid Membrane Forming Curing Compound: Liquid membrane forming compound conforming to ASTM C309, Type 1. ASTM C309, Type 2, shall be used as specified for Hot Weather Concreting. Curing compound used on floors to be painted, tiled or covered with resilient floor covering shall be guaranteed not to interfere with application of paint, tile mortar, or tile adhesive after a 28-day curing period.
- J. Concrete Anchors:
  - 1. All anchors not cast in place shall be polyester resin or amine epoxy adhesive type.
  - 2. Bolts to conform to ASTM A167, type 304 stainless steel.
  - 3. Install in strict conformance with manufacturer's printed instructions. Furnish sizes and embedments indicated, or as directed by Engineer.
  - 4. Furnish anchors manufactured by one of the following:
    - a. Simpson Strong-Tie.
    - b. Hilti Inc.
    - c. ITW Redhead
  - 5. Concrete anchors shall not be substituted for indicated cast-in-place anchor bolts without prior written authorization by the Engineer for each specific anchor group or location.

## **2.05 LABORATORY TESTING OF MATERIALS FOR USE IN CONCRETE**

- A. An approved independent testing laboratory shall be selected and paid by the Contractor to perform all required laboratory tests of materials proposed for use in the production of concrete and to determine mix proportions when laboratory trial batches are required. The laboratory shall report the results of the testing and mix designs as follows:
  - 1. Engineer, Home Office (1 copy).
  - 2. Resident Project Representative, Field Office (1 copy).
  - 3. Contractor (copies as required).
  - 4. Concrete supplier (copies as required).

All laboratory test results shall be submitted to the Engineer for approval no less than 30 days prior to the proposed date of construction.
- B. Contractor shall deliver representative samples of all proposed concrete materials to the laboratory for the following testing:
  - 1. Fine aggregate: to be tested according to ASTM C33, ASTM C40, and ASTM C88.
  - 2. Coarse aggregate: to be tested according to ASTM C33 and ASTM C88.
  - 3. Mixing water, if other than potable water is proposed for use and, in the opinion of the Engineer, there is reason to suspect its acceptability, then using the design mix, the laboratory shall make 2 concrete test cylinders using proposed water and 2 concrete test cylinders using potable water conforming to ASTM C192. All cylinders shall be

tested conforming to ASTM C39. Age of cylinders at test shall be 28 days unless an earlier age is authorized.

4. Air-entraining admixture shall be tested conforming to ASTM C233.

## 2.06 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for all concrete (unless otherwise specified) on the basis of field experience; but in the case where sufficient or suitable strength test data is not available, concrete shall be proportioned on the basis of laboratory trial mix design as specified in ACI 301.
- B. Concrete Qualities Required: Design mixes to provide normal weight concrete with the following properties:
  1. Minimum 28-day compressive strength = 4000 psi for all construction unless otherwise indicated.
  2. Initial slump of concrete shall be 3 inches plus or minus 1 inch. Higher final slumps are acceptable where an approved super plasticizer is used.
  3. Air content shall be between 5 to 7 percent.

Concrete shall be homogeneous, readily placeable and uniformly workable, proportioned to conform to ACI 211.1.

- C. Cement Content: Each cubic yard of concrete shall contain not less than the quantity of cement stated below:

ASTM C33 Coarse Aggregate Size Number	Minimum Cement Per Cubic Yard
#57 (1" to #4)	540 Lbs.
#67 (3/4" to #4)	560 Lbs.
#7 (1/2" to #4)	600 Lbs.

The water content of the concrete mix shall be calculated by the ratio (by weight) of water to cement ("W/C Ratio"). The weight of water shall be the total water in the mix, including free moisture in the aggregate. The W/C ratio shall not exceed 0.38 for concrete in all portions of any structure which contains or conveys water or sewage. The W/C ratio shall not exceed 0.45 for all other concrete.

If the W/C ratio specified herein along with the use of an ASTM C494 Type A water reducer does not supply the specified initial slump or sufficient workability, then an approved high-range water-reducing admixture may be used. Under no circumstances shall water be added which adjusts the slump beyond the specified initial slump, or which exceeds the specified W/C ratio.

For cast-in-place concrete only, a maximum of 25 percent by weight of Portland cement content per cubic yard may be replaced with fly ash at a rate of 1 LB fly ash for 1 LB cement.

If fly ash is used, the water to fly ash plus cement ratio shall not exceed the maximum water cement ratio specified in this specification section.

- D. Super Plasticizer: An approved super plasticizer shall be incorporated in the 0.38 W/C ratio mix design for formed portions of structures, including walls and columns.
- E. Mix Design:
1. Field experience using test results within the preceding 90 days with the materials and plant to be employed may be the basis of mix proportions provided that not less than 30 consecutive satisfactory compressive strength tests on concrete using the proposed Portland cement and other materials with a similar mix are available. A compressive strength test is defined as the average 28-day compressive strength of 2 companion cylinders made conforming to ASTM C172 and ASTM C31 and tested conforming to ASTM C39. The standard deviation of such tests shall be computed as a basis for design of the mix. The design average strength shall exceed the specified strength in accordance with the following formulae:
    - a. When standard deviation is greater than 500 psi, Design Average Strength = Specified Minimum Strength - 500 + 2.326 x Standard Deviation.
    - b. When standard deviation is less than 500 psi, Design Average Strength = Specified Minimum Strength + 1.343 x Standard Deviation.
    - c. Submit previous test data, calculated standard deviation, and the proposed mix proportions to Engineer for approval prior to placing concrete.
  2. When laboratory trial batches are used as a basis for determining mix proportions, all such work shall be performed by the laboratory as specified in the part "Laboratory Testing of Materials for Use in Concrete."
    - a. Laboratory trial batches shall be used to establish a water-cement ratio compression strength curve with at least 3 points, each representing the strength of a separate trial batch. At least 1 point shall be above and 1 below the strength required. Each point on the curve shall represent the average of at least 3 specimens tested at 28 days or an earlier age when approved by Engineer. The slump and air content shall be the maximum limits specified in this part, "Concrete Qualities Required."
    - b. A point on the water-cement ratio compressive strength curve shall be selected that will provide an average strength at least 1200 psi greater than the specified minimum strength.
    - c. Laboratory reports establishing mix proportions shall be sent to Engineer, and his approval obtained prior to placing all concrete.
- F. Measurement of materials shall conform to ACI 304. Measure materials within 1 percent by weight for aggregates and cement, and within 1-1/2 percent by volume or by weight for water.
- G. Mixing and delivery shall conform to ACI 304. Cement temperature when added to mix shall not exceed 170°F. Batch Plant Mixer shall conform to Mixer Manufacturers Bureau Concrete Mixer Standards, AGC, adequate to handle 1 or more full-sack batches. Charge with 5 percent to 10 percent of the mixing water both in advance and after the addition of aggregates and cement. Charge with remaining water uniformly with the other materials. Avoid charging in excess of manufacturer's rating. Discharge mixed concrete completely prior to recharging. The mixing time shall start immediately when all ingredients except the last of the water are in the mixer. Minimum mixing time shall conform with mixer manufacturer's instructions, but not be less than the following:

Capacity of Mixer Cubic Yards	Minimum of Time of Mixing Minutes
1 or less	1 minute
2	1 minute, 15 seconds
3	1 minute, 30 seconds
4	1 minute, 45 seconds
5	2 minutes
6	2 minutes, 15 seconds

Add 15 seconds of mixing time for each additional cubic yard of concrete.

- H. Mixing of concrete at the plant off the jobsite requires a central mixer or truck mixer. Transport in a truck mixer turning at agitation speeds only. Water added to concrete having a slump below the specified minimum shall be at Contractor's risk. If the water added produces a slump greater than the specified maximum, the concrete will be rejected. If water is added, the concrete shall be remixed for a minimum of 25 revolutions. Truck mixer shall conform to "Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers Bureau," of the National Ready-Mix Concrete Association. Ready-mixed concrete shall be produced and delivered conforming to ASTM C94 as applicable. Contractor shall furnish Owner with a concrete delivery ticket for each load of concrete. The ticket shall have the following information recorded:

1. Batch plant name and ticket number.
2. Mix number.
3. Time batched.
4. Time arrived on jobsite.
5. Amount of concrete (by volume).
6. Quantities of materials batched (by weight).
7. Amount of water added at jobsite by Contractor.

### **PART 3 - EXECUTION**

#### **3.01 FORMS**

- A. Design, erect, support, brace and maintain formwork to conform to ACI 318 and ACI 347. Adequately brace, stiffen and support forms to prevent perceptible deflection or settlement, and to hold plumb or level and true to line. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Construct sufficiently tight to prevent mortar leakage. Avoid offsets between adjacent forms and construct so that shores, braces and stiffening members are in line with those below. Use wales, strongbacks, shores and bracing as required. Provide for openings, offsets, sinkages, keyways, recesses, moldings, restrictions, reglets, chamfers, blocking, screeds, buldheads, anchorages and inserts, and other features required for the work.
- B. Design, fabricate and construct formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
- C. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Locate temporary openings on forms at inconspicuous locations.

- D. Chamfer all exposed corners and edges of concrete structures, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- E. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement to eliminate mortar leaks and maintain proper alignment.

**3.02 REMOVAL OF FORMS**

- A. No shores, bracing, supports or other formwork shall be loosened or removed until the concrete members supported thereby have acquired sufficient strength to safely support their own weight and any other possible loads. The minimum time between concrete placement and form removal shall be determined either by field-cured test specimens or in accordance with the time specified for the member involved. If the Contractor elects to determine the required time by means of test specimens, all costs in connection therewith shall be his responsibility. Test specimens shall be made, field-cured, and tested as specified. No forms or supports shall be loosened or removed until tests indicate strength of members as follows:

Structural Member	Percent of design compressive or flexural strength
Unshored slab and beam forms for forms which can be removed without disturbing shores	70
Slab or beam shoring	85
Wall and beam side forms	40

- B. If field-cured test cylinders are not used as the basis for determination of time in place for formwork, the following criteria shall apply:
  - 1. Formwork not supporting weight of concrete, such as sides of beams, walls and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 24 hours after placing concrete, provided concrete is sufficiently hard and will not be damaged by form removal operations, and provided curing and protection operations are maintained.
  - 2. Formwork supporting weight of concrete, such as beam soffits, columns, joints, slabs and other structural elements, may not be removed in less than 14 days of cumulative curing at not less than 50°F (10°C), nor until the concrete has attained design minimum 28-day compressive strength.
- C. Remove forms in a manner to avoid damage to the structure, with particular care for corners and edges.

**3.03 RE-USE OF FORMS**

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form coating



compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

### **3.04 PLACING REINFORCEMENT**

- A. Place in accordance with the contract drawings, Chapters 7 and 12 of ACI 318 and the Manual of Standard Practice of the Concrete Reinforcing Steel Institute.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Tie securely with 16-gage or larger annealed iron wire. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- C. Place reinforcement to obtain at least minimum coverages for concrete protection. Minimum coverage shall conform to Chapter 7 of ACI 318 unless otherwise indicated.
- D. Install welded wire fabric in the longest practical lengths. Lap adjoining pieces at least one full mesh plus 2 inches and lace splices with wire, unless otherwise indicated. Offset end laps in adjacent widths to prevent continuous laps in either direction.

### **3.05 JOINTS**

- A. Construction Joints: Locate and install joints which are not indicated or specified in conformance with ACI 318. Obtain Engineer's approval of joints located by Contractor prior to preparation of reinforcing steel drawings.

Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints. Clean and break laitance or other foreign material from bonding surfaces. Tighten forms remaining in place (where applicable) to prevent seepage between forms and hardened concrete.

- B. Waterstops: Provide water stops and shear keys specified in any new construction joints requested by Contractor. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions. Lapping of waterstops will not be allowed.
- C. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs on-grade at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, equipment foundations and elsewhere as indicated.
- D. Contraction (Control) Joints: Maintain true alignment with straightedge and locate as indicated. Joints shall be grooved except where sawed joints are indicated.

Install grooved joints during finishing process. Width of groove shall not exceed 1/4" and depth shall be at least 1/4 of slab thickness. Sawed joints shall be installed as soon as the concrete surface is firm enough to resist tearing or damage by the power blade and before random shrinkage cracks can occur. Make joints approximately 1/8" wide with depth as indicated. Seal joint with the same type sealant specified for expansion joint sealant.

### 3.06 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Provide for accurate installation of embedded items. Securely fix floor drains and pressure relief valves in place to prevent flotation while placing concrete. Uniformly and accurately slope floor slab toward the drains. Protect pipe sleeves from moisture during cold weather. Protect anchor bolt threads from concrete splatter.

### 3.07 CONCRETE PLACEMENT

- A. Placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in-place. Notify other crafts to permit installation of their work. Moisten wood forms immediately before placing concrete where form coatings are not used. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
  - 1. Notify Engineer at least 24 hours prior to each placement of concrete.
- B. General: Conform to ACI 304. Bonding surfaces shall be clean, free of laitance and foreign materials. Face horizontal bonding surfaces with 1" thick coat of fresh "grout for bonding." Wet all other surfaces. Place concrete on properly prepared and unfrozen subgrade and only in dewatered excavation and forms. Use forms for all concrete except where otherwise indicated or specified. Do not place concrete that has partially hardened or has been contaminated by foreign materials. Prevent mud or foreign materials from entering the concrete or forms during placement operations.
- C. Conveying: Convey concrete from the mixer and deposit in place by methods which will prevent the desegregation or loss of materials. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to provide a practically continuous flow of concrete at the delivery end. Aluminum conveying equipment shall not be used.
- D. Depositing: Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation. Place concrete in continuous horizontal lifts not to exceed 2 feet, and place concrete against bulkheads and keyways at vertical joints. Maximum free drop of concrete shall be 5 feet in walls 10 inches or less in thickness with 1-foot additional drop allowed for each inch of wall thickness over 10 inches, with a maximum drop of 10 feet.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed. When moisture barrier is used, keep lapped joints closed and take precautions to avoid puncturing the barrier. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- F. Consolidation: Consolidate concrete in conformance with ACI 309. Characteristics and application of concrete vibrators shall be as set forth in Table 5.1.4. Provide an adequate number of vibrators of sufficient capacity to keep up with the maximum rate of concrete placement. Vibrate concrete only until the concrete is thoroughly consolidated and the voids filled as evidenced by the leveled appearance of the concrete at the exposed surface and

the embedment of the surface aggregate. Insert vibrators vertically to the full depth of the layer being placed and into the previous layer a minimum of 6 inches. Do not insert vibrators into lower layers of concrete that have begun to set. Do not drag vibrators through concrete. Insert and withdraw vibrators slowly with the vibrator running continuously so that no hole will be left in the concrete. Do not flow concrete from one location to another by the use of a vibrator. Use form vibrators only where sections are too thin or where sections are inaccessible for internal vibrators.

- G. Time Requirements: Place concrete at a sufficient rate to assure that lift below is still plastic and that no cold joints will be formed. Place concrete within 45 minutes after mixing. This period may be extended to 1 hour and 30 minutes provided that the combined air temperature, relative humidity, and wind velocity are such that the plasticity of the fresh concrete is satisfactory for placement and consolidation and that the specified mixing water is not exceeded. Concrete which has partially set shall not be retempered but shall be discarded.
- H. Placing Concrete at Joints: Bed horizontal joints with 1 inch of grout for bonding. Take precautions to ensure tight, well-bonded construction joints with no air pockets or voids, and to avoid bending or displacing waterstops while placing fresh concrete. Delay construction at a joint a minimum of 24 hours where placement is continued past the joint except where otherwise indicated.
- I. Hot-Weather Placing of Concrete: When the temperature is 90°F or above, or is likely to rise above 90°F within a 24-hour period after the concrete placement or when there is any combination of high air temperature, low relative humidity and wind velocity which would impair concrete strength or quality, follow the recommendations of ACI 305. Concrete shall have a maximum temperature of 85°F during placement. Dampen subgrade and forms with cool water immediately prior to placement of concrete. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature. Protect freshly placed concrete immediately after placement so that the rate of evaporation as determined by ACI 305 does not exceed 0.2 pound per square foot per hour. Protect concrete with suitable insulation, if rapidly decreasing nighttime temperatures occur, which would cause thermal shock to concrete placed during warm daytime temperatures. Protect the concrete with temporary wet covering during any appreciable delay between placement and finishing.
- J. Cold Weather Placement of Concrete: When the temperature is 40°F or is likely to fall below 40°F during a 24-hour period after concrete placement, follow the recommendations of ACI 306 to prevent loss of concrete strength or quality. Minimum temperature for concrete as mixed shall be indicated on lines 2, 3 and 4 of Table 1.4.1 of ACI 306. Maximum temperature for concrete as mixed shall be 10°F greater than the corresponding minimum temperature. Place and maintain concrete so that its temperature is never less than the temperature indicated on line 1 of Table 1.4.1 of ACI 306. Maintain the required temperature for the time duration indicated on Table 1.4.2 of ACI 306. Monitor temperatures of concrete at corners or edges of formwork as applicable. Do not expose concrete to carbon monoxide or carbon dioxide fumes from heaters or engines. Oil or coke burning salamanders will not be permitted. Personnel shall be present at all times to maintain safe, continuous operation of heating system. Control temperature and humidity of protected concrete so that excessive drying of concrete surfaces does not occur. Calcium chloride will not be permitted as a concrete accelerator or to thaw frozen subgrade prior to concrete placement.

### **3.08 FINISHING - UNFORMED SURFACES**

- A. Screed Finish: Use as first stage for all concrete finishes. Use as final finish on surfaces that will be covered by additional concrete, grout placement, mortar setting bed (except as otherwise specified) or earth backfill. Immediately after screeding, use a wood float, darby or bullfloat to eliminate high and low spots and to embed large aggregate. This shall be done in a manner to produce even, uniform surfaces so that surface irregularities do not exceed 3/8" in 10' when used as final finish.
- B. Floated Finish: Use as second stage of broomed or troweled finish. Use as final finish on surfaces to receive ceramic tile or quarry tile, and on surfaces which are to be covered with membrane of elastic waterproofing. Float with mechanical or hand float. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats. On surfaces not to receive troweled finish, finish with wood or cork float after mechanical floating to a true uniform surface so that surface irregularities do not exceed 1/8" in 10', except at floor drains.
- C. Broomed Finish: Use as final finish on all outdoor slabs including pavements and sidewalks. After floated finish, draw a stiff bristle broom across the surface making uniform corrugations, perpendicular to the direction of traffic, not more than 1/16" deep.
- D. Troweled Finish: Use as final finish on inside floors and on all other unformed surface not otherwise indicated or specified. Trowel with steel trowel, mechanical or hand, to obtain a smooth, dense finish. The final troweling shall be done after the concrete has become hard enough so that no mortar adheres to the edge of trowel and a ringing sound is produced as the trowel passes over the surface. Do not trowel before surface water has evaporated or been removed with a squeegee. Finish to a true uniform surface so that surface irregularities do not exceed 1/8" in 10', except at floor drains. Do not add sand or cement to the floor surface.
- E. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete floor and in strict compliance with manufacturer's printed instructions.
- F. Repair finished unformed surfaces that contain defects which affect durability or appearance of concrete. Surface defects include crazing, cracks in excess of 0.01 inch wide, or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions. Repair surface defects as specified in the Part I.2, 'Repair of Defective Surfaces.'
- G. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days and before application of any surface preparation including, but not limited to, chemical-hardeners.

### **3.09 FINISHING - FORMED SURFACES**

- A. Surface finish for exterior above-grade areas and any surface receiving coatings shall be required as follows. Surface defects shall be repaired as outlined in I.2 through I.4. Remove or grind down all form marks, fins or irregularities which project more than 1/8" from the surface. Surface shall be finished to a smooth uniform texture by using a carborundum brick or other methods as approved by Engineer.
- B. Repair of Defective Surfaces: Defined as any concrete surface showing misalignment, rock pockets, poor joints, holes from ties, voids, honeycomb, or any other defective area. Repair as soon as the forms have been removed. Chip surface back to a minimum depth of 1/2", chip edges perpendicular to surface, prewet depression, and brush with cement immediately

before patching. Patch surfaces using stiff mortar with same sand-cement ratio as original concrete and with minimum water for placing. Blend with white cement to match existing concrete color. Compact mortar into depressions so that after curing, hole is filled and mortar is flush with surface. Use hammer and ramming rod for compacting the holes. Moist cure for three days or use curing compound. Engineer shall be notified of areas containing defects or where reinforcing steel is exposed prior to determination of repair method.

### **3.010 CONCRETE CURING AND PROTECTION**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid drying at end of final curing period.

- B. Curing Methods: Cure all concrete by one of the following methods unless specified otherwise:

1. Leave in forms for a minimum of 7 days. Keep formwork wet to prevent drying of concrete surfaces.
2. Use saturated bats, soaker hoses, or sprinkler for a minimum of 7 days. Keep concrete continuously wet.
3. Using 1 coat of a liquid membrane-forming compound conforming to ASTM C309, Type 1. Apply immediately after removal of forms (which have been continuously wet); or in case of a slab, after the concrete has been finished and is hardened sufficiently to walk on.
4. Using polyethylene sheets applied in full contact with surfaces.
5. Hot weather curing of unformed surfaces shall commence immediately after finishing and continue for 24 hours. Curing shall consist of application and maintenance of water-saturated material to all exposed surfaces: horizontal, vertical, and otherwise. After the 24-hour interval, continue curing using either a moist cure for 6 days, application of 1 coat of curing compound conforming to ASTM C309, Type 2, or application and maintenance of curing paper or heat-reflecting plastic sheets for 6 more days.

Begin curing formed concrete immediately after placing. Curing shall consist of keeping forms continuously wet for 24 hours. After the 24-hour period, continue curing by loosening forms and applying soaker hoses so that water runs down along concrete surfaces for a minimum of 6 additional days, or, strip forms and apply a curing compound conforming to ASTM C309, Type 2.

6. Cold weather curing of concrete shall conform to the section on Cold Weather Placement of Concrete.

Cure floor surfaces where concrete hardener is indicated with "Curing- Hardening Compound" as specified in this section.

### **3.011 LOW-STRENGTH CONCRETE**

- A. Low-strength concrete is defined as concrete whose 28-day test (average of 2 cylinder breaks) is less than the minimum 28-day strength required. Remove and replace with

acceptable concrete when the quality and the location of the low-strength is such that Engineer considers the strength or durability of the structure is impaired and so orders. Low-strength concrete shall be considered defective work as defined in GENERAL CONDITIONS.

- B. Potentially Low-Strength Concrete: Defined as concrete whose 7-day test is less than 70 percent of the specified minimum 28-day compressive strength.

Construction delays caused by low-strength or potentially low-strength concrete shall not relieve Contractor from responsibility for late completion even though extensions of time may be granted.

### **3.012 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work by other trades is in place. Mix, place and cure concrete as herein specified to blend with in-place construction.
- B. Equipment Bases and Foundations: Construct equipment bases, pads, and foundations as indicated or, when not indicated, conforming to equipment manufacturer's requirements. Reinforce conforming to typical detail unless otherwise indicated. Equipment bases shall include concrete, reinforcing steel, form work (as required) and anchor bolts. Place grout for equipment installed under this contract. Finish top area of bases between anchor bolts and forms with a troweled finish.

### **3.013 QUALITY CONTROL TESTING DURING CONSTRUCTION**

- A. Field Testing of Concrete and Making of Concrete Test Cylinders: Contractor shall furnish test equipment, test cylinder molds, and ACI Certified Grade I Field Testing personnel to perform all required field tests, make the required concrete test cylinders, and deliver test cylinders to the laboratory. The prescribed test shall be made in the presence of or with the concurrence of the Owner/Engineer.

Concrete sampling for tests and cylinder making shall be done conforming to ASTM C172. Prepare test cylinders conforming to ASTM C31, with not less than one set of cylinders (4 cylinders) for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 cubic yard of concrete. Slump Test conforming to ASTM C143 and Air Content Test conforming to ASTM C231. Discard concrete used for slump and air tests. Slump and Air Test results shall be furnished to the Testing Laboratory for inclusion in the Cylinder Test Reports.

A slump and air test shall be taken from the first batch of concrete delivered to the site for each days' pour, for each class of concrete, to check the consistency of the concrete. Compressive strength cylinders, slump, air, and temperature tests shall be taken from a random sample taken at a random point during any given concrete pour as determined by the Resident Project Representative and/or the Engineer.

- B. Additional Testing Due to Variances in Concrete: Should the consistency of the concrete visually appear to vary from what is specified, the Resident Project Representative and/or Engineer can require one additional test (slump, cylinders, air and temperature) to determine that the concrete meets the specified criteria. All costs for additional testing shall be paid for by the Contractor.

C. Laboratory Testing of Concrete During Construction:

1. An independent testing laboratory will be selected and paid by the Contractor to perform the required laboratory tests and statistical evaluations of concrete being used in the work. The laboratory will cure and test concrete cylinders conforming to ASTM C192 and C39, testing 2 cylinders at 7 days of age, and 2 at 28 days of age.
2. The Engineer shall have the right to observe all phases of concrete cylinder curing and testing. Should the Engineer observe any deviations from the prescribed testing procedures that he considers detrimental to concrete strength test results, he shall immediately notify the Owner in writing. The Contractor shall make arrangements with the testing laboratory to receive copies of test reports. The costs of providing a maximum of 2 copies of each report will be paid by the Contractor.
3. Should the statistical data indicate an unacceptable combination of average strength and standard deviation, Contractor shall take immediate corrective action. Should the statistical data indicate an excessive margin of safety, the concrete mix may be modified subject to Engineer's approval.

END OF SECTION

## SECTION 05 50 00

### METAL FABRICATIONS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. Definition: Metal fabrications include items made from iron, steel, or aluminum shapes, plates, bars, strips, tubes, pipes and castings which are not part of structural steel or other metal systems specified elsewhere.
- B. Extent of metal fabrications is indicated on drawings and schedules.
- C. Types of work in this section include but is not limited to metal fabrications for:
  - Ladders.
  - Stairs,
  - Loose bearing and leveling plates.
  - Miscellaneous steel or aluminum trim.
  - Shelf and ledge angles.
  - Metal bar grating.
  - Floor plate.
- D. Related work specified elsewhere:
  - 1. Concrete anchors specified in Division 3.
  - 2. 083114, Access Doors with Safety Grating and Frames.

##### 1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings:
  - 1. See Specification Section 013300 for requirements for details of the submittal process.
  - 2. Fabrication and/or layout drawings and details:
    - a. Submit drawings for all fabrications and assemblies. Include erection drawings, plans, sections, details and connection details.
    - b. Identify materials of construction, shop coatings and third party accessories.
  - 3. Product technical data including:
    - a. Acknowledgement that products submitted meet requirements of standards referenced.
    - b. Manufacturer's installation instructions.
    - c. Provide manufacturer's standard allowable load tables for the following:
      - i. Grating and checkered plate.
      - ii. Expansion anchor bolts.



- iii. Adhesive anchor bolts.
    - iv. Castings, trench covers and accessories.
    - v. Metal (Modular) framing systems.
    - vi. Alternating tread stairs.
  - 4. Contractor designed systems and components, including but not limited to, stairs, landings and ladders:
    - a. Certification that manufactured units meet all design loads specified.
    - b. Shop Drawings and engineering design calculations:
      - i. Indicate design live loads.
      - ii. Sealed by a professional structural engineer.
      - iii. Engineer will review for general compliance with Contract Documents.
- C. Miscellaneous Submittals:
  - a. See Specification Section 01330 for requirements for details of the submittal process.
  - b. Certification of welders and welding processes. Indicated compliance with AWS

### **1.03 QUALITY ASSURANCE**

- A. Referenced Standards:
  - 1. Aluminum Association (AA):
    - a. ADM-1, Aluminum Design Manual.
    - b. 45, Designation System for Aluminum Finishes.
  - 2. American Institute of Steel Construction (AISC):
    - a. Manual of Steel Construction - Allowable Stress Design (ASD).
    - b. 360, Specifications for Structural Steel Buildings (referred to herein as AISC Specification).
  - 3. American National Standards Institute (ANSI):
    - a. A14.3, Ladders - Fixed - Safety Requirements.
  - 4. ASTM International (ASTM):
    - a. A6, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
    - b. A36, Standard Specification for Carbon Structural Steel.
    - c. A48, Standard Specification for Gray Iron Castings.
    - d. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
    - e. A108, Standard Specification for Steel Bars, Carbon and Alloy, Cold Finished.
    - f. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - g. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

- h. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - i. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - j. A496, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
  - k. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - l. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
  - m. A992, Standard Specification for Steel for 1 Structural Shapes.
  - n. B26, Standard Specification for Aluminum-Alloy Sand Castings.
  - o. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - p. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - q. B308, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
  - r. B429, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
  - s. B632, Standard Specification for Aluminum-Alloy Rolled Tread Plate.
  - t. F467, Standard Specification for Nonferrous Nuts for General Use.
  - u. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
  - v. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - w. F594, Standard Specification for Stainless Steel Nuts.
  - x. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
5. American Welding Society (AWS):
- a. A5.1, Standard Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
  - b. D1.1, Structural Welding Code Steel.
  - c. D1.2, Structural Welding Code Aluminum.
6. National Association of Architectural Metal Manufacturers (NAAMM):
- a. AMP 510, Metal Stairs Manual.
  - b. MBG 531, Metal Bar Grating Manual.
7. Occupational Safety and Health Administration (OSHA):
- a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.
8. Building code:
- a. International Code Council (ICC):
    - i. International Building Code and associated standards, 2003 Edition including all amendments, referred to herein as Building Code.

- B. Qualifications:
  - 1. Qualify welding procedures and welding operators in accordance with AWS. Fabricator shall have minimum of 10 years experience in fabrication of metal items specified.
  - 2. Engineer for contractor-designed systems and components: Professional structural engineer licensed in the State of Missouri.
- C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinate installation.
- D. Definitions
  - 1. Installer or Applicator
    - a. Installer or applicator is the person actually installing or applying the product in the field at the project site. The terms installer and applicator are synonymous.
  - 2. Hardware: As defined in ASTM A153.
  - 3. Galvanizing: Hot-dip galvanizing per ASTM A123 or ASTM A153 with minimum coating of 2.0 Oz. of zinc primer per square foot of metal (average of specimens) unless otherwise noted or dictated by applicable referenced standards.

## **PART 2 - PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURERS**

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
  - 1. Epoxy adhesive anchor bolts:
    - a. Hilti Inc.
    - b. ITW Ramset/Red Head.
    - c. Simpson Strongtie.
  - 2. Metal (Modular) framing system:
    - a. Unistrut Building Systems.
    - b. B-Line Systems.
    - c. Kindorf.
    - d. Metal Products Div., USG Industries, Inc.
    - e. Mono-Systems, Inc.
    - f. Superstrut.
- B. Submit request for substitution in accordance with Specification Section 01640.

### **2.02 MATERIALS**

- A. Stainless Steel
  - 1. Minimum Yield strength of 30,000-psi and minimum tensile strength of 70,000-psi.
    - a. Bolts and nuts: ASTM Type 316.
  - 2. Minimum yield strength of 25,000-psi and minimum tensile strength of 70,000-psi

- a. Strip, plate and flat bar for welded connections, ASTM A666, Type 304L or 316L
- 3. Welding electrodes: In accordance with AWS for metal alloy being welded.
- B. Aluminum:
  - 1. Alloy 6061-T6, 32,000 psi tensile yield strength minimum.
    - a. ASTM B221 and ASTM B308 for shapes including beams, channels, angles, tees and zees.
    - b. Weir plates, baffles and deflector plates, ASTM B209.
  - 2. Alloy 6063-T5 or T6, 15,000 psi tensile yield strength minimum.
    - a. ASTM B221 and ASTM B429 for bars, rods, wires, pipes and tubes.
  - 3. ASTM B26 for castings.
  - 4. ASTM F468, alloy 2024 T4 for bolts.
  - 5. ASTM F467, alloy 2024 T4 for nuts.
  - 6. Electrodes for welding aluminum: AWS D1.2, filler alloy 4043 or 5356.
- C. Washers: Same material and alloy as found in accompanying bolts and nuts.
- D. Embedded Anchor Bolts:
  - 1. Building Anchor Bolts:
    - a. ASTM F1554, Grade 55 with weldability supplement S1 or ASTM A36 threaded galvanized rods.
    - b. ASTM A307, Grade A for headed bolts, galvanized.
  - 2. All other anchor bolts: Type 304, 314 or 316.
- E. Adhesive Anchor Bolts:
  - 1. Stainless steel, ASTM Type316.
  - 2. Provide minimum edge distance cover and spacing as recommended by manufacturer, or as indicated on Drawings whichever is larger.
    - a. Minimum embedment as recommended by manufacturer or 8 DIA of bolt, whichever is larger.
    - b. Notify Engineer if required depth of embedment cannot be achieved at a particular anchor bolt location.
    - c. Follow manufacturer's recommendations for installation and torque.
  - 3. Submit manufacturer's load test data to verify at least the anchor bolt capacities at the following embedment depths:
    - a. Data must be based on actual tests performed in unreinforced mass of concrete of not more than 4,000 psi compressive strength.
    - b. Capacity must be at a concrete temperature of at least 130 Deg F.

Anchor Diameter (in)	Bolt	Embedment (in)	Minimum Tension (Kip)(*)(**)	Ultimate capacity
3/8		3	4.8	

1/2	4	8.1
5/8	5	11.4
3/4	6	15.4
7/8	7	20.0
1	8	24.7
1-1/4	10	34.3

(\*) Data must be based on actual tests performed in unreinforced mass concrete not more than 4,000-psi compressive strength.

(\*\*) Capacity must be at a concrete temperature of at least 130 Deg F.

4. Adhesive anchor bolts:

- a. HVA Adhesive Anchor System by Hilti.
- b. HIT HY 150 Adhesive Anchor by Hilti.
- c. HSE 2411 Epoxy Adhesive Anchor by Hilti.
- d. EPCON Ceramic 6 Epoxy by ITW Ramset/Red Head.
- e. Acrylic-Tie by Simpson Strong-Tie.

F. Iron and Steel Hardware: Galvanized in accordance with ASTM A153 when required to be galvanized.

G. Finishes

- 1. Shop Painting: Prepare ferrous surfaces and apply primer as specified in Division 9.
- 2. Shop Coating for Aluminum: All aluminum surfaces and edges in contact with other metals and concrete shall be protected by a heavy brush coat of alkali resistant bituminous coating, or a nonporous tape or gasket. Coating is not required for aluminum in contact with stainless-steel bolts. Apply one of the following bituminous coatings at 15 mils minimum dry film thickness.
  - a. Glidden 61778.
  - b. Koppers - Bitumastic No. 50.
  - c. Porter 7100.
  - d. Tnemec - Heavy Duty 46-449.
  - e. Or approved equal.

**2.03 FABRICATION, GENERAL**

- A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.
- B. Verify field conditions and dimensions prior to fabrication.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a nominal radius of approximately 1/32-inch to 1/16-inch unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

- D. Provide drilled or punched holes with smooth edges. Punch or drill field connections for and for attachment of work by other trades.
- E. Weld Permanent Shop Connections:
  - 1. Welds to be continuous fillet type unless indicated otherwise
  - 2. Full penetration but welds at bends in stair stringers and ladder side rails.
  - 3. Weld structural steel in accordance with AWS D1.1 using Series E70 electrodes conforming to AWS A5.1.
  - 4. Weld aluminum in accordance with AWS D1.2.
  - 5. All headed studs to be welded using automatically timed stud welding equipment.
  - 6. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts.
- G. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- H. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- I. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- J. Tolerances
  - 1. Rolling:
    - a. ASTM A6.
    - b. When material received from the mill does not satisfy ASTM A6 tolerances for camber, profile, flatness, or sweep, the Contractor is permitted to perform corrective work by the use of controlled heating and mechanical straightening, subject to the limitations of the AISC Specifications.
  - 2. Fabrication tolerance:
    - a. Member length:
      - i. Both ends finished for contact bearing: 1/32 IN.
      - ii. Framed members:
        - a) 30 FT or less: 1/16 IN.
        - b) Over 30 FT: 1/8 IN.
    - b. Member straightness:
      - i. Compression members: 1/1,000 of axial length between points laterally supported.
      - ii. Non-compression members: ASTM A6 tolerance for wide flange shapes.
    - c. Specified member camber (except compression members):
      - i. 50 FT or less: Minus 0/plus 1/2 IN.
      - ii. Over 50 FT: Minus 0/plus 1/2 IN (plus 1/8 IN per 10 FT over 50 FT).
      - iii. Members received from mill with 75 percent of specified camber require no further cambering.

- iv. Beams/trusses without specified camber shall be fabricated so after erection, camber is upward.
    - v. Camber shall be measured in fabrication shop in unstressed condition.
  - d. At bolted splices, depth deviation shall be taken up by filler plates.
    - i. At welded joints, adjust weld profile to conform to variation in depth.
    - ii. Slope weld surface per AWS requirements.
  - e. Finished members shall be free from twists, bends and open joints.
    - i. Sharp kinks, bends and deviation from above tolerances are cause for rejection of material.
- 3. Maximum tolerance for difference in depth between checkered plat or grating depth and seat or support angle depth: 1/8-inch
- 4. Distance between edge of grating or checkered plat and face of embedded seat angle or face of wall or other structural member shall be 1/4-inch.
- 5. Bar grating tolerances shall be in accordance with NAAMM MBG 531.
- K. Fabricate grating, checkered plate, stairs, ladders and accessories using aluminum unless shown otherwise on the Drawings.
  - 1. Finish:
    - a. Aluminum: Mill finished unless scheduled or otherwise specified, or if approved by the Engineer, finished in manufacturer's standard coating.
    - b. Coat surfaces in contact with dissimilar materials. See Specification Section 099000.
    - c. Galvanize items where specified or indicated on Drawings.
  - 2. See Specifications Section 099000 for preparation and painting of ferrous metals and other surfaces.

#### **2.04 ALUMINUM CHECKERED PLATE:**

- A. Conform to ASTM B632.
  - 1. Diamond pattern: Use one (1) pattern throughout Project.
  - 2. Material: Type 6061-T6.
- B. Design live load:
  - 1. 100 psf, uniform load.
  - 2. 300 LBS concentrated load on 4 IN square area.
  - 3. All components to be adequate for the uniform load or the concentrated load, whichever requires the stronger component.
  - 4. Maximum deflection: 1/300 of span under a superimposed live load of 50 psf.
- C. Reinforce as necessary with aluminum angles.
- D. Plate sections:
  - 1. Maximum 3 FT wide.
  - 2. Minimum 1/4 IN thick.
  - 3. Maximum 100 LBS per section if required to be removable.

- E. Provide joints at center of all openings unless shown otherwise.
  - 1. Reinforce joints and openings with additional angles to provide required load carrying capacity.
- F. Unless shown otherwise, frame for openings with aluminum checkered plate cover:
  - 1. Aluminum support angles:
    - a. 3 x 2 x 1/4 IN minimum size with long leg vertical.
    - b. 5/8 IN DIA adhesive anchor bolts spaced at maximum of 24 IN OC along each side with not less than two (2) anchor bolts per side.
  - 2. Aluminum concrete insert seats:
    - a. 2 x 2 x 1/4 IN minimum size.
    - b. Auto-welded studs or strap anchors at 18 IN OC with not less than two (2) studs or anchored per side.
  - 3. Drill and tap frame to receive 3/8 IN DIA aluminum cap screws at not more than 24 IN OC with not less than two (2) screws per side.

## **2.05 ALUMINUM GRATING:**

- A. NAAMM MBG 531.
- B. Bearing bars: Rectangular, 1-1/2 x 3/16 IN at 1-3/16 IN OC spacing OR I-bar, 1-1/2 IN deep with minimum 1/16 IN thick bar and minimum 1/4 IN flange width at 1-3/16 IN OC spacing.
- C. Cross bars:
  - 1. Welded, swaged or pressure locked to bearing bars:
  - 2. Maximum 4 IN/OC spacing.
- D. Top edges of bars: Grooved or serrated.
- E. Removable grating sections: Not wider than 3 FT and not more than 100 LBS.
- F. Standard mill finish.
- G. Ends and perimeter edges: Banded.
- H. Openings through grating: Reinforced to provide required load carrying capacity and banded with 4 IN high toe plate.
- I. Provide joints at openings between individual grating sections.
- J. Clips and bolts: Stainless steel.
- K. Seat angles: Aluminum.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site to allow their installation in other construction. If such items are not provided in time for installation, cut in and install.



- C. Prior to installation, inspect and verify condition of substrate. Installation of product constitutes installer's acceptance of substrate condition for product compatibility.
- D. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation. Field welding aluminum is not permitted unless approved in writing by Engineer.

### **3.02 INSTALLATION**

#### **A. General:**

1. **Fastening to In-Place Construction:** Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in- place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts and other connectors as required. Provide steel templates for all column anchor bolts.
2. **Cutting, Fitting and Placement:**
  - a. Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Field cutting grating or checkered plate to correct fabrication errors is not acceptable; replace entire section.
  - b. Remove all burrs and radius all sharp edges and corners of miscellaneous plates, angles, framing systems, etc.
  - c. Set work accurately in location, alignment and elevation. Shim and grout as necessary.
  - d. Fit exposed connections accurately together to form tight hairline joints.
  - e. Do not field splice fabricated items unless said items exceed standard shipping length or change of direction requires splicing. Provide full penetration welded splices where continuity is required.
  - f. Provide each fabricated item complete with attachment devices as indicated or required to install.
  - g. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.
  - h. Tie anchor bolts into position to embedded reinforcing steel using wire. Tack welding of anchors is prohibited. Coat anchor threads and nuts with heavy coat of clean grease prior to concrete/grout/mortar placement.
3. **Connections:** Unless otherwise noted or specified.
  - a. Connect steel members to steel members with 3/4-inch diameter ASTM A325 high strength bolts
  - b. Connect aluminum to aluminum with 3/4-inch diameter aluminum bolts
  - c. connect aluminum to structural steel using 3/4-inch diameter stainless steel bolts
  - d. Connect aluminum and steel members to concrete and masonry using stainless steel expansion anchor bolts or adhesive anchor bolts unless shown otherwise.
  - e. Provide washers for all bolted connections.
  - f. Where exposed, bolts shall extend a maximum of 3/4-inch and a minimum of 1/2-inch above the top of the nut. If bolts are cut off to require maximum height, threads must be dressed to allow nuts to be removed without damage to the bolt or the nuts.
  - g. Provide appropriate protection between connections of dissimilar metals/materials.

4. Field welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work. Grind welds smooth where field welding is required. Field welding aluminum is not permitted unless approved in writing by Engineer.
5. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surface. Clean bottom surface of bearing plates.
6. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use non-metallic non-shrink grout in all locations.
7. Install Bollards in concrete as detailed. Fill pipe with concrete and round off top.
8. Provide abrasive stair nosings in each tread and landing of all concrete stairs and at each concrete stair landing having metal stair structure attaching to the concrete landing. Center stair nosings in stair width. Coordinate nosings with railing vertical posts. Maintain 2-inch clearance between the end of the nosing and the edge of the railing base plate.
9. Attach grating to end and intermediate supports with grating saddle clips and bolts.
  - a. maximum spacing: 2-ft O.C. with minimum of two (2) per side.
  - b. Attach individual units of aluminum grating together with clips at 2-ft O.C. maximum with a minimum of two (2) clips per side.
  - c. Attach each aluminum plate to support per manufacturer's recommendations using stainless steel clips and bolts.

### **3.03 ADJUST AND CLEAN**

- A. After erection, installation or application, clean all miscellaneous metal fabrication surfaces of all dirt, weld slag and other foreign matter. Provide surface acceptable to receive field applied paint coatings in conformance to Specification Section 09900.
- B. Touch-up painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint of miscellaneous metal is specified in Division 9 of these specifications.
- C. Repair damaged galvanized surfaces in accordance with ASTM A780. Prepare damaged surfaces by abrasive blasting or power sanding. Apply galvanizing repair paint to minimum 6-mils DFT in accordance with manufacturer's instructions.

END OF SECTION

## SECTION 07 14 00

### FLUID-APPLIED WATERPROOFING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Extent of each type of dampproofing work is indicated on drawings and as follows.
  - 1. Manholes, all types and locations.
  - 2. Concrete valve vaults
  - 3. Concrete pump station wetwells
  - 4. Similar work used as exposed finish is excluded by definition and, if required, is specified as waterproofing, vapor barrier, roofing, flooring, special coating or other appropriate category. Dampproofing shall be applied below elevation of finish grade only.

##### 1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, installation instructions, and recommendations for each dampproofing material required. Include data substantiating that materials comply with requirements.
- B. Certifications: Submit manufacturer's certification in writing that the product is suitable for the application specified. Certification letter shall state the required application rate to dampproof the indicated structures.

##### 1.03 QUALITY ASSURANCE

- A. General: For each type of work, obtain primary materials from single manufacturer, to greatest extent possible. Provide secondary materials only as recommended by manufacturer of primary materials.
- B. Installer Qualifications: A firm which has specialized for not less than three years in installation of types of dampproofing required for the project and which is acceptable to manufacturer of primary materials.

##### 1.04 PROJECT/SITE CONDITIONS

- A. Substrate: Proceed with dampproofing work only after substrate construction and penetrating work have been completed.
- B. Weather: Proceed with dampproofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations.

## **PART 2 - PRODUCTS**

### **2.01 2.01 COLD LIQUID-APPLIED ELASTOMERIC WATERPROOFING MATERIALS**

- A. Primer: Manufacturer's recommended primer appropriate to substrate
- B. Waterproofing system:
  - 1. One (1) or two (2) component, moisture curing polyurethane elastomer meeting the requirements of ASTM C836.
  - 2. Flowing type for surfaces up to five (5) percent slope.
  - 3. Non-flow type for surfaces exceeding 5-percent
  - 4. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
    - a. Carlisle – Liqueal CCW-703
    - b. Tremco – TREMproof 201/60
    - c. Or approved equal.
- C. Adhesive: Manufacturer's standard
- D. Flashing Reinforcement: Woven uncoated fiberglass mesh.
- E. Sealant: Manufacturer's recommended sealant.
- F. Protection board: Manufacturer approved fiberboard or expanded polystyrene, 1-inch thickness (min.).
- G. Backer Rod: Closed cell polyurethane foam rod.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. Examine Substrate and conditions under which dampproofing work is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

### **3.02 PREPARATION OF SUBSTRATE**

- A. Cure concrete and masonry in accordance with manufacturer's recommendations. Verify moisture content does not exceed manufacturer's maximum allowable. Ensure that curing agents used are compatible with the coating system.
- B. Remove surface contamination by high pressure water cleaning per ASTM D4258.
- C. Clean substrate of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer.
- D. Install can't strips and similar accessories as shown and as recommended by prime materials manufacturer even though not shown.

- E. Fill voids, seal joints, and apply bond breakers (if any) as recommended by prime materials manufacturer, with particular attention at construction joints.
- F. Install separate flashings and corner protection stripping as recommended by prime materials manufacturer, where indicated, to precede application of dampproofing. Comply with details shown and manufacturer's recommendations. Give particular attention to requirements at building expansion joints, if any.
- G. Prime substrate as recommended by prime materials manufacturer.
- H. Protection of Other Work: Do not allow liquid and mastic compounds to enter and clog drains and conductors. Prevent spillage and migration onto other surfaces of work by masking or otherwise protecting adjoining work.

### **3.03     INSTALLATION**

- A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of work.
- B. Apply waterproofing to the exterior side of vertical concrete and masonry wall surface and structure surfaces located below grade. Below grade structure requiring waterproofing membranes include:
  - 1. Precast and Cast-in-place Backflow Preventer Vault
  - 2. Precast and Cast-in-place Concrete Manholes
  - 3. Similar work used as exposed finish is excluded by definition and, if required, is specified as waterproofing, vapor barrier, roofing, flooring, special coating or other appropriate category. Dampproofing shall be applied below elevation of finish grade only.
- C. Provide a minimum 60-mil dry film thickness.
- D. Protection Board: Protection board is to be installed prior to any rigid perimeter insulation specified. Secure protection board as required to prevent displacement during backfilling. All mechanical fasteners used for securing protection board that penetrate the membrane must be re-sealed prior to backfilling.

END OF SECTION

## SECTION 08 31 14

### ACCESS DOORS WITH SAFETY GRATING AND FRAMES

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section includes:

1. Exterior backflow preventer vault access doors with safety grating.

B. Related sections:

1. Section 05 50 00 - Metal Fabrications.

##### 1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. Doors shall be single or double cover construction in sizes as shown on drawings. Covers shall be reinforced on the underside to withstand a live load of 300 pounds per square foot with a maximum deflection of 1/150th of the span.
2. Doors shown on drawings with drainable frames shall have a 1/4" thick, 3" wide by 3-1/2" tall drainage channel frame around the entire perimeter of door with a 1-1/2" diameter drain coupling welded to underside of frame.
3. Drainage frame and standard (plain) frame doors shall fit flush with top of frame.
4. Hinges for drainage frame doors shall be heavy-duty pin hinges (3/8" minimum diameter pins) and shall pivot so cover does not protrude into channel frame. Hinges shall be designed for horizontal installation.
5. Hinges for standard frame doors shall be cam-action hinges and pivot on torsion bars for smooth, easy and controlled opening throughout entire opening and closing of door. Operation shall not be affected by temperature. Hinges shall be designed for horizontal installation.
6. Drainage frame doors shall be fitted with an adequate number and size of compression spring operators for smooth, easy, counterbalanced, controlled operation through entire opening and closing of door. Operation shall not be affected by temperature. Compression springs shall be fully enclosed in telescopic tubes. Upper tube shall be outside of lower tube to prevent accumulation of moisture, grit and debris inside tube assembly. Lower tube shall interlock with a flanged support shoe fastened to a 1/4" gusset support plate.
7. Doors shall be equipped with a steel hold-open arms which will automatically lock doors in open position. A release handle shall be conveniently located for closing.
8. Doors shall be equipped with snap locks and fixed turn handles mounted on underside of doors. Removable latch handles shall be provided and the latch releases shall be protected by a flush gasketed, removable screw plugs. Doors shall have lift handles that are designed to be flush with walking surface when not in use.

B. Safety Grating Requirements:

1. Doors where safety grating is indicated shall have a permanently hinged grate which combines covering of the opening, fall-through protection per OSHA 1910.23 and controlled confined space entry per OSHA 1910.146. The grating shall have 5" by 5" openings and shall be designed to withstand a minimum live load of 300 pounds per square foot with a maximum deflection of 1/150th of the span.
2. Each safety grating leaf shall have an opening arm with a red vinyl grip handle positioned so that the grating serves a barrier between the operator and the pit. The opening shall be equipped with provision for attaching a controlled confined entry space lock.
3. The safety grating in the open position shall form a barrier around the opening. The grating design shall be configured so that it is impossible to close the access door until the fall-through protection is in place.

**1.03 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of accessory door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage devices. Include complete schedule, including types, general locations, sizes, wall, floor and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Bilco Co. - New Haven, CT
- B. USF Fabrication – Hialeah FL

**2.02 MATERIALS**

- A. **Frame and safety grating:** Aluminum.
- B. **Covers:** Aluminum checkered plate.
- C. **Hardware:** Type 316 stainless steel.

**2.03 FABRICATION**

- A. **General:** Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. **Fabrication:** Fabricate units of continuous welded construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

**2.04 FINISHES**

- A. **General:** Aluminum and stainless steel components shall be mill finish. Aluminum surfaces in contact with concrete or mortar shall have a bituminous coating applied to those surfaces.
- B. **Safety Grating:** Aluminum safety grate shall be painted "OSHA safety orange."

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. Comply with manufacturer's instructions for installation.
- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Frame drain shall be piped to daylight, or if shown on the drawings, to an internal sump or wetwell.

**3.02 ADJUSTING**

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

**3.03 SCHEDULES**

- A. Comply with manufacturer's instructions for installation.

NUMBER	LOCATION	CLEAR OPENING		MATERIAL	FRAME	NOTES
		W (FT)	H (FT)			
C-PW-AH01	Backflow Preventer	5.0	3.0	Aluminum	Drainage Frame	a, c

- Notes:
- a. Provide secondary fall protection
  - b. Route to sump
  - c. Route to daylight

END OF SECTION



## SECTION 09 90 00

### PAINTING (INDUSTRIAL) AND COATING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Extent of painting work is indicated on the drawings and schedules and as specified herein. The painting work shall include, but not be limited to all Equipment, Piping, Supports, Accessories, Fittings, Valves, Vault Structure, etc. This specification does not apply to anything that is not connected to the proposed water and wastewater line improvements.
- B. Work includes preparation, painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
  - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
- C. Work includes field painting of exposed bare and covered pipes (including color coding), and of hangers, exposed steel and iron work, except as otherwise indicated.
- D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- E. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules." Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Engineer will select these from standard colors or finishes available.
- F. Following categories of work are not included as part of field-applied finish work.
  - 1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) acoustic materials, architectural casework, and finished mechanical and electrical equipment, including light fixtures, switchgear, and distribution cabinets.
  - 2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, and duct shafts.
  - 3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require finish painting.
  - 4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, and motor and fan shafts will not require finish painting.

- G. The following categories of work are included under other sections of these specifications.
  - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work, and similar items.
  - 2. Unless otherwise specified, shop priming of fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.
  - 3. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified in Divisions 15 and 16, respectively, except as indicated in this Division.
- H. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Manual, or any equipment identification, performance rating, name, or nomenclature plates.

## **1.02 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.
- B. Schedule: Submit a schedule listing together the substrates applicable to the project, the coating product to be used for each substrate and location, and the surface preparation to be performed for each substrate and location. Submittal of coating product data and certifications will not be accepted if they are not included on the coating schedule.
- C. Product Certification: Submit certification in writing by the paint manufacturer that each coating product is recommended and suitable for the specified substrate. The certification shall name the paint and any required primer, and shall include surface preparation instructions.
- D. Samples: Prior to beginning work, Engineer will be furnished color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples to Engineer for Owner's review of color and texture only. Provide a listing of material and application for each coat of each finish sample. Owner shall choose color of paint to be used.

## **1.03 QUALITY ASSURANCE**

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.
- C. Furnish paints that have been recommended by the manufacturer for the substrates and service conditions specified.
- D. Paint applicators shall have at least 5 years of experience in the application of coatings for water and wastewater facilities.

#### **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
  - 1. Name or title of material.
  - 2. Fed. Spec. number, if applicable.
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Manufacturer's name.
  - 5. Contents by volume, for major pigment and vehicle constituents.
  - 6. Thinning instructions.
  - 7. Application instructions.
  - 8. Color name and number.
  - 9. Material Safety Data Sheet (MSDS)
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

#### **1.05 JOB CONDITIONS**

- A. Apply water-base paints only when temperature of surface to be painted and surrounding air temperatures are between 50°F (10°C) and 90°F (32°C), unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
  - 1. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.
- D. Provide a minimum of 15 foot candles of lighting on surfaces to be finished,

#### **1.06 SAFETY**

- A. In accordance with the requirements of the OSHA Regulations for Construction, the Contractor shall provide and require the use of personal protective and lifesaving equipment for all persons working in or about the project.

- B. All pertinent local, state and federal safety regulations shall be adhered to rigidly. All safety precautions noted on the manufacturers Product Data Sheet and Material Safety Data Sheet shall be observed.
- C. Material Safety Data Sheets (MSDS) and Product Data Sheets for all paint, solvents and chemicals used, shall be available on the job site at all times.
- D. No smoking will be permitted in areas where paint mixing and thinning are in progress.
- E. Spray equipment must be grounded at all times during sandblasting and painting.
- F. Head and face protection and respiratory devices: Applicable health and safety precautions required by appropriate regulatory agencies such as OSHA, ANSI, etc. shall be followed.
- G. Ventilation shall be adequate to reduce the concentration of air contaminant to the degree that a hazard to the worker does exist.
- H. Whenever the occupational noise exposure exceeds the maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices. Noise levels cannot exceed OSHA or local regulations for other workers or residents.
- I. All temporary ladders and scaffolding shall conform to the applicable requirements of the OSHA Regulations for Construction. They shall be erected where requested by the Owner's Representative to facilitate proper inspection and be moved by the Contractor to locations requested by the Owner's Representative.
- J. The Contractor shall follow and strictly adhere to all applicable health and safety regulations and precautions as required by local, state, and federal regulatory agencies such for the surface preparation, removal, and waste disposal of all lead-based paint systems.

## **PART 2 - PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURERS**

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
  - 1. Tnemec
  - 2. Carboline Co.
  - 3. PPG
  - 4. Or Approved Equal

### **2.02 MATERIALS**

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
  - 1. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

2. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.
  3. Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Engineer. Furnish material data and manufacturer's certificate of performance to Engineer for any proposed substitutions.
- B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION**

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

#### **3.02 SURFACE PREPARATION**

- A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
  1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Engineer in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
  2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
  3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
- B. Cementitious Materials: Prepare cementitious surfaces of concrete and concrete block to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze. Remove existing paint or coatings on existing structures in accordance with coating system manufacturer's recommendations for surface preparation.

1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
- C. Ferrous Metal Surfaces: Clean non-galvanized, ferrous surfaces, which have not been shop-coated of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning, complying with Steel Structures Painting Council (SSPC) recommendations.
1. Blast clean steel surfaces as recommended by coating system manufacturer and in accordance with SSPC specifications for type of blast cleaning required. Minimum levels of surface preparation shall be SP5, White Metal Blast Cleaning for submerged surfaces and SP10, Near-White Blast Cleaning for exposed surfaces.
  2. Treat bare and sandblasted or pickled clean metal with metal treatment wash coat, prior to priming.
  3. Touch-up shop applied prime coats which have been damaged or bare areas. Wire-brush, solvent clean, and touch-up with same primer as shop coat.
  4. Blast clean existing equipment and piping as recommended by coating manufacturer and in accordance with SSPC recommendations. Where other surface preparations are proposed, submit manufacturer's written recommendations for the specific location considered.
- D. Ferrous metal surfaces which have an existing coating, please refer to the specific preparation requirements for the coating to be applied per this section.
- E. Non-Ferrous Metal Surfaces: Clean non-ferrous and galvanized surfaces in accordance with coating system manufacturer's instructions for type of service, metal substrate, and application required.

### **3.03 MATERIALS PREPARATION**

- A. General: Carefully mix and prepare materials in compliance with manufacturer's directions.
1. Do not mix coating materials produced by different manufacturers, unless otherwise permitted by manufacturer's instructions.
  2. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
  3. Stir materials before application to produce a mixture of uniform density, and as required during application. Do not stir film, which may form on surfaces, into material. Remove film, if necessary, strain material before using.
- B. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

### 3.04 APPLICATION

- A. General: Apply special coatings by brush, roller, spray, squeegee, or other applicators in accordance with manufacturer's directions. Use brushes best suited for type of material being applied. Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
1. Coating colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents.
  2. Provide finish coats which are compatible with prime paints used.
  3. The number of coats and coating film thickness required is same regardless of the application method. Do not apply succeeding coats until previous coat has cured as recommended by coating manufacturer. Sand between coat applications where required to produce an even smooth surface in accordance with coating manufacturer's directions.
  4. Apply additional coats when undercoats or other conditions show through final coat until the cured film is of uniform finish, color and appearance.
  5. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces.
  6. Coat backsides of access panels, removable or hinged covers to match exposed surfaces.
- B. Minimum Coating Thickness: Apply each material at not thinner than manufacturer's recommended spreading rate. Provide a total dry film thickness of entire coating system as recommended by manufacturer, unless otherwise indicated.
- C. Prime Coats: Before application of finish coats, apply prime coat to material which is required to be painted or finished, and which has not been prime coated by others.
1. Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- D. Brush Applications: Brush-out and work brush coats onto surfaces in an even film. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.
1. Brush apply primer or first coats, unless otherwise permitted to use mechanical applicators.
- E. Mechanical Applications: Use mechanical methods for coating application when permitted by coating material manufacturer's recommendations, governing ordinances, and trade union regulations.
1. Wherever spray application is used, apply each coat to provide equivalent hiding of brush-applied coats. Do not double-back with spray equipment building-up film thickness of 2 coats in one pass, unless recommended by coating material manufacturer.

- F. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish, or recoat work not in compliance with specified requirements.

### **3.05 FIELD QUALITY CONTROL**

- A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:
  - 1. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.
  - 2. Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.
- B. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

### **3.06 CLEANUP AND PROTECTION**

- A. Cleanup: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each workday.
  - 1. Upon completion of painting work, clean window glass and other paint- spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Engineer.
  - 1. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
  - 2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.



### 3.07 INTERIOR SPECIAL COATING SCHEDULE

A. General: Provide the following special coating systems for the various substrates as indicated.

1. Concrete Vault, where specifically indicated in the project drawings and specifications:

2-Component Aromatic Polyurea Coating System

Surface Prep: SSPC-SP 13/NACE No. 6 with minimum surface profile equivalent to ICRI CSP3 to CSP5 in accordance with ICRI Technical Guideline No. 03732

First Coat: Urethane-based Primer

OBIC: Prime 1500CP  
Coverage Rate: 200-260 FT<sup>2</sup> per gallon

VersaFlex: VF-15  
Coverage Rate: 100-200 FT<sup>2</sup> per gallon

Second Coat: Aromatic Polyurea

OBIC: Armor 1000  
80.0 mils, D.F.T.

VersaFlex: VF-380  
80.0 mils, D.F.T.

2. Ferrous Metal:

- a. Non-Submerged Equipment and Piping:

2-component Epoxy Coating, Gloss Finish: 2 coats.

Surface Prep.: SSPC SP6

First Coat: High Build Epoxy.

Tnemec: Series N69 Hi-Build Epoxoline II.  
First Coat, 3.0-5.0 mils D.F.T.  
Second Coat, 4.0-6.0 mils D.F.T.

Carboline: Kopcoat 890 High Gloss Epoxy.  
Both coats 4.0-6.0 mils D.F.T.

Or approved equal.

### **3.08 INSPECTION**

- A. At all times the Owner and/or the Engineer shall have access to the work in progress. Contractor shall perform, when requested, the inspections. Tests will be made for surface condition and profile after blasting, wet film thickness, dry thickness and pinholes. No pinholes will be allowed. The inspector will also check application practices. The Contractor shall re-paint all areas found defective and remove and replace any coatings placed using improper practices.
- B. In addition to the tests for surface profile, wet film thickness, dry film thickness and pinholes, which will be made during the progress of the work, the Contractor, in the presence of the Engineer, shall check the coatings after completion of the application for compliance with these specifications. All defects shall be promptly corrected by Contractor.
- C. Owner and Engineer shall be kept informed by Contractor as to the progress of the work. If Contractor fails to notify the Owner and Engineer of progressing work and the inspector has doubts of un-inspected work, the Contractor will be responsible to take whatever measures necessary including but not limited to re-blasting and/or repainting areas in question.

Key Areas of Owner and Engineer Notification by Contractor:

- a. Profile of blast
  - b. Prime coat film thickness
  - c. Stripe coat application and film thickness
  - d. Finish coat film thickness
- D. Owner and Engineer shall be kept informed by Contractor as to progress of work and any delays due to weather or equipment failure.

### **3.09 WARRANTY**

- A. The Contractor shall warrant and guarantee that the materials and workmanship furnished under this contract shall be as specified and shall be free from defects for a period of one years from the date of final payment.
- B. Within the guarantee period and upon notification of the Contractor by the Owner, the Contractor shall promptly make all needed adjustments, repairs, or replacements arising out of defects which, in the judgment of the Owner and Engineer become necessary during such period.
- C. The costs of all materials, parts, labor, transportation, supervision, special tools and supplies required for replacement of parts, repair of parts, or correction of abnormalities shall be paid for by the Contractor, or by his surety under the terms of the Performance and Payment Bond.
- D. The Contractor also extend the terms of this guarantee to cover repair work and all replacement parts furnished under the guarantee provisions for a period of two years from the date of completion thereof.
- E. The coating will be inspected after one year to assure that no coating failure has occurred. If any corrosion, bubbling, delaminating or other indications of failure are detected, the Contractor will repair all affected areas.

END OF SECTION

**SECTION 10 14 14**  
**EXTERIOR SIGNAGE**

**PART 1 - GENERAL**

**1.01. SUMMARY**

A. Hazard and Safety Sign

**1.02. SUBMITTAL**

A. Shop Drawings:

1. See Section 013300 for requirements for the mechanics and administration of the submittal process
2. Product Technical Data including:
  - a. Catalog information of all identification systems.
  - b. Acknowledgements that products submitted meet requirements of standards referenced.
3. Identification register, listing all items in PART 3 of this section to be identified, type of identification system to be used, lettering, location and color.
4. Schedule of Hazard and Safety Signage indicating text and graphics.

**1.03. QUALITY ASSURANCE**

A. Referenced Standards:

1. Occupational Safety and Health Administration (OSHA):
  - a. 29 CFR 1910.145, Specification for Accident Prevention Signs and Tags.

**PART 2 - PRODUCTS**

**2.01. MANUFACTURERS**

A. Available Manufacturers:

- a. Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following Manufacturers of Interior Signs:
  - (1) F.F.I. Group, Inc.
  - (2) Sign Masters
  - (3) Sign World, Inc.

**2.02. MANUFACTURED UNIT**

A. Type B2 – Nonmetallic Signs:

1. Materials: Fiberglass reinforced or durable plastic.
2. Size:
  - a. Surface: As required by text.

- b. Thickness: 60 MILS minimum.
  - 3. Fabrication:
    - a. Rounded corners.
    - b. Drilled holes in corners with grommets.
    - c. Legend: Preprinted, permanently embedded and fade resistant for a 10-yr minimum outdoor durability.
  - 4. Color:
    - a. Background: Manufacturer standard or as specified.
    - b. Lettering: Manufacturer standard or as specified.
  - 5. Standards for OSHA signs: NEMA/ANSI Z535.1, NEMA/ANSI Z535.2, NEMA/ANSI Z535.3, NEMA/ANSI Z535.4, OSHA 29 CFR 1910.145.  
 Material Thickness: 1/4" nominal (1/2" or 3/4" can be substituted)
- B. Material Composition: Solid polymer, cast, filled acrylic. Meeting ANSI Z124 1980, Type Six, and FS WW-P-54E/GEN (8/1/80).
- C. Properties:
- 1. Tensile Strength 6000 psi (ASTM D638)
  - 2. Elongation .4% minimum (ASTM D638)
  - 3. Hardness -94- (Rockwell "M" Scale)  
 -56- (Barcol Impressor)
  - 4. Wear & Cleanability (Passes ANSI 1224 & HUD UM-73-84).
  - 5. Color Stability - No Change 200 hours (NEMA LD3)
  - 6. Flammability (vertical mounted signs) (ASTM E84)
    - a. Flame Spread
      - (1) 1/4" mounted on Masonry-15
      - (2) 1/4" mounted on Gypsum-20
    - b. Smoke Developed
      - (1) 1/4" mounted on Masonry-15
      - (2) 1/4" mounted on Gypsum-25
    - c. Class I
  - 7. Izod Impact 0.28 ft.-lbs/in. Min. (ASTM F256-A) (NEMA LD3)
    - a. Impact Resistance - No fracture, cracks, chips
  - 8. High Temperature Resistance at 500F - No change
  - 9. Stain Resistance-Passes (ANSI Z124-HUD UM73)

- D. Painted surfaces are Acrylic Poly Urethane, low VOC, totally lead-free paints.
- E. For proper color contrast, it is suggested that a White/Off-White base material be used for the raised letter/number/braille. Any PMS contrast color can be used for the background paint infill.

### **2.03. ACCESSORIES**

#### A. Fasteners:

- 1. Screw: Self-tapping, stainless steel

## **PART 3 - EXECUTION**

### **3.01. GENERAL INSTALLATION**

- A. Install identification devices at specified locations.
- B. All identification devices to be printed by mechanical process, hand printing is not acceptable.

### **3.02. SCHEDULE**

#### A. Hazard and Safety Signage:

- 1. Permit required Confined Space signage:
  - a. Tag Type: Type B2 – Nonmetallic Signs.
  - b. Fastner: Screw
  - c. Size: 10 IN by 14 IN
  - d. Location: As indicated on Drawings.
  - e. Location Field located as directed by engineer or Owner.
    - (1) Allowance: Provide 20 signs.
    - (2) Legend:
    - (3) OSHA Danger sign
    - (4) Description of Hazard: "PERMIT REQUIRED CONFINED SPACE DO NOT ENTER".

END OF SECTION

## SECTION 31 00 00

### EARTHWORK

#### PART 1 - GENERAL

##### 1.01. SUMMARY

- A. This Section includes site preparation activities and items of earthwork necessary to complete the project.

##### 1.02. SUBMITTALS

- A. Submit sieve analysis reports for all granular materials
  - 1. Analysis shall include the source location and material description
  - 2. Analysis shall have been performed within 12 months of the submittal.
- B. Submit to Engineer for approval the name, location, and qualifications of the independent soils testing agency selected and hired by the Contractor for compaction testing and soils inspection. Include the name and qualifications of the supervising professional engineer to be designated the Soils Engineer.
- C. Submit certified soils inspection and testing results as the work progresses:
  - 1. In-place moisture-density soil test reports. Fully document each specific location or stationing information, lift or approximate elevation, and date and other pertinent information.
  - 2. Inspection records of subgrade and compaction. Fully document each with specific location or stationing information, lift or approximate elevation, and date or other pertinent information.

##### 1.03. QUALITY ASSURANCE

- A. Standards:
  - 1. American Association of State Highway and Transportation Officials Standard Method of Test (AASHTO):
    - T-96 - RESISTANCE TO DEGRADATION OF SMALL-SIZE COARSE AGGREGATE BY ABRASION AND IMPACT BY THE LOS ANGELES MACHINE.
    - T-99 - THE MOISTURE-DENSITY RELATIONS OF SOILS USING A 2.5 KG (5.5 LB) RAMMER AND A 305 MM (12 IN) DROP.
    - T104 - SOUNDNESS OF AGGREGATE BY USE OF SODIUM SULFATE OR MAGNESIUM SULFATE TEST.

2. American Society of Testing and Materials (ASTM):

- D698 - TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT (12,400 FT-LBF/FT)
- D1556 - STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY THE SAND-CONE METHOD
- D1557 - TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT (56,000 FT-LBF/FT<sup>3</sup>(2,700 KN-M/M<sup>3</sup>))
- D2167 - STANDARD TEST METHOD FOR DENSITY AND UNIT WEIGHT OF SOIL IN PLACE BY THE RUBBER BALLOON METHOD
- D2922 - STANDARD TEST METHODS FOR DENSITY OF SOIL AND SOIL-AGGREGATE IN PLACE BY NUCLEAR METHODS (SHALLOW DEPTH)
- D2937 - STANDARD TEST METHOD FOR DENSITY OF SOIL IN PLACE BY THE DRIVE-CYLINDER METHOD
- D4253 - STANDARD TEST METHODS FOR MAXIMUM INDEX DENSITY AND UNIT WEIGHT OF SOILS USING A VIBRATORY TABLE
- D4718 - STANDARD PRACTICE FOR CORRECTION OF UNIT WEIGHT AND WATER CONTENT FOR SOILS CONTAINING OVERSIZE PARTICLES

**1.04. SITE CONDITIONS**

- A. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by Owner to prevent interruptions of facility operations or travel.
- B. Lines and grades shall be as indicated on the plans.
- C. Contractor shall be responsible for all construction layout/staking to construct the work from control data furnished or established by the Engineer.
- D. Carefully maintain all bench marks, monuments and other reference points. Contractor shall be responsible for replacement if disturbed or destroyed.
- E. Disposition of Existing Facilities, Structures and Property:
  - 1. Adequately protect from damage all existing utilities, structures and property and remove or relocate only as indicated, specified or as directed by the Engineer.
  - 2. Report inactive and abandoned utilities encountered in excavating and grading operations. Remove, plug, or cap as directed.
  - 3. Confine operations to that area provided through easements, licenses, agreements and rights-of-way. The Contractor's entrance upon any lands outside of that area provided



by easements, licenses, agreements or public rights-of-way, shall be at the Contractor's sole liability.

## **PART 2 - PRODUCTS**

### **2.01. MATERIALS**

#### **A. Materials Classification:**

1. All materials encountered, regardless of type, character, composition, or condition thereof, shall be unclassified.

#### **B. Excavation shall include all materials found within the designated limits for excavation.**

1. Determine quantity of various materials to be excavated prior to submitting Bid Form.
2. Arrangements for entry to site for purpose of conducting subsurface investigations, including test borings, shall be made with Owner.

#### **C. Material properties for compaction:**

1. Cohesionless materials include gravels, gravel-sand mixtures, sands and gravelly sands exclusive of clayey and silty material - materials which are free-draining and for which impact compaction will not produce a well-defined moisture-density relationship curve and for which the maximum density by impact methods will generally be less than by vibratory methods.
2. Cohesive materials include silts and clays generally exclusive of sands and gravel - materials for which impact compaction will produce a well-defined moisture-density relationship curve.

#### **D. Waste Materials:**

1. Includes excess suitable material and material unsuitable for use in the Work.
2. Remove from work area as excavated.
3. Keep excess suitable material segregated from other waste material.
4. Dispose of waste material on site as directed by the Engineer, or off site.
5. Grade waste areas and leave them with an orderly and neat appearance.

#### **E. Borrow Materials:**

1. Refers to all backfill and embankment material obtained from approved locations on or off the jobsite.
2. Borrow shall include all excavating, handling and final disposal of material as specified.
3. Material removed from borrow area(s) shall be approved by the Engineer.
4. Leave on-site borrow area(s) graded to drain and to present a neat appearance.

F. Granular Fill and Pipe Embedment Materials.

1. Material shall be crushed limestone or crushed natural gravel with the following gradation:

Sieve Designation	Percent Passing By Weight
1"	100
1/2"	55-90
No. 4	8-40
No. 10	0-15
No. 200	0-4

2. Material shall not have a loss of more than 15% after 5 cycles when tested for soundness with sodium sulfate as described in AASHTO T104.
3. Use:
  - a. Under slabs on grade.
  - b. To correct over excavation in trenches.
  - c. As pipe embedment.

G. Aggregate Drainage Materials:

1. Material shall be crushed limestone or crushed natural gravel with the following gradation:

SIEVE DESIGNATION	PERCENT PASSING BY WEIGHT
1"	100
3/4"	50-100
1/2"	0-15
NO. 10	0-4

2. Material shall not have a loss of more than 15% after 5 cycles when tested for soundness with sodium sulfate as described in AASHTO T104.
3. Use:

- a. Under slabs and mats where pressure relief valves or perforated drains are used for groundwater control.
- b. At base of walls where perforated drains are shown.

H. 1-IN Minus (MoDOT Type 1) Aggregate:

- 1. Material shall consist of crushed stone, sand and gravel or reclaimed asphalt or concrete. Aggregate shall have the following gradation:

SIEVE DESIGNATION	PERCENT PASSING BY WEIGHT
1"	100
1/2"	60-90
NO. 4	35-60
NO. 30	10-35

- 2. Aggregate shall not contain more than 15 percent deleterious rock and shale.
- 3. The fraction of material passing the No. 40 sieve shall have a minimum plasticity index of six (6).
- 4. Any sand, silt and clay or deleterious rock, shale shall be uniformly distributed throughout the material
- 5. Use:
  - a. Under slabs and mats where engineered granular fill is required to remediate highly plastic and low strength soils.
  - b. As directed on the plans.

I. Base Stabilization Rock:

- 1. Crusher run limestone, 4" maximum size.

J. Topsoil Materials:

- 1. Includes those materials obtained from excavation or borrow area(s) which are free from roots, rocks and debris and which are suitable for supporting growth of vegetation.

K. Backfill Materials:

- 1. Include suitable approved materials from excavations and borrow area(s).
- 2. Shall be friable sandy or silty clay containing fine material sufficient to provide a dense mass free of voids and capable of satisfactory compaction.

3. Shall be free of roots or other organic matter, refuse, cinders, ice, snow, frozen earth, or other unsuitable matter.
4. Do not use material containing gravel, stones, or shale particles greater in dimension than one-half the depth of the layer to be compacted.
  - a. Larger rocks may be incorporated in embankments where specifically directed by the Engineer.

### **PART 3 - EXECUTION**

#### **3.01. CLEARING AND GRUBBING**

- A. Perform clearing and grubbing where indicated and as necessary to perform excavation, trenching, embankment, borrow and other work required.
- B. Clearing:
  1. Clearing includes felling and disposal of trees and brush. Remove only those trees necessary for prosecution of the work. Preserve and protect all trees not specifically required to be removed.
  2. Temporarily remove existing fences within the limits of clearing.
- C. Grubbing:
  1. Removal and disposal of tree stumps and roots larger than 3 inches in diameter.
  2. Remove to a depth of at least 18 inches below existing grade.
  3. Backfill all excavated depressions with approved material and grade to drain.

#### **3.02. DEMOLITION**

- A. Remove existing equipment or structures as indicated, or as required to perform new construction.
- B. Materials not indicated or specified to be relocated or returned to Owner shall be disposed of as specified in "Disposal of Debris" in this section.
- C. Relocation and return of material or equipment:
  1. Carefully dismantle, in manner to avoid damage, all materials and equipment specified or indicated to be relocated or returned to Owner.
  2. Store materials and equipment to be reused in a manner to avoid corrosion, staining, breakage, or damage.
  3. Material or equipment specified or indicated to be relocated or returned to the Owner and damaged due to Contractor's negligence shall be repaired or replaced as directed by Engineer.
- D. Obstructions:

1. Sidewalks, driveways, curb and gutter, drainage structures and similar obstructions permitted to be removed shall be cut in straight lines or removed to the nearest construction joint if located within five feet of the edge of the excavation. In no case shall the joint or line of cut be less than one foot outside the edge of the excavation. Surface obstructions removed to permit construction shall be reconstructed as specified and to the dimensions, lines and grades of original construction.
2. Fences interfering with construction, and located within public rights-of-way or as may be allowed for in permits or agreements, may be removed by the Contractor. Provide narrow trench openings in fence with a temporary gate, maintained in a closed position except to permit passage of equipment and vehicles. Fences within temporary construction easements may be removed by the Contractor provided that temporary fencing is installed in such a manner as to serve the purpose of the fencing removed. The Contractor shall locate and record all fence corners prior to removal. Restore all removed fencing to the condition existing prior to construction unless otherwise specified or directed. The Contractor shall be solely liable for the straying of any fenced or corralled animals or other damage caused by any fence so removed.

### **3.03. STRIPPING**

- A. Remove topsoil from areas within limits of excavation, trenching, borrow and areas designed to receive embankment or compacted fill.
- B. Scrape areas clean of all brush, grass, weeds, roots and other unsuitable material.
- C. Strip to a minimum depth of 6 inches, and to a sufficient depth to remove excessive roots in heavy vegetation or brush areas and as required to segregate topsoil.
- D. Stockpile topsoil reasonably free of subsoil, debris and stones larger than 2-inch diameter, in sufficient quantity to complete the work. Stockpile shall not interfere with construction operations and existing facilities.

### **3.04. DISPOSAL OF DEBRIS**

- A. Dispose of debris off the jobsite at a location provided by the Contractor.
- B. Combustible waste material and debris may be burned if permitted by local regulations. Burning is subject to the Contractor obtaining required permits and conducting burning operations in accordance with Federal, State and local regulations.

### **3.05. EXCAVATION SUPPORT**

- A. Support excavations and slopes using sheeting, bracing, or other means as necessary to:
  1. Protect life and property.
  2. Conform to Federal, State and local regulations.
  3. Avoid excessively wide cuts in unstable material.
  4. Protect existing structures and facilities from soil movement.
- B. Plan layout of excavation operations to protect adjacent property and existing structures and facilities.

- C. Take precautions against movement or settlement of existing structures. Establish and record elevations of existing facilities near excavations before excavating. Remove sheeting and bracing in a manner that does not create voids or induce settlement of adjacent soil.
- D. If existing or adjacent structures show structural distress, or become endangered by any condition or event, cease operations immediately and notify Engineer. Do not resume operations prior to correction or modification of procedures leading to the unstable condition.

### 3.06. EXCAVATION

#### A. General:

- 1. Includes excavation for the installation to the alignment and elevation indicated of ground wires, electrical conduits, storm drainage pipes, process piping and structures.

#### B. Trenches:

##### 1. Ground Wires and Electrical Conduits:

- a. Remove material required for alignment and elevation, or minimum depth of installation.

##### 2. Pipes:

- a. Trench depth to provide embedment and to remove unsuitable bottom material.
- b. Trench width, at top of pipe and below, to be between pipe outside diameter plus 1 foot (minimum) and plus 2 foot (maximum).
- c. Trench walls to be vertical below the top of pipe and may be vertical or sloped above top of pipe as determined by the stability of the material being trenched.
- d. Trenches to be sheeted and braced when required.
- e. Maximum length of open trench shall comply with local codes and shall not exceed 400 feet.
- f. Erect barriers or other appropriate protection to prohibit accidental or unauthorized entry of persons into trenches.

#### C. Structures: Perform as specified for "Trenches" and as follows:

- 1. Excavate area adequate to permit erection and removal of forms.
- 2. Trim to neat lines where concrete is to be deposited against earth.
- 3. Excavate by hand in areas where space and access will not permit use of machines.
- 4. Notify Engineer immediately when excavation has reached the depth indicated. Do not proceed further until approved.
- 5. Restore bottom of excavation to proper elevation in areas over excavated, as follows:
  - a. For structures supported by piles or caissons, with compacted embankment.

- b. For structures supported by concrete footings or mats, with concrete.
6. Excavate rock, where encountered, to a distance of at least three (3) feet away from outside of structure walls. Bench any additional rock excavation required for stability during construction to maintain vertical cuts. Perform such additional excavation and furnish any additional backfill subsequently required at no extra cost to Owner.

D. Blasting:

- 1. Blasting shall not be allowed within the scope of this project without written authorization of the Owner and Engineer,

**3.07. DEWATERING**

- A. Control grading around excavations to prevent surface water from flowing into excavation.
- B. Drain or pump surface and groundwater as required to continually maintain all excavations and trenches free of water or mud. Commence when water first appears and continue until work is complete to the extent that no damage will result from the presence of water.
- C. Discharge to approved drains or channels. Contractor shall obtain State or local permits for discharge if such are required. Water discharged to streams shall be free of silt and other objectionable materials. Discharge water so that the work in progress and other properties are not damaged. Do not interfere unduly with the use of streets, alleys, private drives, or entrances.
- D. Use pumps of adequate capacity to ensure rapid drainage.
- E. Construct and use drainage channels and subdrains as required.
- F. Remove unsuitable excessively wet materials and replace with approved material.

**3.08. STOCKPILING**

- A. Stockpile in amounts sufficient for and in a manner to segregate materials suitable for backfilling trenches and structures.
- B. Do not obstruct or prevent access to roads and drives.
- C. Do not obstruct drainage patterns.
- D. Stockpile material in such a manner as to limit potential for erosion and inundation as a result of local or global flooding. Coordinate stockpiles locations with Owner.

**3.09. COMPACTION AND TESTING FOR EMBANKMENT, BACKFILLING, AND SUBGRADE**

- A. Perform wetting or drying of compacted material as required to obtain specified density. Moisture content at time of placement shall not be less than optimum or more than 4 percent above optimum as determined by ASTM D 698.
- B. Do not place snow, ice or frozen earth in compacted soil and do not place compacted soil on a frozen surface.
- C. Remove waste material, trees, organic material, rubbish, or other deleterious substances from soil to be compacted.

- D. An acceptable testing laboratory shall be selected and paid for by the Contractor to perform all laboratory and field soil testing necessary to demonstrate compliance with compaction requirements. The soil density testing frequency shall be as follows:
  - 1. For trenches within street right-of-way, or under drives or parking lots, density tests representative of each three (3) feet of trench depth shall be taken at five hundred (500) linear foot intervals along the lines. Concentrate tests at cross streets and drives.
  - 2. For trenches outside the street right-of-way, density tests representative of each three (3) feet of trench depth shall be taken at one thousand (1000) linear foot intervals along the lines.
  - 3. For structural backfill, density tests representative of each 100 cubic yards of fill shall be taken.
  - 4. For compacted subgrade, density tests representative of each 500 square yards of subgrade shall be taken.
- E. Perform testing in accordance with ASTM D 698 where AASHTO T-99 or "Standard Proctor" has been indicated. AASHTO T-99 may be used only with prior written approval of the Engineer.
- F. Cohesionless material shall be compacted to 75% of relative density as determined by ASTM D4253 unless otherwise noted.

### **3.010. EMBANKMENT**

- A. Placement:
  - 1. Place to the contours and elevations indicated.
  - 2. Place embankment material in lifts not exceeding eight (8) inches (uncompacted depth).
  - 3. When rocks larger than four inches are present, they shall be scattered and thoroughly consolidated with sufficient compacted soil to completely fill all voids between the rocks. Exclude rocks larger than one half the depth of the lift from the top two (2) feet of the embankment.
- B. Compaction:
  - 1. Cohesive material in embankment shall be compacted to 95% of maximum density at optimum moisture as determined by ASTM D 698.
  - 2. Cohesionless material in embankment shall be compacted to 75% of relative density as determined by ASTM D4253.

### **3.011. BACKFILLING**

- A. Place backfill to the elevations indicated.
- B. In areas requiring 95 percent compaction, place backfill in lifts not exceeding eight (8) inches (uncompacted depth). Place in twelve (12) inch maximum lifts in other areas.
- C. Obtain compaction specified by normal methods and equipment. Accomplish without inundation or flooding.



- D. Complete promptly after approval to proceed.
- E. Backfill failing to meet specified densities shall be removed or scarified and recompacted to meet specified densities.
- F. Use acceptable topsoil materials for top layers of compacted backfill in pasture land, lawns, parks, and gardens.
- G. Trenches:
  - 1. Backfill pipes in 6 inch lifts deposited alternately on opposite sides of pipe to a plane 12 inches above pipe.
  - 2. Compact backfill to 95 percent of maximum density (ASTM D 698) under all areas to be surfaced with concrete, asphaltic concrete, or gravel, including streets, drives, sidewalks, and parking areas, and under developed lots and lawns. Compact all other backfill to 90 percent of maximum density (ASTM D 698).
  - 3. No rock greater than one (1) foot, measured along its longest axis, shall be placed within two (2) feet of the top of a pipe in any backfill. No rocks greater than one (1) foot will be allowed in the backfill above service line terminations, tees and wyes.
- H. Structures:
  - 1. Compact backfill to 95 percent of maximum density (ASTM D 698) under all structures and in excavations adjacent to structures.
  - 2. Backfill only after concrete has attained 70 percent of its design strength.
  - 3. Backfill adjacent to structures only after, in the opinion of the Engineer, a sufficient portion of the structure has been completed to resist the imposed soil load.
  - 4. Remove all forms and debris from excavation prior to placing backfill.
  - 5. Backfill within one (1) foot of structure shall be free of gravel, rock or shale particles larger than four (4) inches.
  - 6. Bring lifts up simultaneously on all sides of structures.
  - 7. Exercise caution in the use of heavy equipment in areas adjacent to structure to avoid high lateral stress on the structure walls. Use only light equipment to place backfill within twenty (20) feet of the structure.
  - 8. Where structural excavation has been through rock, backfill with compacted granular fill to top of rock formation, unless indicated otherwise on the drawings. Where entire excavation is in rock, terminate granular backfill 2 feet below finished grade. Place geotextile filter fabric over granular backfill and continue backfill to finish grade with suitable approved material.

### **3.012. SUBGRADE PREPARATION**

#### **A. General:**

- 1. Excavate or place embankment as required to construct subgrades to elevations and grades indicated.

2. Remove all unsuitable material and replace with approved embankment material. Perform all wetting, drying, shaping, and compacting required to prepare a suitable subgrade.
- B. Roughen subgrade for embankment by discing or scarifying and wet or dry the top 6 inches as required to insure bond with embankment.
  - C. Extend subgrade the full width of surfaced areas plus one foot.
  - D. Compact the top six inches of subgrades for traffic areas and slabs on grade to 95 percent of maximum density (ASTM D 698).
  - E. Proofroll subgrade after moisture conditioning and compaction to identify soft or disturbed areas. Use a fully loaded tandem axle dump truck or equipment providing an equivalent loading for proofrolling. Undercut and replace soft areas identified by proofrolling with structural backfill if so directed by the Engineer.

### **3.013. GRANULAR FILL, PIPE EMBEDMENT**

- A. Place on subgrades where indicated prior to placing concrete slabs on grade.
- B. Place in trench to limits indicated. Provide for proper support of pipe and even distribution around pipe.
- C. Compact as indicated, in lifts not to exceed 6 inches, using approved vibratory equipment.
- D. Trenches: At intervals not to exceed 400 feet, or closer if so indicated, provide trench bedding cut-off wall 5 feet in length constructed of select impermeable material hand-placed and compacted around pipe.

### **3.014. PLACEMENT OF TOPSOIL**

- A. Place topsoil on all areas indicated.
- B. Placement:
  1. Clear site of vegetation heavy enough to interfere with proper grading and tillage operations.
  2. Clear surfaces of all stones or other objects larger than 3 inches in thickness or diameter, all roots, brush, wire, grade stakes, or other objectionable material.
  3. Loosen subgrade by discing or scarifying to a depth of 2 inches wherever compacted by traffic or other causes to permit bonding of the topsoil to the subgrade.
  4. Distribute topsoil over required areas without compaction other than that obtained with spreading equipment.
  5. Place material within following limits:
    - a. Not less than four (4) inches in depth.
    - b. Not more than six (6) inches in depth.

6. Shape cuts, fills and embankments to contours indicated.
  7. Grade to match contours of adjacent areas and permit good natural drainage.
  8. Grade a gentle mound over trenches.
- C. After spreading topsoil, clear surface of stones or other objects larger than two (2) inches in thickness or diameter and of objects that might interfere with planting and maintenance operations.
- D. Protect areas from erosion until grass is established. Repair eroded areas as required.

### **3.015. MAINTENANCE AND REPAIR**

A. Maintenance:

1. Protect newly graded areas from actions of the elements.
2. Settling or erosion shall be filled, repaired and grades reestablished to elevations and slopes indicated.

B. Correction of Settlement:

1. Settlement of embankments, backfill, or trenches occurring within the One Year Correction Period after Final Acceptance shall indicate defective work and shall be promptly corrected if the settlement results in the following:
  - a. Visible depressions, ruts, or ground slumping.
  - b. Pooling of water where positive slope existed or has been required.
  - c. Voids beneath or beside slabs or structures.
  - d. Movement of soil exposing unfinished or waterproofed structure surfaces.
  - e. Movement of structures or facilities, including but not limited to foundation settlement, differential settlement, cracking, misalignment of adjacent objects, or movement of vertical elements out of plumb.
2. Contractor shall correct settlement and damages arising from or attributable to the settlement.
3. Make repairs within ten (10) days from and after due notification by Owner of embankment or backfill settlement and resulting damage.
4. Make own arrangements for access to the site for purposes of correction and maintenance of corrected areas.

END OF SECTION

## SECTION 31 25 13

### DUST AND EROSION CONTROL

#### PART 1 - GENERAL

##### 1.01. SUMMARY

- A. This item shall consist of temporary control measures during the life of a contract to control air pollution, soil erosion, and siltation through the use of berms, dikes, dams, sediment basins, fiber mats, gravel mulches, grasses, slope drains, and other erosion control devices or methods.

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

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

##### 1.02. SUBMITTALS

- A. Prior to the commencement of construction activities, submit:
  - 1. A detailed proposal of all methods of control and preventative measures to be utilized to limit discharge of soil sediment and other significant materials from the construction site.
  - 2. A drawing of the work area, haul routes, storage areas, access routes, etc. Provide a detailed assessment of the current land conditions, including trees and vegetation.
  - 3. A copy of the NPDES permit for storm water discharges from the construction site, when applicable.
  - 4. A copy of the stormwater pollution prevention plan (SWPPP) for review and comment by the Owner and Engineer.

##### 1.03. RELATED SECTIONS

- A. Section 310000 – Site Preparation & Earthwork

##### 1.04. REFERENCES

- A. "Protecting Water Quality, a Field Guide to Erosion, Sediment and Storm Water Best Management Practices for Development Sites in Missouri and Kansas".

B.

##### 1.05. SITE DESCRIPTION

- A. Project Name: St. James Veteran's Home Water and Wastewater Improvements
- B. Location: St. James, Missouri
- C. County: Phelps

D. Description:

1. W 1/2, NW 1/4, S20, T38N, R06E

E. Developer: State of Missouri, 620 N Jefferson St, St. James, MO 65559

F. Project Description: Project involves the installation of a new water line and wastewater line with associated manholes. Installation of a backflow prevention system and terminating use of existing water and wastewater lines. The concrete driveway, sidewalks, and landscaping will be repaired to their original surface type.

G. Predevelopment Runoff Coefficient: C=0.311

H. Post Development Runoff Coefficient: C=0.311

I. Total Area of Site: 37.49 Acres

J. Disturbed Area: 1.39 Acres

K. Receiving Stream:

1. NA

L. SWPPP Coordinator: Contractor to designate:

M. MoDNR Regional Office: P.O. Box 176, Jefferson City, MO 65102

N. MoDNR Phone: 573-751-3443

## **PART 2 - PRODUCTS**

### **2.01. MATERIALS**

A. Compost Berms:

1. Compost should consist of both fine and coarse grades for maximum filtration. Fine grades shall have a maximum particle size of 3/8" to 1/2". Coarse grades shall have a maximum particle size of 2" to 3". All berms shall have a ratio of coarse and fine material of 1:1. No particle should be greater than 3".
2. The recommended moisture content ranges from 20-50%.
3. The percentage of carbon based materials in finished compost should range between 40-70%.
4. The pH should be between 5.0 and 8.5.
5. Nitrogen Content: 0.5-2.0%.
6. Compost should have a minimum soluble salt level between 4.0 and 6.0 mmhos/cm.
7. Compost must be weed and pesticide free, with manmade materials comprising less than 1%

B. Erosion Control Blankets:

1. Erosion control blanket shall be an extended-term machine produced blanket of 70 percent agricultural straw and 30 percent coconut fiber matrix with a functional longevity of up to 24-months. The blanket shall be of consistent thickness with the straw and coconut evenly distributed of the entire area of the blanket.
2. The blanket shall be covered on the top side with heavy weight photodegradable polypropylene (3.0lbs/1000 sq. ft) netting having ultraviolet additives to delay breakdown and an approximate mesh opening of 0.5 by 0.5-inches.
3. The blanket shall have a light weight (1.5lbs/1000 sq. ft) photodegradable polypropylene netting on the bottom, with a mesh opening of approximately 0.5 by 0.5-inches.
4. The blanket shall be sewn together with degradable thread.

C. Fertilizer. Fertilizer shall be a standard commercial grade and shall conform to all Federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

D. Grass. Grass which will not compete with the grasses sown later for permanent cover shall be a quick-growing species (such as ryegrass or cereal grasses) suitable to the area providing a temporary cover.

E. Inlet Pavement Filters:

1. Inlet pavement filters shall consist of 9-inch diameter tubes made of synthetic filter fabric filled with recycled discrete synthetic fibers.
2. Pavement filter length shall be 24-inches greater than inlet curb opening or grate dimension.
3. Aggregate filter pouch shall be present for use with grated or combination inlets.

F. Mulches. Mulches may be hay, straw fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials.

G. Silt Fence:

1. The geotextile fabric shall be composed of high-tenacity polypropylene, nylon, polyester ethylene yarns, which are woven into a stable network such that the yarns retain their relative position.
2. The geotextile fabric shall be inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids.
3. The geotextile fabric shall meet AASHTO M288-00 specification for Class 1 unsupported silt fence.
4. Support posts shall be 1.25" (min.) diameter hardwood or 1lbs/linear foot steel. The posts shall have projections for fastening the geotextile fabric.
5. The height of the silt fence shall not exceed 36-inches above the existing grade. The storage height of the fence should not exceed 18-inches.

- H. Slope Drains. Slope drains may be constructed of pipe, fiber mats, rubble, portland cement concrete, bituminous concrete, or other materials that will adequately control erosion.
- I. Straw bales:
  - 1. Straw bales shall consist of rectangular-shaped bales of hay or straw weighing at least 50 pounds per bale with a minimum size of 1.0' x 1.5' x 3.0'.
  - 2. The hay or straw material shall be free from primary noxious weed seeds and rough or woody materials.
- J. Triangular Silt Dike:
  - 1. Temporary silt dikes shall be triangular-shaped, having a height of at least eight to ten inches (8" - 10") in the center with equal sides and a sixteen- to twenty-inch (16" - 20") base.
  - 2. The triangular-shaped inner material shall be urethane foam.
  - 3. The outer cover shall be a woven geotextile fabric placed around the inner material and allowed to extend beyond both sides of the triangle two to three (2' - 3') feet.
  - 4. Standard length of each dike will be seven feet (7') unless otherwise indicated on the plans.
  - 5. The Dikes shall be attached to the ground with wire staples. The staples shall be No. 11 gauge wire and be at least six to eight (6" - 8") inches long. Staples shall be placed as indicated on the installation detail."
- K. Straw Wattles:
  - 1. Straw wattles shall consist tightly rolled bales of hay or straw, having a diameter of at least eight to twenty inches (8"-20").
  - 2. The hay or straw material shall be free from primary noxious weed seeds and rough or woody materials.
  - 3. Stakes shall be willow or wooden stakes.
- L. Other. All materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project.

**2.02. SIGNIFICANT MATERIAL INVENTORY**

- A. The following list of significant materials that might potentially be released with storm water discharges from the job site during construction. The contractor shall be responsible for monitoring and assuring that the materials listed in the inventory do not migrate off site via storm water runoff during construction.

Material Trade Name	Chemical/Physical Description	Storm Water Pollutants
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Erosion	Solid Particles	Soil, sediment
Fertilizer	Liquid or solid grains	Nitrogen, phosphorus
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbonates, arsenic
Asphalt	Black solid	Oil, petroleum distillates
Concrete	White solid	Limestone, sand
Plaster	White granules or powder	Calcium Sulphate, calcium carbonate, sulfuric acid
Glue, adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquid	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic
Curing compounds	Creamy white liquid	Naphtha
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium.
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)

### **PART 3 - EXECUTION**

#### **3.01. GENERAL.**

- A. The contractor shall be responsible for managing storm water runoff and erosion during the course of construction. The contractor shall implement BMPs as deemed necessary to adequately retain sediment and construction materials on-site. Any modifications to the implemented BMPs shall be documented using the appropriate forms, which shall be kept in a log book. The log book shall be kept on the job site and shall be available immediately for review by governing authorities, at their request.
- B. All BMPs shall be inspected once a week and immediately after each significant rain event (0.5-inches in 24-hours). All appropriate measures must be taken to repair BMPs if damage is observed during the investigations.
- C. The appropriate inspection and maintenance forms must be filled out during each inspection. The inspection and maintenance forms must be saved in the log book for the project. The log book shall be kept on the job site and shall be available immediately for review by governing authorities, at their request. The inspection and maintenance forms may be found in Specification Section 02370.3.20, located in the Project Manual.
- D. The contractor shall establish a minimum of one temporary construction entrance per development site to provide access to adjacent public right-of-way. All vehicular access to the site(s) shall occur via the temporary construction entrance.



- E. No area shall be left denuded for longer than 14 consecutive days. Areas left denuded for longer than 14 consecutive days without heavy construction traffic or work shall be temporarily seeded and mulched so as to limit erosion.
- F. All temporary diversion berms, diversion ditches and soil stockpile areas shall be seeded and mulched immediately after grading.
- G. Where possible, the contractor shall maintain and protect existing trees and vegetation.
- H. After the site has been seeded and permanent vegetation has been established, the contractor shall remove each BMP as indicated on each BMP detail sheet. Excess debris and sediment shall be removed from each BMPs and wasted on the site in such a manner as to eliminate any movement of the material off of the site.
- I. In the event of a conflict between these requirements and pollution control laws, rules, or regulations of other Federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

### **3.02. MATERIAL MANAGEMENT PRACTICES**

- A. All materials stored on-site shall be stored in a neat, orderly manner in their appropriate containers. If possible, materials shall be stored under a roof or other enclosure.
- B. Products shall be kept in their original containers with the manufacturer's label. Substances shall not be mixed with one another unless recommended by the manufacturer. Whenever possible, all of the product shall be used up before disposing of the container. The manufacturer's recommendations for the proper use and disposal of their products shall be followed. The construction manager shall inspect the on-site materials daily to ensure the proper use and disposal.
- C. Hazardous products shall be kept in resealable containers. Original labels and material safety data shall be retained. All federal, state and city regulations shall be followed when disposing of any hazardous waste.

### **3.03. SPILL CONTROL PRACTICES**

- A. All on-site vehicles shall be monitored for leaks and shall receive regular preventative maintenance to reduce the chance of leakage.
- B. Concrete trucks shall only wash-out or discharge surplus concrete, or drum-wash water, at dedicated concrete truck wash-out areas. No excess concrete or drum wash water shall be released from the site. The contractor shall be responsible for creating dedicated concrete truck wash-out areas and communicating the locations of the areas to all subcontractors.
- C. Petroleum products shall be stored in tightly sealed containers which are clearly labeled.
- D. All asphaltic substances used on-site shall be applied according to the manufacturer's recommendations.
- E. Fertilizers shall be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked into the soil to limit exposure to storm water. The contents of any partially used bags of fertilizer shall be transferred to a sealable plastic container to avoid spills.

- F. All spills shall be cleaned up immediately after discovery. The manufacturer's recommended methods for spill cleanup shall be relayed to site personnel and they shall be made aware of the location of the cleanup supplies. Materials and equipment necessary for spill cleanup shall be stored on-site. In case of a spill, the spill area shall be kept well ventilated and cleanup personnel shall wear the appropriate clothing to prevent injury from contact with the hazardous substance. Spills of toxic and hazardous material, regardless of the size of the spill, shall be reported to the appropriate state and local government agencies immediately after discovery.

### **3.04. ADDITIONAL SITE BMPS**

- A. The following is a list of additional site management BMPs that will be incorporated to prevent contamination of storm water runoff.
  - 1. Provide trash containers onsite and perform regular site clean up for proper disposal of solid waste. Solid waste shall include, but not be limited to, scrap building materials, product/material packaging, food and drink containers.
  - 2. Provide containers for the disposal of waste paints, solvents, cleaning compounds, etc.
  - 3. Store construction materials away from drainage courses and low areas.
  - 4. Install containment berms and drip pans at petroleum product and liquid storage tanks and containers.
  - 5. Concrete trucks shall not discharge surplus concrete or wash water on the ground or into ditches on site. Dedicated concrete truck wash-out areas will be designed to ensure concrete particles will not be released from the construction site.

### **3.05. COMPOST BERMS.**

#### **A. Installation Procedure:**

- 1. For slopes 3:1 or less, install a compost berm 1-2 ft high and 2-4 ft wide at the base. For maximum filtration properties, install the berm in a trapezoidal shape, with a 4-6 ft base, and a 2-3 ft wide top. Larger berms should be used for steeper slopes. The basic rule of thumb is that the base should be twice the height of the berm.
- 2. Berms can be placed around the perimeter of affected areas, if the area is flat or the perimeter is on contour. Berms should be placed using "smiles" and j-hooks. Do not place berms where they cannot pond water. See typical Silt Fence Placement details for further installation information.
- 3. For steeper slopes, an additional berm can be constructed on the top shoulder of the slope.
- 4. Do not use compost berms in areas of concentrated flow, as they are intended to control and filter sheet flow only.
- 5. Once adequate stabilization of all up hill areas has been achieved, compost berms can be left onsite and seeded, or spread out in place as a soil enhancement.

#### **B. Maintenance and Inspection Procedure:**

- 1. Inspect the compost berm weekly and after each significant storm event (0.5-inch of rain in 24-hours). Repair any erosion near the compost berm immediately.

2. Remove sediment from the compost berm when sediment dike is approximately 1/2 the total height of the berm.

### **3.06. DIVERSIONARY CHANNEL.**

#### **A. Installation Procedure:**

1. Temporary diversion channels must be installed as a first step in the land-disturbing activity and must be functional prior to upslope land disturbance.
2. The channel should be cleared grubbed and adequately compacted to prevent failure.
3. Temporary or permanent seeding and mulch shall be applied to the channel immediately following its construction.
4. The channel should be located to minimize damages by construction operations and traffic.

#### **B. Maintenance and Inspection Procedure:**

1. The measure shall be inspected once a week and after every significant storm event (0.50-inches in 24-hours). Any necessary repairs to the channel should be performed immediately.
2. Damages caused by construction traffic or other activity must be repaired before the end of each working day.
3. If vegetation has not been established, reseed damaged and sparse areas immediately

### **3.07. EROSION CONTROL BLANKET.**

#### **A. Installation Procedure:**

1. Grade and shape area of installation. Remove all rocks, clods, vegetative or other obstructions so that the installed blankets, or mats will have direct contact with the soil.
2. Prepare seedbed by loosening 2-3 inches of topsoil above final grade. Incorporate amendments, such as lime and fertilizer, into soil according to soil test and the seeding plan. Seed area before blanket installation for erosion control and re-vegetation. When seeding prior to blanket installation, all check slots and other areas disturbed during installation must be reseeded. Where soil filling is specified, seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.
3. U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats to the ground surface. Wire staples should be a minimum of 11 gauge. Metal stake pins should be 3/16 inch diameter steel with a 1 1/2 inch steel washer at the head of the pin. Wire staples and metal stakes should be driven flush to the soil surface. All anchors should be 6-8 inches long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils. For installation of erosion control blankets and turf reinforcement mats on slopes and in channels, refer to manufacturer's installation instructions.
4. Lay the erosion control blanket loosely, on top of the graded and seeded soil and stake or staple to maintain contact with soil. Do not stretch the blanket. The erosion control blanket shall be

installed such that the roll length extends in a down hill direction, perpendicular to the contour lines.

B. Maintenance and Inspection Procedure:

1. The measure shall be inspected once a week and after every significant storm event (0.50-inches in 24-hours). Any necessary repairs to the channel should be performed immediately.
2. If wash-out or breakage of the erosion control blanket occurs, reinstall the blanket only after repair and reseeding of slope or drainage way.

**3.08. INLET PAVEMENT FILTER.**

A. Installation Procedure:

1. Install curb inlet pavement filter in front of the curb inlet opening, as directed by BMP manufacturer. Each end of the filter shall overlap the curb inlet opening approximately 12".

B. Maintenance and Inspection Procedure:

1. Inspect the curb inlet pavement filter weekly and basin after each significant storm event (0.5-inch of rain in 24-hours). Clean all accumulated silt and debris located in the vicinity of the filter.

**3.09. MULCHING.**

A. Installation Procedure:

1. Mulch shall be applied to any site where soil has been disturbed and the protective vegetation has been removed, as a means of providing temporary stabilization of soil, until permanent stabilizing vegetation is established. On steep slopes, greater than 2.5:1, or where the mulch is susceptible to movement by wind or water, the mulch material should be hydraulically applied or the straw mulch should be appropriately anchored. Hydraulic fiber mulches and/or tackifying agents shall be used to effectively bind the straw together and prevent displacement by wind or rain.
2. Straw mulch shall be applied to a depth of 2-4 inches on seeded sites, unless it is incorporated into the soil by tracking, disking, or other techniques. The mulch layer shall have a uniform thickness across the site. For seeded sites, apply 1.5 to 2 tons of straw mulch per acre. For unseeded sites, apply 2 to 3 tons of straw mulch per acre. The straw mulch shall not be applied at rates higher than 3 tons/acre (7 tons/ha). Straw mulch may be applied by hand on small sites and blown on by machine on large sites.
3. Prior to mulching, install any needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grass-lined channels and sediment basins, etc.
4. Straw mulch must be anchored immediately to minimize loss by wind or water. Straw mulch is commonly anchored by:
  - a. Crimping, Tracking, Disking, or Punching into the Soil;
    - 1) On small sites, where straw has been distributed by hand, it can be anchored by hand punching it into the soil every 1-2 feet with a dull, round-nosed shovel. A sharp shovel will merely cut the straw and not anchor it.

- 2) A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the top 2-8 inches of soil. This practice affords maximum erosion control but is limited to flatter slopes where equipment can operate safely.
  - 3) Tracking is the process of cutting straw into the soil using a bulldozer or other equipment that runs on cleated tracks. Tracking is used primarily on slopes 3:1 or shallower; where this type of equipment can safely operate. This is an effective way to crimp straw on fill slopes. Tracking equipment must operate up and down the slope so the cleat tracks are perpendicular to flow.
- b. Covering with a Netting
- 1) Nettings of biodegradable paper, plastic or cotton netting can be used to cover straw mulch.
- c. Spraying with Asphaltic or Organic Tackifier;
- 1) Polymer tackifiers are generally applied at rates of 40-60 lbs/ac, however manufacturer's recommendations may vary. Organic tackifiers are generally applied at rates of 80-120 lbs/acre, however manufacturer's recommendations vary.
  - 2) Applications of liquid mulch binders shall be heavier at edges, in valleys, and at crests of banks and other areas where the mulch may be moved by wind or water. All other areas shall have a uniform application of the tackifier.
  - 3) Tacking with cellulose fiber mulch at a rate of 750 lbs/ac.

B. Maintenance and Inspection Procedure:

1. Inspect the mulch weekly and after each significant storm event (0.5-inch of rain in 24-hours). Repair any erosion near the mulch immediately.

**3.010. RIPRAP OUTLET PROTECTION.**

A. Installation Procedure:

1. Prepare the subgrade to the required lines and grades shown on the plans. The subgrade will have to be cut sufficiently deep so that the finished grade of the riprap will be at the elevation of the surrounding grade. Brush, trees, stumps and other deleterious materials must be removed before installation of the riprap.
2. The sand and gravel filter blanket shall then be placed after the subgrade is prepared. For gravel, spread the filter stone in a uniform layer of the specified depth. If a filter fabric is used in the place of sand or gravel, place the filter fabric directly on the prepared foundation, making sure to overlap the edges of the fabric by 12-inches and place anchor pins every 3-feet along the overlap. Geotextile filter fabric shall be Lynx 180EX, 8-oz, non-woven geotextile fabric. A 4-inch layer of fine gravel or sand may be needed above the filter fabric where large stones are used or machine placement is difficult.
3. Riprap (Min. 8"-12", Average Size =10"). Riprap shall be crushed limestone (no sandstone or other deleterious material).

4. Riprap material should be placed in one operation. The Riprap should not be placed by dumping through chutes or other methods that could possibly cause segregation of stone sizes. Care must be taken to not dislodge the underlying base of filter when the placing of the riprap material.
5. The toe of the riprap should be keyed to a stable foundation at its base. The toe should be excavated to the depth of 1.5 times the design thickness of the riprap and should extend horizontally from the slope.

B. Maintenance and Inspection Procedure:

1. The riprap outlet protect should be inspected weekly and after each significant rainfall event (0.5-inches in 24-hours). Repair any scour or dislodged stones.

**3.011. ROCK CHECK DAM.**

A. Installation Procedure:

1. Divert runoff from undisturbed areas away from the rock dam and basin area.
2. Excavate the foundation for the apron, using it as a temporary sediment basin during construction of the dam.
3. Clear and grub the area under the dam, removing and properly disposing of all root material, brush and other debris. Grade the earth abutments no steeper than 2.5:1; 3:1 where vehicles must cross. Smooth the dam foundation.
4. Cover the entire foundation, including both earth abutments, with filter fabric, making sure the upstream strips overlap the downstream strips at least 1 foot and the upslope end is keyed in. Filter fabric shall be Lynx 180EX, 8-oz, non-woven geotextile fabric.
5. Construct the dam to planned dimensions. Key the stone into channel banks and extend it beyond the abutments a minimum of 18-inches to prevent flow around the dam.
6. Once the dam is in place, clear the sediment basin area properly disposing of the cleared material.

B. Maintenance and Inspection Procedure:

1. Inspect the rock dam weekly and basin after each significant storm event (0.5-inch of rain in 24-hours).
2. Remove sediment when it accumulates to half the height of the dam.
3. Check the dam and abutments for erosion, piping or rock displacement and repair immediately.
4. If the basin does not drain between storms, replace the stone on the upstream face of the dam.
5. Once the construction site has become permanently stabilized, remove the structure and any unstable sediment. Smooth the basin site to blend with the surrounding area and stabilize. All water and sediment should be removed from the basin prior to dam removal. Sediment should be placed in designated disposal areas and not allowed to flow into streams or drainage ways during structure removal.

### **3.012. SEEDING.**

#### **A. Installation Procedure:**

1. Seeding Material and Application Rates:
  - a. Annual rye grass, wheat, or oats should be used for temporary seeding. Apply the rye grass at 120 lbs. per acre. Apply the wheat or oats at 100 lbs. per acre.
  - b. A mixture of 65% kentucky bluegrass and 35% chewing fescue or creeping red fescue should be used for permanent seeding. Apply the mixture at 2 lbs. per 1000 square feet.
2. Seeded Preparation:
  - a. Install necessary mechanical erosion and sedimentation control practices before seeding, and complete grading according to the approved plan.
  - b. Lime and fertilizer needs should be determined by soil test. Apply the lime and fertilizer evenly and incorporate into the top 4-6 inches of soil by discing or other suitable means.
3. Seeding:
  - a. All seeding shall be performed during favorable weather conditions and only during normal and accepted planting seasons when satisfactory growing conditions exist. The planting operations shall not be performed during times of extreme drought, when ground is frozen or during times of other unfavorable climatic conditions unless otherwise approved by owner's representative. The contractor assumes full and complete responsibility for all such plantings and operations.
  - b. Seed should be labeled in accordance with the U.S. Department of agriculture rules and regulations under the federal seed act and comply with the requirements of the missouri seed law. Labels contain important information on seed purity, germination, and presence of weeds. Weed seed should not exceed 1.0% by weight of the mixture.
  - c. Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydroseeder. Small grains should be planted no more than 1 inch deep, and grasses and legumes no more than 1/2 inch.
  - d. Seeding - Maintenance:
    - 1) Generally, a permanent stand of vegetation cannot be determined to be fully established until soil cover has been maintained for one full year from planting. Inspect seeded areas for failure and make necessary repairs and re-seedings within the same season, if possible.

### **3.013. SILT FENCE.**

#### **A. Installation Procedure:**

1. Posts shall be placed on the downstream side of the fabric and shall be spaced at a maximum of 6-ft, unless supported by 16-gauge backing wire with a 6" mesh. If the silt fence is supported by

a backing wire, a maximum post spacing of 10-feet is allowed. The posts shall be driven at least 2-feet into the ground.

2. A trench for anchoring the fabric shall be dug along the upslope side of the posts. The trench shall be at least 6 inches wide and 6 inches deep. The fabric shall be laid in the trench, which then shall be backfilled and compacted to prevent water and sediment from passing underneath the fabric fence.
3. The filter fabric shall be furnished in a continuous roll cut to the length of the silt fence to avoid splices. When splices are necessary, the fabric shall be spliced at a support post with a minimum 6-inch overlap, folded over, and securely fastened.

**B. Maintenance and Inspection Procedure:**

1. Inspect silt fence for proper installation and compaction by pulling up on the fence while kicking the toe of the fabric. If the fence comes out of the ground, do not "accept" the installation.
2. Silt fences and filter barriers shall be inspected weekly and after each significant storm (0.5-inch in 24 hour). Any required repairs shall be made immediately.
3. Sediment should be removed when it reaches 1/2 height of the fence or 18-inches maximum. The removed sediment shall conform with the existing grade and be vegetated or otherwise stabilized.
4. Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized and any sediment stored behind the silt fence has been removed.

**3.014. STRAW BALE SEDIMENT TRAP.**

**A. Installation Procedure:**

1. Grade and shape area of installation. Remove all rocks, clods, vegetative or other obstructions so that the installed blankets, or mats will have direct contact with the soil.
2. Straw Bale Sediment Traps (SBST) shall be place in small drainage channels to limit the transference of sediment from the site. The straw bales will be placed downstream of the specified areas to be cleared and graded. The bales shall be placed on even contours.
3. If SBSTs are to be used as perimeter controls, the SBST shall be installed on an even contour, 6-ft from the toe of slope.
4. Bales shall be placed in a row with ends tightly abutting the adjacent bales. Bales should be stacked no more than one bale high. Straw, rocks or filter fabric shall be used to fill any gaps between bales.
5. Each bale shall be embedded in the soil a minimum of 4". Once each bale is placed, backfill bale and tamp backfill material to prevent erosion under or around the bales.
6. Bales shall be securely anchored in place by stakes or rebars driven through the bales. The first stake in each bale shall be driven towards previously laid bale to force the two together. Drive the stakes at least 18-inches into the ground.



7. Bales shall remain in place and maintained until site vegetation has been reestablished (normally one full growing season).

B. Maintenance and Inspection Procedure:

1. The measure shall be inspected once a week and after every significant storm event (0.50-inches in 24-hours). Any necessary repairs to the channel should be performed immediately.
2. If wash-out or breakage of the erosion control blanket occurs, reinstall the blanket only after repair and reseeding of slope or drainage way.

**3.015. TEMPORARY CONSTRUCTION ENTRANCE.**

A. Installation Procedure:

1. The temporary construction entrance shall meet the requirements of the necessary permitting agencies.
2. The temporary construction entrance should be crowned to provide for adequate drainage. All drainage must be directed away from existing public right of ways.
3. Clear all vegetation, roots and other obstructions in preparation for the entrance. The entrance shall be graded and compacted prior to placement of the geotextile fabric.
4. Place Lynx 180EX, 8-oz, non-woven geotextile fabric on compacted subgrade.
5. Place 2" to 4" of crushed stone (Ave Dia = 2") on top of the geotextile fabric.

B. Maintenance and Inspection Procedure:

1. The temporary construction entrance will be inspected weekly and after each significant rainfall event (0.5-inches in 24-hours). Repair any washout of crushed stone.
2. Replace crushed stone if tracking of sediment onto public right of way occurs.
3. All sediments, and all other materials, tracked onto public roadways shall be removed immediately

**3.016. TEMPORARY SEDIMENTATION BASIN.**

A. Installation Procedure:

1. The temporary sediment basin shall be constructed on-site by excavating or building an embankment before any clearing or grading work begins.
2. Areas under the embankment and any structural works shall be cleared, grubbed and stripped of any vegetation and rootmat. In order to facilitate cleanout and restoration, the basin area shall be cleared, grubbed and stripped of any vegetation.
3. Embankment and structural works shall be installed as shown on the details. A cut-off trench shall be excavated along the centerline of the earth fill embankments. The minimum depth shall be 2 feet. The cut-off trench shall extend up both abutments to the riser crest elevation.

4. Fill material for the embankment should be clean mineral soil free of roots, woody vegetation, oversized stones, rocks or other objectionable material. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. Fill material shall be placed in 6-inch lifts, continuous layers over the entire length of the fill. Compacting shall be obtained by routing the hauling equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment, or by the use of a compactor. The embankment should be constructed to an elevation of 10 percent higher than the design height to allow for settlement if compacting is achieved with hauling equipment. If compactors are used for compacting, the overbuild may be reduced to not less than 5 percent.
  5. The principle spillway riser shall be securely attached to the discharge pipe by welding all around. All connections shall be watertight. The pipe and riser shall be placed on a firm, smooth soil foundation. The connection between the riser and the riser base shall be watertight.
  6. Pervious materials such as sand, gravel or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in 4-inch layers and compacted under the shoulders and around the pipe to at least the same density as the adjacent embankment. A minimum of 2 feet of compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment.
  7. The emergency spillway shall not be installed in fill.
  8. Elevations, design width, and entrance and exit channel slopes are critical to the successful operation of the emergency spillway.
  9. Baffles shall be constructed with straw bale sediment barriers or silt fence.
  10. The embankment and emergency spillway shall be stabilized with vegetation immediately following construction.
  11. Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized.
- B. Maintenance and Inspection Procedure:
1. Inspect sedimentation basins weekly and after each significant storm event (0.5-inches in 24-hours).
  2. All damages caused by soil erosion or construction equipment shall be repaired before the end of each working day.
  3. Remove sediment when the sediment storage zone is half full. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment or in or adjacent to a stream or floodplain.
  4. When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposit shall be leveled or otherwise disposed of in accordance with the approved erosion and sediment control plan.
  5. If the basin does not drain between storms, replace the stone on the upstream face of the dam.

6. Once the construction site has become permanently stabilized, remove the structure and any unstable sediment. Smooth the basin site to blend with the surrounding area and stabilize. All water and sediment should be removed from the basin prior to dam removal. Sediment should be placed in designated disposal areas and not allowed to flow into streams or drainage ways during structure removal.

### **3.017. TEMPORARY SEDIMENT TRAP**

#### **A. Installation Procedure:**

1. The temporary sediment trap shall be constructed on-site by excavating or building an embankment before any clearing or grading work begins.
2. Areas under the embankment shall be cleared, grubbed and stripped of any vegetation and rootmat. In order to facilitate cleanout and restoration, the basin area shall be cleared, grubbed and stripped of any vegetation.
3. The embankment shall be installed as shown on the details. A cut-off trench shall be excavated along the centerline of the earth fill embankments. The minimum depth shall be 2 feet. The cut-off trench shall extend up both abutments to the spillway crest elevation.
4. Fill material for the embankment should be clean mineral soil free of roots, woody vegetation, oversized stones, rocks or other objectionable material. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. Fill material shall be placed in 6-inch lifts, continuous layers over the entire length of the fill. Compacting shall be obtained by routing the hauling equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment, or by the use of a compactor. The embankment should be constructed to an elevation of 10 percent higher than the design height to allow for settlement if compacting is achieved with hauling equipment. If compactors are used for compacting, the overbuild may be reduced to not less than 5 percent.
5. Geotextile fabric shall be Linq 180EX, non-woven or approved equal. Install geotextile fabric on the base of the channel, extending it up the sides to the top of the embankment. Key all free edges of geotextile fabric 6" into subgrade.
6. Riprap shall be 3" to 9" diameter (mean diameter = 6") crushed limestone. Place riprap to the lines and grades, working smaller stones into voids to achieve a dense mass. The spillway crest should be level with a minimum width of 5 feet.
7. Cover the inside face of the stone outlet section with a 1-foot layer of well graded stone (2-inch minus).
8. Set a clean-out measurement stake in the basin at a height equal to one-half the distance from the bottom to the spillway crest.
9. Elevations, design width, and entrance and exit channel slopes are critical to the successful operation of the spillway.
10. Flow diversion baffles shall be constructed with silt fence.
11. The embankment shall be stabilized with vegetation immediately following construction. Place silt fence at toe of embankment slope, immediately downhill of temporary sediment trap.

12. Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized.

B. Maintenance and Inspection Procedure:

1. The measure shall be inspected once a week and after every significant storm event (0.50-inches in 24-hours). Any necessary repairs to the channel should be performed immediately.
2. All damages caused by soil erosion or construction equipment shall be repaired before the end of each working day.
3. Remove sediment when the sediment storage zone is half full. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment or in or adjacent to a stream or floodplain.
4. When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposit shall be leveled or otherwise disposed of in accordance with the approved erosion and sediment control plan.

### **3.018. TRIANGULAR SILT DIKE**

A. Installation Procedure:

1. Clear and grub channel bottom and remove all debris, roots, brush, etc. Perform preliminary grading of channel.
2. Cut a 3" to 6" square trench at the leading edge of the front geotextile apron. The front geotextile apron shall be tucked into the trench and 6" No. 11 gauge wire staples shall be driven through the fabric into undisturbed earth. The staples must be installed at 4'-0" cts. The trench must then be backfilled with soil.
3. The apron, triangular silt dike and other appurtenances must be secured to the soil with 6" No. 11 gauge wire staples spaced at 2'-0" cts. Where triangular silt dike units overlap, staples shall be placed at the center of each unit.
4. The triangular silt dike shall extend up the channel bank so that there is a minimum of 1'-0" elevation difference between the terminus of the dike and the top of the dike located in the channel bottom, so as to eliminate the potential for flows around the edges of the triangular silt dike unit.

B. Maintenance and Inspection Procedure:

1. Inspect the triangular silt dike weekly and after each significant storm event (0.5-inch of rain in 24-hours). Repair any erosion near the dike immediately.
2. Remove sediment from the dike when sediment dike is approximately 1/2 the total height of the dike.

### **3.019. STRAW WATTLE**

A. Installation Procedure:

1. Prepare the slope before the wattling procedure is started.
2. Shallow gullies should be smoothed as work progresses.
3. Dig small trenches across the slope on contour, to place rolls in. The trench should be deep enough to accommodate half the thickness of the roll. When the soil is loose and uncompacted, the trench should be deep enough to bury 2/3 of its thickness because the ground will settle.
4. It is critical that rolls are installed perpendicular to water movement, parallel to the slope contour.
5. Start building trenches and install rolls from the bottom of the slope and work up.
6. Construct trenches at the contour intervals of three to twelve feet (3'-12') apart depending on the steepness of slope. The steeper the slope, the close together the trenches.
7. Lay the roll along the trenches fitting it snugly against the soil. Make sure no gaps exist between the soil and straw wattle.
8. Use a straight bar to drive holes through the wattle and into the soil for the willow or wooden stakes.
9. Drive the stake through prepared hole into soil. Leave only 1 or 2 inches of stake exposed above the roll.
10. Install stakes at least every 4 feet apart through the wattle, additional stakes may be driven on the downslope side of the trenches on highly erosive or very steep slopes.

**B. Maintenance and Inspection Procedure:**

1. Inspect straw wattles weekly and after each significant event (0.5-inches in 24-hours).
2. All damages caused by soil erosion or construction equipment shall be repaired before the end of each working day.
3. Remove sediment when the sediment storage zone is half full. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment or in adjacent to a stream or floodplain.
4. When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposit shall be leveled or otherwise disposed of in accordance with the approved erosion and sediment control plan.

**3.020. SCHEDULE.**

- A. Prior to the start of construction, the Contractor shall submit schedules for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the Engineer.

### **3.021. RECORD KEEPING.**

- A. The contractor shall create and maintain a log book documenting all monitoring and repair operations associated with each BMP. The log book shall include the forms contained within this specification. The forms contained within this specification include:
  - 1. Form 1 – Inspection form for Structural Controls
    - a. Form 1 shall be completed each time an inspection of structural controls occurs. Structural Controls include, but are not limited to: inlet protection, rock dams, silt fences, straw bale sediment traps, temporary sediment traps, temporary sediment basins, triangular silt dikes, etc.
  - 2. Form 2 – Inspection form for Stabilization Measures
    - a. Form 2 shall be completed each time an inspection of stabilization measures occurs. Stabilization measures include, but are not limited to: temporary seeding, permanent seeding, mulching, hydroseeding, sodding, etc.
  - 3. Form 3 – Inspection Certification Form.
    - a. Form 3 shall be completed after each inspection to legally certify that the inspection has been performed and that the site has been found to be in compliance with the project plans and specifications.
  - 4. Form 4 – Form for changes in Pollution Prevention Plan
    - b. Form 4 shall be completed after changes are made to the proposed BMPs and project plans due to unforeseen conditions and construction techniques.
- B. The log book shall be maintained at the job site at all times, in a neat and orderly fashion. The log book shall be available immediately for review by the engineer, the owner and local, state and federal governing authorities during normal business hours.
- C. The log book shall contain copies of all local, state and federal land disturbance permitting issued for the project.







**Form No. 3 – Inspection Certification Form**

Project: \_\_\_\_\_

This certification must be completed after each inspection to signify that the inspection has been properly completed and the site has been found to be in compliance with the Storm Water Pollution Prevention Plan.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Date: \_\_\_\_\_



END OF SECTION

**SECTION 32 12 16**

**ASPHALT PAVING**

**PART 1 - GENERAL**

**1.01. SUMMARY**

- A. Section Includes: Asphaltic pavement for the purpose of repair of cut areas in existing asphalt paved areas.

**1.02. REFERENCES**

- A. 2023 (English) Edition of the "Missouri Standard Specifications for Highway Construction", Section 403 per the Missouri Highway and Transportation Commission.

**1.03. DESCRIPTION OF WORK**

- A. Extent of asphaltic pavement restoration paving area is shown on the drawings.
- B. Prepared subbase is specified in Section 310000 - Site Preparation and Earthwork.

**1.04. SUBMITTALS**

- A. Furnish samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

**PART 2 - PRODUCTS**

**2.01. MATERIALS**

- A. Coarse Aggregate:
  - 1. Shall consist of sound, durable rock, free from cemented lumps or objectionable coatings.
    - a. Test: AASHTO T 96, does not exceed 50% wear.
  - 2. The percentage of deleterious substances shall not exceed the following values.

<b>Deleterious Material</b>	<b>Percent by Weight</b>
Deleterious Rock	8.0
Shale	1.0
Other Foreign Material	0.5

- 3. Crushed stone shall be obtained from rock of uniform quality.
  - a. Test sourced from any approved ledges, and trial mix sample shall meet the following criteria.

<b>Property</b>	<b>Value</b>
Los Angeles Abrasion, AASHTO T 96, percent loss, max	50
Absorption, AASHTO T 85, percent, max	4.0

4. Gravel aggregate shall be washed sufficiently to remove any objectional coating and shall meet the following criteria.

Property	Value
Los Angeles Abrasion, AASHTO T 96, percent loss, max	50
Absorption, AASHTO T 85, percent, max	5.5

5. Steel slag consisting principally of a fused mixture of oxides and silicates shall be a synthetic aggregate produced as a by-product of basic oxygen, electric or open hearth steel making furnace.
- B. Fine Aggregate:
1. Shall be a fine, granular material passing the 3/8-inch sieve, naturally produced by the disintegration of rock of siliceous nature and/or manufactured by the mechanical reduction of sound durable rock.
  2. The percentage of deleterious substances shall not exceed the following values.

Deleterious Material	Percent by Weight
Clay lumps and shale	1.0
Total lightweight particles, including coal and lignite	0.5
Other deleterious substances	0.1

3. Lightweight particle requirement will not apply to wet bottom boiler slag, angular chert sand, or manufactured sand.
  4. Mineral filler shall be in accordance with AASHTO M 17. Prior to use manufacturer shall provide a certified test report with results tested in accordance with applicable section AASHTO M 17 and MoDOT test method TM-73.
  5. Hydrated lime shall be thoroughly dry and free of lumps.
    - a. Test: AASHTO M 303, Type I or II, except gradation shall be in accordance with AASHTO T 37.
- C. Asphalt Binder: Comply with requirements of Section 1015.10 in the 2023 (English) Edition of the "Missouri Standard Specifications for Highway Construction", for asphalt binder material.
- D. Additives:
1. Fiber additives for stone matrix asphalt mixture may be either cellulose or mineral fiber.
    - a. Test: AASHTO M 325 in accordance with MoDOT Test Method TM 60.
  2. Anti-Strip additive shall not be detrimental to the bituminous mixture.
    - a. Testing: Type I

Test	Test Method
Specific Gravity @ 77 F	AASHTO T 228
Brookfield Viscosity 77 F using an RVT viscometer. The report shall include a corresponding test temperature, speed, spindle and model of Instrument.	ASTM D2196
Pensky-Martens Closed Cup Flash Point or Cleveland Open Cup Flash Point	ASTM D93 AASHTO T 48
Infrared Spectrum (neat material)	Appropriate Method

b. Testing: Type II

Test	Test Method
Weight per Gallon @ 77 F	ASTM D1475
Brookfield Viscosity 77 F using an RVT viscometer. The report shall include a corresponding test temperature, speed, spindle and model of Instrument.	ASTM D2196
pH	Appropriate Method
Percent Solids	ASTM D1644 Method A
Infrared Spectrum (latex portion)	Appropriate Method

- c. Heat stability shall comply with requirements of Section 1071.5.2 in the 2023 (English) Edition of the “Missouri Standard Specifications for Highway Construction”.
- d. Shall not significantly lower the unconditioned strength of AASHTO T 283.
  - 1) Testing shall comply with requirements of requirements of Section 1071.5.3 in the 2023 (English) Edition of the “Missouri Standard Specifications for Highway Construction”.
- E. Refer to Section 403 in the 2023 (English) Edition of the “Missouri Standard Specification for Highway Construction”, for more material requirements.

**PART 3 - EXECUTION**

**3.01. INSTALLATION**

- A. Asphaltic pavement shall be installed in accordance with MoDOT specifications noted above and all other related specifications noted therein.
- B. Do not place asphalt until the subbase has been checked for line and grade. Do not place asphalt around manholes or other structures until they are at the required finish elevation and alignment.
- C. Protect finished asphalt paving, complying with applicable requirements of Section 403 in the 2023 (English) Edition of the “Missouri Standard Specification for Highway Construction”.

END OF SECTION

**SECTION 32 13 13**  
**CONCRETE PAVING**

**PART 1 GENERAL**

**1.01. RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including Division 1 Specification sections, apply to work of this section.

**1.02 DESCRIPTION OF WORK**

- A. Extent of portland cement concrete paving is shown on drawings, including curbs, gutters, walkways and pavement.
- B. Prepared subbase is specified in Section 310000 - Site Preparation and Earthwork.
- C. Concrete and related materials are specified in Division 3.
- D. Joint fillers and sealers are specified in Division 7.

**1.03 SUBMITTALS**

- A. Furnish samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

**1.04 QUALITY ASSURANCE**

- A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
  - 1. Use flexible spring steel forms or laminated boards to form radius bends as required.
  - 2. Coat with a non-staining form release agent that will not discolor or deface surface of concrete.
- B. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 40 or Grade 60.
- C. Fabricated Bar Mats: Welded or clip-assembled steel bar or rod mats, ASTM A 184. Use ASTM A 615, Grade 40 steel bars, unless otherwise indicated.

- D. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and other required materials.
- E. Expansion Joint Materials: Comply with requirements of applicable Division 7 sections for preformed expansion joint fillers and sealers.
- F. Liquid Membrane Forming Curing Compound: Complying with ASTM C 309, Type I, Class A unless other type acceptable to Engineer. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.
  - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to the following:
    - a. "Masterseal"; Master Builders.
    - b. "J-20 Acrylic Cure"; Dayton Superior.
    - c. "Kure-N-Seal"; Sonneborn-Contech.
    - d. "L&M Cure"; L & M Construction Chemicals.
    - e. "LR-152"; Protex Industries.
    - f. or approved equal.
- G. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "J-40 Bonding Agent"; Dayton Superior Corp.
    - b. "Weldcrete"; Larsen Products.
    - c. "Everbond"; L & M Construction Chemicals.
    - d. "EucoWeld"; Euclid Chemical Co.
    - e. "Hornweld"; A. C. Horn.
    - f. "Sonocrete", Sonneborn-Contech.
    - g. "Acrylic Bondcrete"; The Burke Co.
    - h. or approved equal.
- H. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.
  - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
    - a. "Epoxtite", A. C. Horn.
    - b. "Edoco 2118 Epoxy Adhesive"; Edoco Technical Prod.
    - c. "Sikadur Hi-Mod"; Sika Chemical Corp.
    - d. "Euco Epoxy 463 or 615"; Euclid Chemical Co.
    - e. "Patch and Bond Epoxy"; The Burke Co.
    - f. "Sure-Poxy"; Kaufman Products Inc.
    - g. or approved equal.

## **2.02 CONCRETE MIX, DESIGN AND TESTING**

- A. Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control.



## **PART 3 EXECUTION**

### **3.01 SURFACE PREPARATION**

- A. Remove loose material from compacted subbase surfaces immediately before placing concrete.
- B. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

### **3.02 FORM CONSTRUCTION**

- A. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
- B. Check completed formwork for grade and alignment to following tolerances:
  - 1. Top of forms not more than 1/8" in 10'.
  - 2. Vertical face on longitudinal axis, not more than 1/4" in 10'.
- C. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

### **3.03 REINFORCEMENT**

- A. Locate, place and support reinforcement as specified in Division 3 sections, unless otherwise indicated.

### **3.04 CONCRETE PLACEMENT**

- A. General: Comply with requirements of Division 3 sections for mixing and placing concrete, and as herein specified.
- B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required 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.
- C. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
  - 1. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 2. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

3. When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.
- D. Fabricated Bar Mats: Keep mats clean and free from excessive rust, and handle units to keep them flat and free of distortions. Straighten bends, kinks, or other irregularities or replace units as required before placement. Set mats for a minimum 2" overlap to adjacent maps.
- E. Place concrete in 2 operations; strike-off initial pour for entire width of placement and to the required depth below finish surface. Lay fabricated bar mats immediately in final position. Place top layer of concrete, strike-off and screed.
  1. Remove and replace portions of bottom layer of concrete which has been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Engineer.
- F. Curbs and Gutters: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

### **3.05 JOINTS**

- A. General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
  1. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Weakened Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness as follows:
  1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
  2. Sawed Joints: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
  3. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.
- C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such placements terminate at expansion joints.
  1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
- D. Expansion Joints: Provide premolded joint filler for expansion joints, putting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.

1. Extend joint fillers full width and depth of joint, and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surfaces.
  2. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.
  3. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
- E. Fillers and Sealants: Comply with requirements of applicable Division 7 sections for preparation of joints, materials, installation, and performance.

### **3.06 CONCRETE FINISHING**

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.
- C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
- D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
  1. Broom finish, by drawing a fine-hair broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Engineer.
- E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Engineer.

### **3.07 CURING**

- A. Protect and cure finished concrete paving, complying with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.

### **3.08 REPAIRS AND PROTECTIONS**

- A. Repair or replace broken or defective concrete, as directed by Engineer.
- B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

- C. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION

**SECTION 32 91 10**  
**LANDSCAPE WORK**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Extent of landscape development work includes all areas disturbed during construction.
- B. Subgrade Elevations: Excavation, filling and grading required to establish elevations shown on drawings are not specified in this section. Refer to earthwork sections.

**1.02 SUBMITTALS:**

- A. Provide the following Certifications:
  - 1. Submit certificates of inspection as required by governmental authorities. Submit manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.
  - 2. Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.
- B. Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- C. Submit typewritten instructions, 2 copies to the Owner and 1 copy to the Project Engineer, recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period.

**1.03 QUALITY ASSURANCE**

- A. Subcontract landscape work to a single firm specializing in landscape work.
- B. Source Quality Control will include:
  - 1. Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
  - 2. Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.
- C. Before delivery of topsoil, furnish Engineer with written statement giving location of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped, and crops grown during past 2 years.

#### **1.04 DELIVERY, STORAGE AND HANDLING**

- A. Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

#### **1.05 JOB CONDITIONS**

- A. Removal of trees and shrubs shall be only as directed by the project Engineer.
- B. Proceed with and complete landscape work as rapidly as portions of site become available, working with seasonal limitations for each kind of landscape work required.
- C. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required.
- D. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Engineer before planting.
- E. Plant or install materials during normal planting seasons for each type of landscape work required. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.
- F. All planting shall occur after final grades are established, unless otherwise acceptable to Engineer.

#### **1.06 SPECIAL PROJECT WARRANTY**

- A. Warranty vegetated areas through specified maintenance period and until final acceptance.

#### **1.07 CLEANING UP**

- A. The Contractor shall at all times keep the premises free from the accumulation of waste materials or rubbish caused by employees or work and, at the completion of the work, shall remove all rubbish, tools, and surplus materials from the premises, leaving the area in a neat and clean condition.

#### **1.08 COORDINATION**

- A. Coordinate all vegetation operations occurring on farmed ground with property owner.
- B. Coordinate all vegetation operations with general contractor.

### **PART 2 - PRODUCTS**

#### **2.01 TOPSOIL**

- A. Topsoil will be stockpiled for re-use in landscape work. If quantity of stockpiled topsoil is insufficient, provide additional topsoil as required to complete landscape work.
- B. Provide 4" inch of new topsoil which is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2" in any dimension, and other extraneous or toxic matter harmful to plant growth.

1. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4"; do not obtain from bogs or marshes.

**2.02 SOIL AMENDMENTS**

- A. Soil amendments shall be added to the soil based upon results of soil testing and the recommendations of a state certified soil testing laboratory.
- B. Fertilizer:
  1. All fertilizer shall conform to applicable State Fertilizer Laws, uniform in composition, dry and free-flowing, delivered to the site in its original, unopened containers with each container bearing the manufacturer's guaranteed analysis.
  2. Any fertilizer that becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.
  3. Fertilizer for seeded areas shall be a complete fertilizer containing 8% nitrogen (1/2 organic, 1/2 inorganic), 32% phosphoric acid and 16% potash, or as recommended by soil testing laboratory.

**2.03 MULCH**

- A. Mulch for seeded areas shall be cereal straw from current year's crop free of noxious weed seed.
- B. At Contractor's option, seeded area may be hydro-mulched in lieu of straw mulching with a wood fiber mulch product.

**2.04 SEEDED AREA**

- A. Grass seed shall be fresh, clean seed of the current year's crop complying with tolerances for purity and germination established by the United States Department of Agriculture.
- B. Seed shall be labeled in accordance with the latest U.S. Department of Agriculture rules and regulations under the Federal Seed Act, and shall be approved. Wet, moldy, or otherwise damaged seed will not be acceptable. The pure live grass seed mix to be used shall be as follows (weed seed shall not exceed 0.5 percent by weight of the total of pure live seed and other material in the mixture):

Kinds of Seeds	Pounds Per Acre
K-31 Fescue ( <i>Festuca elatior</i> var. <i>arund Inacae</i> )	25
Domestic Ryegrass ( <i>Lolium perenne</i> and L. Multiflorum)	10
Orchard Grass ( <i>Dactylis glomerata</i> )	<u>10</u>
Total Pounds Pure Live Seed Per Acre	45

- C. Seeding shall be accomplished in the first of the following two periods after completion of earthwork:

March 1st to June 1st  
August 15th to October 1st

## **2.05 WATER**

- A. Water will be furnished by the Owner and will be suitable for irrigation and free from ingredients harmful to plant life.
- B. Hoses and any other watering equipment required for the work shall be furnished by the Contractor.

## **PART 3 - EXECUTION**

### **3.01 VEGETATION REMOVAL**

- A. Every consideration shall be given to preservation of natural vegetation whenever possible.
- B. Contractor shall coordinate all vegetation removal with the project Engineer prior to demolition.
- C. Typically, all vegetation within the permanent easement may be removed. Vegetation within the temporary construction easement may be removed if under 8" caliper (as measured on trunk 6" from ground) and not flagged.
- D. All trees 8" and greater and all flagged trees and shrubs shall not be disturbed in any manner.

### **3.02 RE-VEGETATION**

- A. In the event flagged vegetation and trees 8" or greater are disturbed, Contractor shall replace the vegetation with same variety at Contractor's expense.
- B. Trees shall be planted at a rate of a minimum of two trees replaced for each tree greater than eight inches diameter - at breast height removed, and three trees for each tree greater than twelve inches diameter removed. Replacement trees shall be at least four feet in height, excluding the root system.
- C. Provide trees, shrubs and plants of quantity, size, genus, species and variety indicated and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock." Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scale, injuries, abrasions, or disfigurement.
- D. Label each tree with securely attached waterproof tag bearing legible designation of botanical and common name.
- E. The Engineer may inspect trees either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size and quality. Engineer retains right to further inspect trees and shrubs for size and condition of balls and root system, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

### **3.03 SOIL TESTS**



- A. Obtaining Samples:
  - 1. After backfill and finish grading are completed and prior to seed bed preparation, Contractor shall obtain representative soil samples of disturbed areas to be revegetated.
  - 2. The method of soil sampling shall conform to guidelines of the soil testing laboratory.
  - 3. A maximum of 50 soil samples and tests shall be taken and performed.
  - 4. The number and location of soil samples shall be at the direction of the project Engineer.
- B. Testing Laboratory:
  - 1. Contractor shall deliver to a State approved testing laboratory the soil samples in accordance with that testing laboratory's guidelines.
  - 2. Testing laboratory shall perform standard testing procedures on properly obtained soil samples to determine the existing condition of the soil.
  - 3. Soil test report shall provide soil treatment recommendations for fertilizer (nitrogen, phosphorous and potassium), limestone and any other soil amendment necessary for proper germination and growth of seed (Reference Part 2 - Products, 2.04 Seeded Area).

### **3.04 PREPARATION**

- A. Preparation for Planting Seeded Areas:
  - 1. Loosen subgrade of seeded areas to a minimum depth of 4". Remove stones over 1-1/2" in any dimension, sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
  - 2. Spread top soil to minimum depth of 4" as required to meet lines, grades and elevations shown, after light rolling and natural settlement.
  - 3. Apply one-half the total amount of fertilizer as recommended by the soil testing laboratory and incorporate into the top 2" of all seeded areas.
  - 4. Fine grade seeding areas to smooth, even surfaces with loose, uniformly fine texture. Roll, rake and drag seed areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
  - 5. Restore seeded areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

### **3.05 PLANTING SEEDED AREAS**

- A. Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.
- B. Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds 5 mi. per hr. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.
- C. Apply one-half of the fertilizer over the entire seeded area.

- D. Rake seed lightly into top 1/8" of soil, roll lightly, and water with a fine spray.
- E. Apply straw mulch at a rate of two tons per acre. The entire mulched area shall be coured by a mechanical slicer to secure the straw mulch to the soil. Mulch shall be a cereal straw from oats, rye, or other approved grain crop. Wheat straw shall not be used.
- F. At the Contractor's option, seeded area may be hydro-mulched, in lieu of straw mulching, with Excel Fibermulch as manufactured by American Excelsior Co., or approved equal, at a rate of 1400 pounds per acre.

### **3.06 PLANTING PROCEDURES**

- A. Plant trees and shrubs as per the following requirements:
  1. Set balled and burlapped (B&B) stock in center of pit with top of ball at same elevation as adjacent finished grades. Remove burlap from sides of balls; retain on bottoms. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.
  2. Dish top of backfill to allow for mulching.
  3. Mulch pits and planted areas. Provide not less than following thickness of mulch and work into top of backfill and finish level with finish grades. Provide 4" thickness of mulch.
  4. Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs and foliage. If deciduous shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving and again 2 weeks after planting.
  5. Wrap tree trunks of 2" caliper and larger. Start at ground and cover trunk to height of first branches and securely attach. Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures before wrapping.
  6. Guy and stake trees immediately after planting.

### **3.07 MAINTENANCE**

- A. Begin maintenance immediately after planting.
- B. Maintain seeded areas for not less than the period stated below, and longer as required to establish an acceptable cover.
  1. Seeded areas, not less than 60 days after substantial completion. If seeded in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.
  2. Maintain trees, shrubs and other plants until final acceptance but in no case less than 60 days after substantial completion of planting.
- C. Maintain seeded areas by watering, fertilizing, weeding, mowing, trimming, and other operations as required to establish a smooth, acceptable surface, free of eroded or bare areas.

- D. Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.

### **3.08 CLEANUP AND PROTECTION**

- A. During landscape work, keep pavements clean and work area in an orderly condition.
- B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors, trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

### **3.09 INSPECTION AND ACCEPTANCE**

- A. When landscape work is completed, including maintenance, Engineer will, upon request, make an inspection to determine acceptability.
- B. Landscape work may be inspected for acceptance in parts agreeable to Engineer, provided work offered for inspection is complete, including maintenance.
- C. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by Engineer and found to be acceptable.

END OF SECTION

## SECTION 33 05 06

### PIPE INSTALLATION AND TESTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. This section includes fabrication, handling, installation and testing of buried and interior pipe, fittings, valves, specials and appurtenances as indicated on the drawings and as specified herein.
- B. This section does not include installation of storm and sanitary drains or plumbing.
- C. Install all small piping to cooling or sealing water connections, vents, drains, control tubing, etc., required to complete the installation of each unit of mechanical equipment.

##### 1.02 REFERENCES

A. American Society for Testing and Material (ASTM):

- 1. C12 - Installation of Vitrified Clay Pipe Lines.
- 2. C828 - Low Pressure Air Test of Vitrified Clay Pipe Lines.
- 3. D212 - Installation of PVC Pipe.
- 4. D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
- 5. D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Pipe.

B. American Society of Mechanical Engineers (ASME):

- 1. B31 - Code for Pressure Piping.
- 2. B31.1 - Power Piping Section.
- 3. Boiler Code - Section 1.

C. American Water Works Association (AWWA):

- 1. B300 - Hypochlorites
- 2. B301 - Liquid Chlorine
- 3. C105 - Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids.
- 4. C206 - Field Welding of Steel Water Pipe.
- 5. C600 - Installation of Gray and Ductile Cast Iron Water Mains and Appurtenances.
- 6. C605 - Underground Installation of PVC and PCVO Pressure Pipe and Fittings.
- 7. C651 - Disinfecting Watermains.
- 8. M11 - Steel Pipe Design and Installation

D. Plastic Pipe Institute (PPI):

- 1. PPI TR-33 - Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe

### **1.03 DELIVERY, STORAGE AND HANDLING**

- A. Handle pipe, valves, and fittings in a manner to insure installation in an undamaged condition.
  - 1. Do not drop or bump.
  - 2. Use slings, hooks and other devices designed to protect pipe, fittings, joint elements and coating when moving sections of pipe from storage area to installation location.
- B. Handle pipe and fittings with equipment having an adequate factor of safety against overturning.

## **PART 2 PRODUCTS**

**2.01** As specified in Divisions 33 and 43.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION - BELOW GROUND PIPING**

- A. Belowground Piping
  - 1. Utilize equipment, methods, and materials ensuring installation to lines and grades indicated.
    - a. Maintain within tolerances specified or acceptable laying schedule.
      - (1) Alignment: 2 inches.
      - (2) Grade: +1 inch per 100 feet.
    - b. Do not lay on blocks unless pipe is to receive total concrete encasement.
    - c. Accomplish horizontal and vertical curve alignments with fittings and pipe deflections. Limit joint deflection with ductile-iron pipe and fittings to conform to AWWA C600. Deflection may, with approval, exceed standard deflections by utilizing machined bells. Deflections for PVC pipe joints shall not exceed the manufacturer's recommendations.
    - d. Obtain acceptance of method proposed for transfer of line and grade from control to the work.
  - 2. Install pipe of size, materials, strength class, and joint type with embedment indicated for plan location.
  - 3. Insofar as possible, commence laying at downstream end of line and install pipe with spigot ends in direction of flow.
  - 4. Clean interior of all pipe, fittings, and joints prior to installation. Exclude entrance of foreign matter if work is suspended or stopped.
    - a. Close open ends of pipe with snug-fitting closures.

- b. Do not let water fill trench. Include provisions to prevent flotation should water control measures prove inadequate.
  - c. Remove water, sand, mud and other undesirable material from trench before removal of end cap.
5. Brace or anchor as required to prevent displacement after establishing final position.
6. Perform only when weather and trench conditions are suitable. Do not lay in water.
7. Thermoplastic pressure pipe shall be installed in conformance with ASTM D2774 and manufacturer's requirements. Thermoplastic pipe installed for sewers and other gravity-flow applications shall be installed in conformance with ASTM D2321.
8. The Contractor shall provide and install tracing wire for locating purposes on all buried or below grade water mains. The tracer wire shall be attached to top of pipe and run the full length of the utility line and shall be terminated at dead-ends. The tracer wire shall be secured to the pipe every 5 ft. Contractor shall pull wire through and wrap wire around valve bonnets leaving 2' of extra wire in the valve curb box. Tracer wire shall consist of #10 AWG fully annealed, high carbon steel, copper clad conductor with a 30 mil high-density, high molecular weight polyethylene insulation rated for direct burial use at 30 volts, Copperhead or approved equal. Tracer wire insulation color shall conform to APWA color code standards for identification of buried utilities. Tracer wire shall be installed in such a manner as to limit wire splicing. Splicing shall be with 3M DBY/DBR direct bury splice kits or approved equal.
9. Location of Sewers with Respect to Water Mains:
  - a. Parallel Installation: Water mains shall be laid at least ten feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten-foot separation, the Design Engineer and appropriate State Regulatory Agency must be contacted to determine, on a case by case basis, if a deviation is acceptable. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer and on either case, at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer. In areas where the recommended separations cannot be obtained, either the waterline or the sewer line shall be constructed of mechanical joint pipe or cased in a continuous casing.
  - b. Crossings: Water mains crossing sewers shall be laid to provide a minimum vertical clear distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, the full length of water pipe shall be located so both joints will be as far from the sewer as possible but in no case less than ten feet. Special structural support of the water and sewer pipes may be required. In areas where the recommended separations cannot be obtained either the waterline or the sewerline shall be constructed of mechanical joint pipe or cased in a continuous casing that extends no less than ten feet on both sides of the crossing.
  - c. Exception: Any variance from the specified separation distances in a. and b. must be submitted to the Design Engineer and appropriate Regulatory Agency for approval.
  - d. Force Mains: There shall be at least a ten-foot horizontal separation between water mains and sanitary sewer force mains and they shall be in separate trenches. In areas

where these separations cannot be obtained, either the waterline or the sewer line shall be cased in a continuous casing.

- e. Sewer Manholes: No waterline shall be located closer than ten feet to any part of a sanitary or combined sewer manhole.
- f. Disposal Facilities: No waterline shall be located closer than 25 feet to any on-site wastewater disposal facility, agricultural waste disposal facility, or landfill.

B. Jointing:

1. General Requirements:

- a. Locate joint to provide for differential movement at changes in type of pipe embedment, impervious trench checks, and structures. Joint to be not more than 2 feet from structure wall, unless supported by concrete cradle structurally continuous with base slab or footing.
- b. Perform in accordance with manufacturer's recommendations.
- c. Clean and lubricate all joint and rubber gasket surfaces with lubricant recommended.
- d. Utilize methods and equipment capable of fully homing or making up joints without damage.
- e. Check joint opening and deflection for specification limits.

2. Special Provisions for Jointing Ductile Iron Pipe:

- a. Conform to AWWA C600.
- b. Visually examine while suspended and before lowering into trench.
  - (1) Paint bell, spigot, or other suspected portions with turpentine and dust with cement to check for cracks invisible to the eye.
  - (2) Remove turpentine and cement by washing when test is satisfactorily completed.

3. Special Provisions for High Density Polyethylene (HDPE) Pipe:

- a. HDPE pipe shall be joined utilizing butt fusion welding techniques in conformance with manufacturer's installation instructions, PPI TR-33 and ASTM D2657 requirements.

C. Cutting Pipe:

- 1. Cut in neat manner without damage to pipe.
- 2. Ductile iron and steel pipe to be cut with a carborundum blade saw or other acceptable methods.
- 3. Remove burrs and sharp edges and smooth the pipe end by grinding.
- 4. Repair lining where required and as approved.

D. Closure Pieces:

1. Connect two segments of pipeline or a pipeline segment and structure with short sections of pipe fabricated for the purpose.
2. Location of joints, types of joints, and pipe materials and strength classifications shall comply with specifications.
3. May be accomplished with sleeve couplings:
  - a. Of length such that gaskets are not less than 3" from pipe ends.
  - b. Include spacer ring identical to pipe end such that clear space in closure does not exceed 1/4".

E. Remove plugs from existing pipe as indicated in order to complete connections to existing pipe. Removed plugs shall become the property of the Contractor.

F. Furnish and install test plugs where necessary to properly complete required testing.

1. Test plugs shall be as manufactured by pipe supplier.
2. Plugs shall be push-on, flanged, mechanical joint or restrained as required for ductile iron pipe and shall be watertight against heads equal to the specified test pressure.
3. Secure plugs in place to facilitate removal when required to connect pipe.
4. Restrain plugs to fittings where indicated.

G. Restrained joints or thrust blocks shall be installed where required to counteract internal pressure forces.

H. Install thrust blocks in accordance with Section 330509, Thrust Blocks for Utility Piping.

### **3.02 INSTALLATION - INTERIOR AND ABOVE GROUND EXTERIOR PIPING**

A. Interior piping installation includes:

1. Field welds.
2. Makeup of flanged, mechanical joints, grooved, screwed and solder joints.
3. Connection to existing pipe.
4. Connection to equipment.
5. Installation of hangers, supports, restraints and anchors.
6. Installation of miscellaneous valves.
7. Testing of piping systems.



- B. Install pipe, fittings and valves in accordance with recognized industry standards which will achieve permanently leakproof piping systems, capable of performing indicated service without failure.
- C. Install piping systems with a minimum of joints and couplings, but with adequate and accessible unions, flanged couplings adapters or sleeved couplings for disassembly and maintenance or replacement of valves and equipment.
- D. Welded pipe 2-1/2" and larger shall be fabricated such that a minimum of field welds are required.
- E. Split backing rings shall be used at all field welds for 2-1/2" and larger carbon steel pipe and fittings.
- F. All flanges shall be installed so that bolt holes straddle center lines.
- G. Install vents at all high points and drains at all low points. Vents and drains to be 3/4" unless noted otherwise.
- H. All piping runs shall be parallel with column row lines avoiding diagonal runs where possible.
- I. Restrained joints shall be used at tees and elbows to counteract internal pressure forces in mechanical joint pipe.
- J. Provide all holes, sleeves, flashing and concrete inserts required for erection and installation of piping.
  - 1. Cut holes thru existing concrete and masonry where required with a core drill and grout in sleeves or install link-seal devices.
  - 2. Field cut all openings required in grating and checkered plate. Openings larger than 4" in diameter thru grating shall be banded with a bar of the same size as the main bearing bars. Openings cut in steel shall be cleaned and painted with metal prime paint.
  - 3. Furnish and install hoods, flashing and caulking for all piping through outside walls and roofs.
- K. Furnish all temporary hangers required for erection and installation of pipes.
- L. Welding:
  - 1. All pipe welders performing work under this contract shall be qualified per Section IX of the ASME Code or the American Welding Society Standard AWS B3.0-77 "Welding Procedure and Performance Qualification."
  - 2. Documentation of welding procedure specifications and welders' qualifications shall be submitted for approval.
  - 3. Pressure piping shall be welded in accordance with ANSI B31.1.
  - 4. All butt welds shall have full penetration and shall be smooth and uniform on the pipe interior.
  - 5. Carbon steel welds shall be either gas tungsten arc welding or shielded metal arc welding on the root pass and completed by any of the acceptable metallic arc processes.

6. When welding low carbon grade stainless steel, low carbon electrodes or filler metal compatible to the base metal shall be used.
7. Fillet welds shall have complete penetration. Any cracks, holes, slag or lack of fusion appearing on the weld surface shall be removed before depositing the next layer.

### 3.03 CONNECTIONS WITH EXISTING PIPING

- A. Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers, and as authorized by Owner. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations with damage to adjacent property.
- B. For Connection to Dissimilar Pipe Materials. Where steel pipe is to be connected to buried or submerged concrete pipe, cast iron pipe, or to existing steel pipe, the connection shall be made by means of an insulating flange or transition coupling.

### 3.04 FIELD TESTING

#### A. Pressure Tests:

1. The Contractor shall furnish all pumps, piping, labor and other materials and services necessary to bring the piping up to the specified test pressure.
2. All pipes shall be pressure tested. Pipes which will be pressurized under normal operating conditions shall conform to the requirements of the hydrostatic pressure test. All other piping shall meet the requirements of the air leakage test.
3. Pipe in the sections to be tested shall be backfilled or center loaded, with thrust blocks installed and completely backfilled. Interior pipe supports and restraint systems shall be completely installed prior to testing.

#### B. Hydrostatic Pressure Test – Polyvinyl Chloride (PVC), Ductile Iron (DIP) and Other Non-HDPE Pipe:

1. Test connections shall be made and the pipe filled with water. Unless otherwise specified, a pressure of not less than 1.5 times the normal operating pressure (for the lowest point on the pipe line) but not less than 150 pounds per square inch (psi) or not more than the rated working pressure for the pipe shall be used for testing.
2. After air removal, water shall be pumped in to bring the pipe to the specified pressure. After two hours, additional water shall be drawn from a container of known volume. The amount of water required to return the system to the specified pressure shall not exceed the amount determined by the following formula:

$$Q = SD(P)^{1/2}/133000,$$

Where

- Q - Total allowable leakage in two hours, gallons.
- S - Length of section tested, feet.
- D - Nominal pipe diameter, inches.
- P - Test pressure, psi.

3. All exposed pipe, fittings, valves, hydrants and joints shall be inspected and all evidence of moisture appearing on the surface of the ground during the test shall be investigated by the Contractor by excavation where the pipe has been covered with backfill. Should the leakage test results exceed allowable leakage, the test pressure shall be maintained for an additional period of time as directed by the Engineer to facilitate location of leaks.
4. All pipe, fittings, valves, pipe joints, hydrants, and other materials which are found to be defective when the pipe line is tested shall be removed from the line immediately and replaced with new and acceptable material by and at the expense of the Contractor. The pressure test shall be repeated after repairing leaks and other defective work until the pipe line installation conforms to specified requirements and is accepted by the Engineer.

C. Hydrostatic Pressure Test – High Density Polyethylene (HDPE) Pipe:

1. Test connections shall be made and the pipe filled with water. Trapped air must be bled off from the pipeline. Unless otherwise specified, a pressure of not less than 1.5 times the normal operating pressure but not less than 150 pounds per square inch (psi) shall be utilized for testing. At no time shall the test pressure exceed the rated working pressure for the pipe. The test pressure shall be measured at the lowest elevation along the pipeline alignment.
2. Pressure testing of the pipeline shall occur after backfilling has been completed but not sooner than a time which is sufficient to allow for curing of any concrete placed for anchorage or embedment, along the pipeline alignment. Where concrete has been placed along the concrete alignment, pressure testing shall not be completed within 7-days of the concrete placement.
3. After air removal, water shall be pumped into the pipeline to bring the pipeline to the specified testing pressure and to allow for the initial expansion of the pipe. Additional water shall be added at hourly intervals so as to maintain the specified testing pressure. The specified testing pressure must be maintained for four (4) hours.
4. After the initial expansion of the pipe line is complete, testing may begin. Testing of the HDPE pipeline shall conform to one of the two methods listed below. Note that under no circumstances shall the total time of the test exceed 8-hours at specified testing pressure. If the test is not completed within this time limit, due to leakage, equipment failure, etc, the testing shall cease for a minimum of 8-hours before the next test sequence.
  - a. At the beginning of the testing phase, bring the internal pressure of the pipeline to the specified test pressure through the addition of water. Once the pipeline is at the specified test pressure, the pipeline pressure shall be reduced by 10-psi to obtain the target pressure. The reduced test pressure shall be maintained for period of 1-hour. At the end of the 1-hour testing period, the residual pipeline pressure shall be measured. If the residual pipeline pressure is within 5 percent of the target value, the pipe line shall be considered passed.
  - b. At the beginning of the testing phase, bring the internal pressure of the pipeline to the specified test pressure through the addition of water. The pipeline should be allowed to sit for a period of up to 3-hours. At the end of the testing period, water should be added to bring the pipeline back to the specified testing pressure. The volume of water added to the pipeline to achieve the specified testing pressure shall not exceed the volumes listed in the table below.

Allowance for Expansion under Test Pressure							
Nominal Pipe Size	U.S. Gals/100-ft of Pipe			Nominal Pipe Size	U.S. Gals/100-ft of Pipe		
	1-Hour	2-Hour	3-Hour		1-Hour	2-Hour	3-Hour
2"	0.08	0.12	0.15	20"	2.80	5.50	8.00
3"	0.10	0.15	0.25	22"	3.50	7.00	10.50
4"	0.13	0.25	0.40	24"	4.50	8.90	13.30
5"	0.21	0.41	0.63	28"	5.50	11.10	16.80
6"	0.30	0.60	0.90	30"	6.20	12.60	19.10
8"	0.50	1.00	1.50	32"	7.00	14.30	21.50
10"	0.75	1.30	2.10	36"	9.00	18.00	27.00
12"	1.10	2.30	3.40	42"	12.00	24.00	36.00
14"	1.40	2.80	4.20	48"	15.00	27.00	43.00
16"	1.70	3.30	5.00	54"	18.00	30.00	50.00
18"	2.20	4.30	6.50				

5. All exposed pipe, fittings, valves, hydrants and joints shall be inspected and all evidence of moisture appearing on the surface of the ground during the test shall be investigated by the Contractor by excavation where the pipe has been covered with backfill.
4. All pipe, fittings, valves, pipe joints, hydrants, and other materials which are found to be defective when the pipe line is tested shall be removed from the line immediately and replaced with new and acceptable material by and at the expense of the Contractor. The pressure test shall be repeated after repairing leaks and other defective work until the pipe line installation conforms to specified requirements and is accepted by the Engineer.

D. Air Leakage Test:

1. Contractor may perform air tests for all pipe sizes.
2. Air leakage testing shall be performed on lines as specified and on the following lines:
  - Outfall line.
  - Drain lines.
  - Sanitary sewer lines.
3. Furnish all facilities required including necessary piping connections, test pumping equipment, pressure gauges, bulkheads, regulator to avoid overpressurization, and all miscellaneous items required.
  - a. The pipe plug for introducing air to the line shall be equipped with two taps. One tap will be used to introduce air into the line being tested, through suitable valves and fittings, so that the input air may be regulated. The second tap will be fitted with valves and fittings to accept a pressure test gauge indicating internal pressure in the sewer pipe. An additional valve and fitting will be incorporated on the tap used to check internal pressure so that a second test gauge may be attached to the internal pressure tap. The pressure test gauge will also be used to indicate loss of air pressure due to leaks in the sewer line.
  - b. The pressure test gauge shall meet the following minimum specifications:

Size (diameter)	4-1/2 inches
Pressure Range	0-15 psi

Figure Intervals	1 psi Increments
Minor Subdivisions	0.05 psi
Pressure Tube	Bourdon Tube or diaphragm
Accuracy	+ 0.25% of maximum scale reading
Dial	White coated aluminum with black lettering, 270° Arc and mirror edge
Pipe Connection	Low male ½" N.P.T.

Calibration data will be supplied with all pressure test gauges. Certification of pressure test gauge will be required from the gauge manufacturer. This certification and calibration data will be available to the Engineer whenever air tests are performed.

- Test each reach of sewer pipe between manholes after completion of the installation of pipe and appurtenances and the backfill of sewer trench.
- Plug ends of line and cap or plug all connections to withstand internal pressure. One of the plugs provided must have two taps for connecting equipment. After connecting air control equipment to the air hose, monitor air pressure so that internal pressure does not exceed 5.0 psig. After reaching 4.0 psig, throttle the air supply to maintain between 4.0 and 3.5 psig for at least two (2) minutes in order to allow equilibrium between air temperature and pipe walls. During this time, check all plugs to detect any leakage. If plugs are found to leak, bleed off air, tighten plugs, and again begin supplying air. After temperature has stabilized, the pressure is allowed to decrease to 3.5 psig. At 3.5 psig, begin timing to determine the time required for pressure to drop to 2.5 psig. If the time, in seconds, for the air pressure to decrease from 3.5 psig to 2.5 psig is greater than that shown in the table below, the pipe shall be presumed free of defects.

Pipe Size	Required Time per 100 LF	Maximum Required Time
8"	70 sec.	227 sec.
10"	110 sec.	283 sec.
12"	158 sec.	340 sec.
15"	248 sec.	425 sec.
18"	356 sec.	510 sec.
21"	485 sec.	595 sec.
24"	634 sec.	680 sec.
27"	765 sec.	765 sec.
30"	851 sec.	851 sec.
33"	935 sec.	935 sec.
36"	1020 sec.	1020 sec.
42"	1200 sec.	1200 sec.
48"	1400 sec.	1400 sec.

If air test fails to meet above requirements, repeat test as necessary after all leaks and defects have been repaired. Prior to acceptance, all constructed sewer lines shall satisfactorily pass the pressure air test.

- In areas where ground water is known to exist, install a 1/2-inch diameter capped pipe nipple, approximately 10" long, through manhole wall on top of one of the sewer lines

entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, ground water level shall be determined by removing pipe cap, blowing air through pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to pipe nipple. The hose shall be held vertically and a measurement of height in feet of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings.

E. Vacuum Testing of Manholes:

1. Each manhole shall be tested immediately after assembly and prior to backfilling.
2. All lift holes shall be plugged with an approved non-shrink grout.
3. All pipes entering the manhole shall be plugged, taking care to securely brace the plug from being drawn into the manhole.
4. The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturers' recommendations. Test head shall be as manufactured by P.A. Glazier, Inc., of Worcester, Massachusetts, or equal.
5. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for 48-inch diameter, 75 seconds for 60-inch, and 90 seconds for 72-inch diameter and larger manholes.
6. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained.

F. Deflection Tests:

1. Deflection tests shall be performed on all flexible sewer pipe by the Contractor using a mandrel pull. The mandrel shall have not less than seven (7) arms. The mandrel pull cannot be performed any sooner than 30 days after the reach being tested has been installed and final backfill has been placed.
2. A section of sewer line reach shall be deemed as failed when the mandrel cannot be moved through it with reasonable force. The tests shall be performed without mechanical pulling devices.
3. At the conclusion of the mandrel pull, the Contractor, at his expense, shall be required to remove and replace all pipe which fails the test.
5. The mandrel diameter shall be based on 95% of the actual inside pipe diameter.

G. Test tracer wire or tracer tape following backfilling.

**3.05 PIPING AND TEST SCHEDULE**

A. Refer to 331416

### **3.06 CLEANING**

- A. Clean and disinfect potable water distribution piping as follows:
1. Purge all new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired, prior to use.
  2. Use the purging and disinfecting procedure prescribed by the authority having jurisdiction or, in case a method is not prescribed by that authority, use the procedure described in AWWA C651, or as described below:
    - a. Fill the system or part thereof with a water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) the system or part thereof and allow to stand for 24 hours. Chlorine solutions shall be prepared from materials meeting AWWA B300 or B301.
    - b. Drain the system or part thereof of the previous solution and refill with a water/chlorine solution containing at least 200 parts per million of chlorine and isolate and allow to stand for 3 hours.
    - c. Following the allowed standing time, flush the system with clean, potable water until chlorine does not remain in the water coming from the system.
    - d. Submit water samples in sterile bottles to the authority having jurisdiction. Repeat the procedure if the biological examination made by the authority shows evidence of contamination.
    - e. Prevent chlorine containing solutions from entering water bodies.

### **3.07 INSPECTION**

- A. Inspection of pipe and fittings will be conducted by the Engineer as soon as practical after delivery to the job site.

### **3.08 ACCEPTANCE**

- A. Pipe will be inspected by the Engineer for acceptance by Owner as specified in Division 33.

END OF SECTION

## SECTION 33 05 09

### THRUST RESTRAINT FOR UTILITY PIPING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes:
  - 1. Joint restraint system.
- B. Related Requirements:
  - 1. Section 310000 - Earthwork: Earthwork requirements for Site utilities.
  - 2. Section 331416 - Site Water Utility Distribution Piping: Requirements for piping Work as required by this Section.

##### 1.02 REFERENCE STANDARDS

- A. ASTM International:
  - 1. ASTM A48 – Gray Iron Casting.
  - 2. ASTM C150 – Portland Cement

##### 1.03 COORDINATION

- A. Section 013100 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with installation of fittings and joints that require restraint.

##### 1.04 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer catalog information for restrained joint details and installation instructions.
- C. Shop Drawings:
  - 1. Indicate restrained joint details and materials being used.
  - 2. Submit layout drawings showing piece numbers and locations.
  - 3. Indicate restrained joint locations.
- D. Samples: Submit two samples of joint restraint parts.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Delegated Design Submittals:



1. Submit signed and sealed Shop Drawings with design calculations and assumptions for restrained lengths.
2. Submit joint restraint details.
3. Use joint restraint devices specifically designed for applications described in manufacturer information.

G. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

H. Qualifications Statement:

1. Submit qualifications for manufacturer, fabricator, and licensed professional.

#### **1.05 CLOSEOUT SUBMITTALS**

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Project Record Documents: Record actual locations of joint restraints.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Store materials according to manufacturer instructions.

C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

### **PART 2 - PRODUCTS**

#### **2.01 PERFORMANCE AND DESIGN CRITERIA**

A. Provide pressure pipeline with restrained joints at each bend, tee, and change in direction.

#### **2.02 MATERIALS**

A. Concrete:

1. 5-1/2 sack mix Portland Cement, compressive strength of 3,000 psi

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

A. Section 330506 – Pipe Installation and Testing: Requirements for installation examination.

- B. Verify that pipe and fittings are ready to receive Work.
- C. Field measure and verify conditions for installation of Work.

### **3.02 PREPARATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation preparation.
- B. Clean surfaces of pipe and fittings that are to receive joint restraint systems.

### **3.03 INSTALLATION**

- A. Install at all buried tees, elbows, bends, and dead ends where indicated or required.
- B. Place against undisturbed earth.
- C. Of design indicated or specified.
  - 1. Bearing surface area may be adjusted should field conditions be in variance with design assumption. Engineer shall be contacted to inspect actual conditions prior to placement of thrust block.

END OF SECTION

## SECTION 33 05 61

### CONCRETE MANHOLES

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section Includes:

1. Modular precast concrete manholes and structures with tongue-and-groove joints and masonry transition to cover frame, covers, anchorage, and accessories.
2. Doghouse manhole connections to existing sanitary sewer lines.
3. Bedding and cover materials.
4. Pile support systems.
5. Vertical adjustment of existing manholes and structures.

B. Related Requirements:

1. Section 330130 - Packer Injection Grouting: Grout sealing as required by this Section.
2. Section 330130 - Manhole Rim Adjustment: Resetting existing castings and grates.
3. Section 333100 - Sanitary Sewerage Piping: Piping connections to manholes.

##### 1.02 DEFINITIONS

- A. Bedding: Specialized material placed under the manhole prior to installation and subsequent backfill operations.

##### 1.03 REFERENCE STANDARDS

A. American Association of State Highway Transportation Officials:

1. AASHTO M91 - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale).
2. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
3. AASHTO M306 - Standard Specification for Drainage, Sewer, Utility, and Related Castings.

B. American Concrete Institute:

1. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.

C. ASTM International:

1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM C32 - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale).
4. ASTM C55 - Standard Specification for Concrete Building Brick.

5. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.
6. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
7. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
8. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
9. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
10. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
11. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

#### **1.04 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information for manhole covers, component construction, features, configuration, and dimensions.
- C. Shop Drawings:
  1. Indicate structure locations and elevations.
  2. Indicate sizes and elevations of piping and penetrations.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- F. Source Quality-Control Submittals: Indicate results of shop and/or factory tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Qualifications Statement:
  1. Submit qualifications for the manufacturer.

#### **1.05 CLOSEOUT SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Project Record Documents: Record actual locations of manholes and connections, and record invert elevations.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

- B. Handling: Comply with precast concrete manufacturer instructions and ASTM C913 for unloading and moving precast manholes and drainage structures.
- C. Storage:
  - 1. Store materials according to manufacturer instructions.
  - 2. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property.
  - 3. Repair property damaged from materials storage.
- D. Protection:
  - 1. Protect materials from moisture and dust by storing them in clean, dry location remote from construction operations areas.
  - 2. Provide additional protection according to manufacturer instructions.

## **1.07 EXISTING CONDITIONS**

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Concrete: Reinforced, 4000 psi. Conform to Division 03.
- B. Manhole Frames and Covers:
  - 1. Units cast of gray iron, free of defects, conforming to ASTM A48.
  - 2. Machine bearing surfaces to provide even seating.
  - 3. Coat with coal tar pitch varnish.
  - 4. Non-bolt down lids shall be Neenah R-1642 or approved equal.
  - 5. Bolt down lid with waterproof gasket, Neenah R-1916-F or approved equal.
- C. Manhole Steps:
  - 1. Have a minimum width of 14 inches.
  - 2. Steel reinforced corrosion resistant polypropylene plastic.
  - 3. Fabricate with positive friction lock system.
  - 4. "PS 2 PF" as manufactured by M. A. Industries of Peachtree City, Georgia 30269, or approved equal.
- D. Waterproofing:
  - 1. As specified in Division 07.
- E. Joint Sealers:
  - 1. NPC Bidco C-56 butyl mastic sealant.

2. Press Seal EZ-Stik butyl mastic sealant.
3. Or approved equal. Joint sealant shall meet or exceed the requirements of the latest versions of AASHTO M-198 and ASTM C990. Minimum width of sealant strips shall be 1 inch.

F. Pipe to Manhole Connectors:

1. A-Lok Premium by A-Lok Products, Inc., for pipe deflections less than or equal to 10-degrees. Z-Lok boot by A-Lok Products, Inc., for pipe deflections greater than 10-degrees, but less than or equal to 25-degrees.
2. Or approved equal. Pipe to manhole connectors shall meet or exceed the requirements of the latest version of ASTM C923.

## 2.02 FABRICATION

A. Manholes:

1. Design: Construct as follows:
  - a. Precast manholes shall conform to ASTM C 478 except as specified herein. Minimum circumferential reinforcement per linear foot shall be as follows:

Manhole I.D.	Wall Thickness	Minimum Circumferential Reinforcement per Lineal Foot
48"	5"	0.18 sq. in.
60"	6"	0.21 sq. in.
72"	7"	0.28 sq. in.

- b. Cement shall be ASTM C150, Type II.
  - c. Manhole adjustment rings 4" or less in height shall be fiber reinforced.
2. Connections:
  - a. Manhole entry pipe gasket system shall be as specified above for Pipe-to-manhole Connectors. Leakage testing shall conform to ASTM C923.
  - b. Place pipe stub in manhole wall with bell or coupling outside manhole wall to provide flexible joint as indicated.
  - c. Make provisions for future connections where indicated.
3. Invert Channels:
  - a. Form invert channel with 4000 psi concrete, in conformance with Division 03.
  - b. Make changes in the direction of flow with smooth curves of as large a radius as size of manhole permits.
  - c. Make changes in size and grade smoothly and uniformly.
  - d. Slope floor of manhole adjacent to channels in drain thereto.
  - e. Finish channel bottom smoothly without roughness, irregularity, or pockets.
4. Waterproofing:
  - a. As specified in Division 07.
5. Joint Sealers:
  - a. Apply per manufacturer's instructions.
6. Manhole Frames and Covers:
  - a. Embedded into concrete construction where indicated on plans.
  - b. Set on double ring of mastic on top of manholes and grouted in place.
  - c. Install items level and in alignment.
7. Manhole Steps:
  - a. Steps shall be placed in wet concrete.
  - b. A minimum of 2 inches of plastic coating shall be embedded in the concrete wall.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation examination.
- B. Verify that items provided by other Sections of Work are properly sized and located.
- C. Verify that built-in items are in the proper location and are ready for roughing into Work.
- D. Verify that the excavation base is ready to receive Work and excavations and that dimensions and elevations are as indicated on drawings.

### **3.02 PREPARATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation preparation.
- B. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.
- C. Coordinate placement of inlet and outlet pipe or duct sleeves as required by other Sections.
- D. Do not install manholes and structures where Site conditions induce loads exceeding structural capacity of manholes or structures.
- E. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

### **3.03 INSTALLATION**

- A. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas.
- B. Remove large stones or other hard matter impeding consistent backfilling or compaction.
- C. Protect manhole from damage or displacement while backfilling operation is in progress.
- D. Excavating:
  - 1. As specified in Section 310000 – Earthwork on and in indicated locations and depths.
  - 2. Provide clearance around sidewalls of manhole or structure for construction operations granular backfill, and placement of geotextile filter fabric.
  - 3. If groundwater is encountered, prevent accumulation of water in excavations; place the manhole or structure in a dry trench.
  - 4. Where the possibility exists of a watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation as approved by Architect/Engineer.
- E. Base and Alignment:

1. Place foundation slab and trowel top surface level.
2. Place manhole sections plumb and level, trim to correct elevations and anchor to the foundation slab.

F. Backfilling: As specified in Section 310000 - Earthwork.

G. Precast Concrete Manholes:

1. Lift precast components at lifting points designated by the manufacturer.
2. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure that the interior of the pipeline and structure remains clean.
3. Assembly:
  - a. Assemble multisection manholes and structures by lowering each section into the excavation.
  - b. Install rubber gasket joints between precast sections according to manufacturer recommendations.
  - c. Lower, set level, and firmly position the base section before placing additional sections.
4. Remove foreign materials from joint surfaces and verify that sealing materials are placed properly.
5. Maintain alignment between sections by using guide devices affixed to the lower section.
6. Joint sealing materials may be installed on-site or at the manufacturer's plant.
7. Verify that installed manholes and structures meet the required alignment and grade.
8. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.

END OF SECTION



## SECTION 33 05 97

### IDENTIFICATION AND SIGNAGE FOR UTILITIES

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section Includes:

1. Pipeline marker posts.
2. Metal utility markers.
3. Plastic utility markers.
4. Marking flags.
5. Plastic ribbon tape for placement above direct-buried utility.
6. Trace wire for placement above direct-buried utility.

B. Related Requirements:

1. Section 331416 - Site Water Utility Distribution Piping: Piping, valves, and appurtenances requiring identification marking.
2. Section 333100 - Sanitary Sewerage Piping: Piping, valves, and appurtenances requiring identification marking.

##### 1.02 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit product specifications and installation instructions for each identification material and device required.
- C. Samples: Submit samples of each color, lettering style, and other graphic representation required for each identification material or system.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

##### 1.03 CLOSEOUT SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Project Record Documents: Record actual locations of tagged valves.

#### PART 2 - PRODUCTS

##### 2.01 ACCEPTABLE MANUFACTURERS

- A. W. H. Brady Company.
- B. Seton Name Plate Corporation.

- C. Or approved equal.

## **2.02 IDENTIFICATION MATERIALS**

- A. ANSI Standards: Comply with ANSI A13.1 for lettering, colors, and viewing angles of identification materials.
- B. Except as otherwise indicated, provide the manufacturer's standard products of categories and types required for each application.
- C. Painted Identification Materials:
  - 1. Stencils: Standard fiberboard stencils prepared for required applications with letter sizes generally complying with recommendations of ANSI A 13.1 for piping and similar applications, but not less than 1 1/4" high letters for ductwork, and not less than 3/4" high letters for access door signs and similar operational instructions.
  - 2. Stencil Paint: Standard exterior type stenciling enamel; black, except white where white provide greater visual contrast on application substrate, and except as otherwise indicated; either brushing grade or pressurized spray can form and grade.
  - 3. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for systems, comply with ANSI A13,1 for colors.
- D. Plastic Pipe Markers:
  - 1. Provide manufacturer's standard pre-printed, self-sticking, permanent, color-coded, plastic sheet pipe markers, complying with ANSI A13.1.
  - 2. For external diameters less than 6" (including insulation if any), provide full band markers, extending 360° around pipe or conduit at each location, fastened by one of the following methods:
    - a. Adhesive lap joint in pipe marker overlap.
    - b. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1 1/2".
  - 3. For external diameters of 6" and larger (including insulation if any), provide either full-band or strip type markers, but not narrower than 3 times letter height (and of required length), fastened by tape to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1 1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
  - 4. Use the manufacturer's standard pre-printed nomenclature which best describes the piping system in each instance, as selected by Engineer in cases of variance with names as shown or specified.
  - 5. Print each pipe marker with arrows indicating the direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.
- E. Self-Adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure sensitive, pre-printed, flexible vinyl signs for identification, operation instructions, or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application (as examples: EXHAUST FAN, KEEP OFF, FUEL OIL).
- F. Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20 gage steel; of standard red, black, and white graphics; 14" x 10" size except where 10" X 7" is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording (as examples: KEEP AWAY BURIED CABLE, DO NOT TOUCH SWITCH).

- G. Provide the following sign at all nonpotable water hydrants NOTICE NONPOTABLE WATER NOT FOR DRINKING.

**2.03 LETTERING AND GRAPHICS**

- A. Coordinate names, abbreviations, and other designations used in identification work, with Engineer. Provide numbers, lettering, and wording as recommended by manufacturers or as required for proper identification systems.
- B. Where multiple systems of the same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples: Boiler No. 3, Air Supply No. 1H, Standpipe F12, Substation No. P2).

**2.04 COLOR CODING FOR PROCESS PIPING**

- A. All exposed process piping shall be color-coded for easy identification. The following process piping color coding scheme shall be implemented. Pipe identification and flow direction labels shall be stenciled in a contrasting color.

Raw sludge line	Gray
Sludge recirculation suction line	Brown with yellow bands
Sludge draw off line	Brown with orange bands
Sludge recirculation discharge line	Brown
Treated Effluent	Tan
Digested sludge line	Black
Sludge gas line	Red
Natural gas line	Red
Nonpotable water line	Purple
Potable water line	Blue
Fire main	Red
Chlorine line	Yellow
Sulfur Dioxide	Yellow with red bands
Sewage (wastewater) line	Gray
Compressed air line	Dark green
Process air line	Light green
Fuel oil/diesel	Red
Plumbing drains and vents	Black
Ferric Chloride	Orange
Polymer	Unpainted PVC (*)

(\*) PVC exposed to UV radiation shall be painted white in accordance with Division 9, Specification Section 099000 – Painting (Industrial) and Coating.

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. General Installation Requirements:
  1. Where identification is to be applied to surfaces that require insulation, painting, or other covering or finish, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

2. 2. Install protective underlayment on uninsulated hot surfaces to receive plastic identification materials; secured with adhesive or anchorages as recommended by the insulation manufacturer.
3. Comply with governing regulations and requests of governing authorities for identification of services, systems, and equipment.
4. Provide colors to comply with governing regulations. Except as otherwise indicated.

B. Piping System Identification:

1. Install pipe markers on each system indicated to receive identification, and include arrows to show normal direction flow (if any):
2. Self-adhered plastic signs but limited in use to surfaces recommended by the sign manufacturer as suitable for permanent adhesion.
3. Locate markers as indicated and as follows, where piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plethora), and exterior non-concealed locations.
  - a. Near each valve or other similar control device.
  - b. Near each branch, excluding short take-offs for fixtures and terminal units; mark each line at the branch, where there could be a question of flow pattern.
  - c. Near locations where lines pass through walls or floors/ ceilings or enter non-accessible enclosures.
  - d. Near major equipment items and other points of origination and termination.
  - e. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of lines and equipment.
  - f. On lines above removable acoustical ceilings, except omit intermediately spaced markers.

END OF SECTION

## SECTION 33 14 16

### SITE WATER UTILITY DISTRIBUTION PIPING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section Includes:

1. Pipe and fittings for Site water line, including domestic water line and fire water line.
2. Tapping sleeves and valves.
3. Backflow preventers.

B. Related Requirements:

1. Section 330509 - Thrust Restraint for Utility Piping: Tied joint-restraint system to anchor and resist forces developed in underground closed pipeline systems.
2. Section 330597 - Identification and Signage for Utilities: Pipe markers.
3. Section 331417 - Site Water Service Utility Laterals: Water main service connections.
4. Section 331419 - Valves and Hydrants for Water Utility Service: Fire hydrants, valves, and valve boxes for fire hydrant and water main installations.
5. Section 331900 - Water Utility Metering Equipment: Positive displacement meters as required by this Section.

##### 1.02 REFERENCE STANDARDS

A. Pipe and fittings shall be designed and tested in accordance with manufacturers' recommended procedures and the following codes and applicable standards:

1. American National Standards Institute (ANSI):

- A21.4 - Cement Mortar Lining for Ductile Iron Pipe and Fittings.
- A21.10 - Ductile Iron and Gray-Iron Fittings, 3 in through 48 in, for Water.
- A21.11 - Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
- A21.15 - Flanged Ductile-Iron Pipe with Threaded Flanges.
- A21.51 - Ductile Iron Pipe, Centrifugally Cast, for Water.
- A312 - Seamless and Welded Austenitic Stainless Steel Pipe.
- A403 - Wrought Austenitic Stainless Steel Piping Fittings.
- B16.1 - Cast Iron Flanged Fittings
- B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.
- B16.5 - Pipe Flanges and Flanged Fittings.
- B16.9 - Factory-Made Wrought Buttwelding Fittings.
- B16.11 - Forged Fittings, Socket Welding and Threaded.
- B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings
- B16.21 - Nonmetallic Gaskets for Pipe Flanges.
- B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- B16.25 - Butt Welding Ends.

2. American Society of Mechanical Engineers (ASME):

- B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
- B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.
- B16.5 - Pipe Flanges and Flanged Fittings.
- B16.9 - Factory-Made Wrought Buttwelding Fittings.

- B16.11 - Forged Fittings, Socket Welding and Threaded.
- B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings
- B16.21 - Nonmetallic Gaskets for Pipe Flanges.
- B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- B16.25 - Butt Welding Ends.
- B31.1 - Code for Pressure Piping, Power Piping Section. ASME Boiler Code Section 1.
- B36.10 - Welded and Seamless Wrought Steel Pipe.

3. American Society for Testing and Materials (ASTM):

- A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- A106 - Seamless Carbon Steel Pipe for High Temperature Service.
- A182 - Forged and Rolled Alloy Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High Temperature Service.
- A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- A307 - Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
- A312 - Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- A403 - Wrought Austenitic Stainless Steel Pipe Fittings.
- A536 - Ductile Iron Castings.
- A674 - Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids.
- A746 - Ductile Iron Gravity Sewer Pipe.
- B75 - Seamless Copper Tube.
- B88 - Seamless Copper Water Tube.
- C150 - Portland Cement.
- D1248 - Polyethylene Plastics Extrusion Materials for Wire and Cable.
- D1784 - Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds.
- D2241 - Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
- D2310 - Machine Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- D2737 - Polyethylene (PE) Plastic Tubing -CTS; CTS Tubing; DR; OD Controlled
- D2997 - Centrifugally Cast "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings (4" through 15").
- D3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- D3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
- D3350 - Polyethylene Plastics Pipe and Fitting Materials.
- F477 - Elastomeric Seals (Gaskets) For Joining Plastic Pipe.
- F679 - Type PSM Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings (18" through 27").
- F714 - Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.

4. American Water Works Association (AWWA):

- C104 - Cement mortar Lining for Ductile Iron Pipe and Fittings.
- C105 - Polyethylene Encasement for Ductile Iron Pipe Systems.
- C110 - Ductile Iron and Gray-Iron Fittings.
- C111 - Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
- C115 - Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- C150 - Thickness Design of Ductile Iron Pipe.
- C151 - Ductile Iron Pipe, Centrifugally Cast.
- C153 - Ductile Iron Compact Fittings.
- C222 - Polyurethane Coating for Interior and Exterior of Steel Water Pipe and Fittings
- C600 - Installation of Ductile Iron Mains and Their Appurtenances.
- C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In.

- C901 - Polyethylene (PE) pressure pipe and tubing, ¾ inch through 3 inch, for Water Service.
- C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In.
- C950 - Fiberglass Pressure Pipe.

5. National Bureau of Standards, Voluntary Products Standard (NBS):

PS15-69 - Custom Contact Molded Reinforced Polyester Chemical Resistant Process Equipment.

6. National Sanitation Foundation (NSF):

- NSF-61 - Drinking Water System Components – Health Effects.
- NSF-372 - Drinking Water System Components - Lead Content.

### **1.03 SUBMITTALS**

- A. Only request submittals needed to verify compliance with Project requirements.
- B. Section 013300 - Submittal Procedures: Requirements for submittals.
- C. Product Data: Submit manufacturer information regarding pipe materials, pipe fittings, valves, hydrants.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Include separate Paragraphs for additional certifications.
- F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- G. Qualifications Statements:
  - 1. Submit qualifications for manufacturer and installer.
    - a. Regional products.

### **1.04 CLOSEOUT SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### **1.05 QUALITY ASSURANCE**

- A. Valves: Mark valve body with manufacturer's name and pressure rating.
- B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

- C. Perform Work according to Missouri Department of Natural Resources (MDNR) standards.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Storage:
  - 1. Store materials according to manufacturer instructions.
  - 2. Block individual and stockpiled pipe lengths to prevent moving.
  - 3. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
  - 4. Store PE and PVC materials out of sunlight.
- C. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Provide additional protection according to manufacturer instructions.

#### **1.07 EXISTING CONDITIONS**

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

#### **1.08 JOB CONDITIONS**

- A. Lines and grades shall be as indicated. The engineer will furnish a benchmark and a baseline or other necessary horizontal control points to permit the Contractor to lay out, stake, and construct the work.

#### **1.09 PIPING SYSTEM DESCRIPTIONS**

- A. Piping is grouped into designated systems according to the chemical and physical properties of the fluid conveyed, system pressure, piping size and system materials of construction. The table below identifies each piping classification, its utility designation and the system classification for each utility designation.



SYMBOL	SYSTEM	UTILITY DESIGNATOR	SIZE (IN)	PIPE MATERIAL	TEST PRESSURE (PSIG)
PW	1	Potable Water	Up to 3	Copper/HDPE	150 <sup>(1)</sup>
	1		4 and larger	PVC	150 <sup>(1)</sup>

(1) Minimum defer to Division 33, specification section 330506.3.04 for further testing requirements

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURER

- A. Ductile Iron Pipe:
  - 1. American Cast Iron Pipe Co.
  - 2. U.S. Pipe Supply.
  - 3. Or approved equal.
- B. Plastic Pressure and Gravity Pipe (PVC):
  - 1. North American Specialty Products.
  - 2. Diamond Plastics.
  - 3. Or approved equal.
- C. Stainless Steel Pipe:
  - 1. Felker Bros. Corp.
  - 2. Marmon/Keystone.
  - 3. Or approved equal.
- D. High Density Polyethylene Pipe:
  - 1. Chevron-Philips.
  - 2. ISCO Industries.
  - 3. Or approved equal.

### 2.02 MATERIALS

- A. Pipes, fittings and appurtenances containing more than 0.25% lead calculated by weighted average shall not be used in potable water service.
- B. Ductile Iron Pipe and Fittings:
  - 1. Ductile iron pressure pipe shall conform to AWWA C115, C150, and C151 except as otherwise specified.
  - 2. Minimum thickness class for flanged pipe, AWWA C115, shall be class 53.
  - 3. Joints:
    - a. All buried gravity pipe shall have push on joints conforming to AWWA C111 unless otherwise indicated or specified.

- b. All interior and exposed exterior pipes shall be flanged unless otherwise indicated or specified. Contractor shall coordinate flange drilling and pressure class with connected valves, equipment and accessories supplied.
- c. Pipe flanges shall be ductile iron, conforming to ANSI B16.1 and AWWA C115 and shall be drilled class 125 or class 250 where required for valves, equipment and accessories supplied.
- d. Sleeved or coupled joints shall be provided where indicated. Furnish pipe ends suitable for installing the style of sleeve or coupling indicated or specified. Provide anchor couplings or thrust blocks where restraint is required to withstand specified operating or hydraulic test pressure and where indicated.
- e. Flexible Joints (Unrestrained), where indicated on the drawings for buried piping shall be one of the following:
  - 1) Mechanical joint.
  - 2) Sleeve Coupling.
    - a) Ford FC1.
    - b) Romac 501.
    - c) Smith Blair 411.
    - d) Or approved equal.
  - 3) Sleeve couplings shall be cast iron, ductile iron, or fusion-bonded epoxy coated steel. Bolts and nuts shall be Type 304 or 316 stainless steel.

4. Restrained Joints:

- a. Furnish restrained joints, harnesses, anchors, or thrust blocks at all locations, unless otherwise noted. All bolts, nuts and tie rods shall be Type 304 or 316 stainless steel.
- b. Proprietary restrained joints for push-on pipe shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
  - 1) Flex Ring, American Cast Iron Pipe.
  - 2) Tr-Flex, U.S. Pipe Co.
  - 3) Fast-Grip Gasket, American Cast Iron Pipe Co. (12-inch and smaller pipe only).
  - 4) Snap-LOK, Griffin Pipe Products
  - 5) Or approved equal
  - 6) Joint restraint systems consisting solely of wedge elements in rubber gaskets will not be acceptable for pipe greater than 12-inch diameter.
- c. Restrained flexible joints shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
  - 1) Romac 400RG.
  - 2) Romac Alpha.
  - 3) EBAA Iron Mega Coupling Series 3800.
  - 4) Smith-Blair 470 Series.
  - 5) Or approved equal.
- d. Restrained mechanical joints shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
  - 1) EBAA Iron Mega-Lug.
  - 2) Stainless steel tie-rod assemblies. Tie rods shall connect no less than 50 percent of the bolts in the coupled glands.
  - 3) Or approved equal
- e. Mechanical joint glands and field-assembled flanges using set screws bearing directly against the pipe for restraint will not be acceptable.

5. Fittings:

- a. Fittings shall conform to AWWA C110 or C153 and shall be ductile iron.

- b. Fittings provided with buried pressure or flooded pipe shall have mechanical joints.
  - c. Fittings for gravity pipe with push-on joints shall be mechanical joints or push-on joints.
  - d. Provide all specials, taps, and plugs as specified or indicated.
  - e. Flanged fittings shall be provided for flanged pipe.
  - f. Flange faces shall be coated with a rust-preventive compound.
6. Lining:
- a. All pipe and fittings for potable water service shall be lined with cement mortar conforming to ANSI 21.4 and AWWA C 104, unless otherwise indicated.
  - b. All pipe and fittings for wastewater service shall be lined with cement mortar and coal tar epoxy with a minimum thickness of 24 mil applied to a surface prepared in accordance with manufacturer's recommendations unless otherwise indicated. Lining shall conform to ANSI A21.4/AWWA C104.
  - c. Where indicated, all pipe and fittings for wastewater service shall be lined with one of the following.
    - 1) Amine cured novalac epoxy containing at least 20 percent by volume of ceramic quartz pigment, Protecto 401, Permox-CTF, or approved equal. The lining shall be a minimum of 40 mils nominal dry film thickness. The inside of the socket shall be coated in accordance with the manufacturer's recommendations.
  - d. Lining shall extend from the edge of the plain end to the gasket seat in the bell socket.
  - e. Lining application shall be in accordance with the manufacturer's recommendations.
7. All buried iron pipes and fittings shall be coated with the manufacturer's standard exterior bituminous coating. All exposed pipe and fittings shall be exterior coated with the finish coatings as specified in Division 9.
8. Gaskets and Bolting Material:
- a. Provide all gaskets, bolts, lubricants, and other accessories required to install pipe and fittings complete and ready for service.
  - b. Bolts and nuts for flanged and mechanical joints shall be Type 304 or 316 stainless steel.
  - c. Gaskets for flanged joints shall be 1/8" thick, full-faced synthetic rubber.
  - d. Gaskets for flanged joints on air service shall be rated for 22° F minimum.
9. Polyethylene Encasement: Buried ductile iron piping shall be encased in polyethylene conforming to ASTM D 1248, Type 1, Class C, Grade E 1 when noted on the plans.
10. Flanged Coupling Adapters:
- a. Flanged Coupling Adapters shall have restraining anchor studs and/or harnesses and shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
    - 1) Ford FCA.
    - 2) Smith-Blair 913.
    - 3) Or approved equal.
  - b. Couplings shall be coated per Division 9.
  - c. Type 304 or 316 stainless steel bolts, nuts and tie rods shall be used.
  - d. Gaskets, except for air piping, shall be neoprene rubber. Gaskets for air piping shall be suitable for operation at a temperature of 250° F.
11. Flanged Dismantling Joints:

- a. Flanged Dismantling Joints shall have restraining tie rods and shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
  - 1) Ford FDJ.
  - 2) Smith-Blair 975.
  - 3) Or approved equal.
- b. Couplings shall be coated per Division 9.
- c. Type 304 or 316 stainless steel bolts, nuts, and tie rods shall be used.
- d. Gaskets, except for air piping, shall be neoprene rubber. Gaskets for air piping shall be suitable for operation at a temperature of 250° F.

C. Copper Tubing:

- 1. Copper tube shall conform to ASTM B88 - Type L for above ground installations. Buried pipe may be type K or L.
- 2. Fittings shall be wrought copper with solder joints in accordance with ANSI B16.22.

D. PVC Pipe:

- 1. The materials of this pipe shall be uniformly blended with unplasticized polyvinyl chloride. Nothing used in its manufacture shall be injurious to humans or animals, nor shall it impart taste or odor to domestic water or in any manner alter the chemical content of waters flowing through the pipe. It shall consist of all new materials, and the manufacturer shall furnish a sworn statement that no reused or materials known as "mill shorts" were used in the manufacture of the pipe or fittings. All pipes shall have superior high tensile strength. The pipe shall conform to all requirements of commercial standards and ANSI, as specified on the drawings and/or in the Piping Schedule in Section 33 14 16.1.010. The PVC pipe shall conform to the following standard specifications:
  - a. AWWA C 900, Class 235, DR 18.
- 2. All plastic pipe shall be approved by and bear the National Sanitation Foundation seal of approval and will comply with the requirements for Class 12454 A or Class 12454 B virgin components as defined in ASTM D1784 with an estimated hydrostatic design basis (HDB) rating of 4000 psi (27.58 MPa) for liquid at 73.4°F (23°C). Pipe and fittings with elastomeric seal joints shall meet the requirements of ASTM D3139.
- 3. Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied.
- 4. PVC Pipe. The pipe shall be joined by means of a rubber ring slip joint, by means of a bell joint which shall be an integral and homogeneous part of the pipe barrel.
  - a. At no point in the pipe bell, including the recess groove for rubber rings, shall the wall thickness be less than that for the pipe barrel.
  - b. Samples of pipe shall be submitted to the Engineer for acceptance.
  - c. Maximum laying length of pipe shall be 20 feet.
  - d. All pipes shall have a guide mark on the spigot end to enable checking of adequate seating into the bell.
  - e. The manufacturer shall provide a factory representative skilled in the installation of the type of pipe purchased to instruct the Contractor's personnel in the proper procedures for connecting and laying the pipe. This instruction is to be given at the beginning of pipe-laying operations.

5. Fittings for Pipe. Fittings for plastic pipe shall be ductile iron as specified. Ductile iron fittings for plastic pipes shall have a pressure rating not less than the pipe.
  6. Restrained Joints:
    - a. Furnish harnesses, anchors, and/or thrust blocks were called for on the drawings and at all locations where required to prevent separation of joints under operating and specified test hydraulic test pressures. All bolts, nuts, and tie rods shall be Type 304 or 316 stainless steel.
    - b. Restrained flexible joints shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
      - 1) Romac Alpha.
      - 2) EBAA Iron Mega Coupling Series 3800.
      - 3) Smith-Blair 470 Series.
      - 4) Or approved equal.
    - c. Restrained mechanical joints shall be rated for the greater of 150 psi minimum working pressure and the specified hydraulic test pressure:
      - 1) EBAA Iron Mega-Lug.
      - 2) Or approved equal.
      - 3) Stainless steel tie-rod assemblies. Tie rods shall connect no less than 50 percent of the bolts in the coupled glands.
    - d. Mechanical joint glands and field-assembled flanges using set screws bearing directly against the pipe for restraint will not be acceptable.
- E. High-Density Polyethylene Pipe (HDPE) and Fittings: Pipe and fittings shall conform to ASTM F714.
1. General: Furnish maximum pipe lengths normally produced by the manufacturer, except for fittings, closures, and specials. Only solid wall HDPE pipe in accordance with ASTM F714 will be accepted. HDPE profile wall pipe and fittings will not be accepted. The pipe shall have a green stripe for wastewater service and a blue stripe for water service.
  2. Materials: The pipe shall be high performance, high molecular weight, high-density polyethylene pipe, Driscoplex 4000/4100 by CP Chem Performance Pipe, a division of Chevron Phillips Chemical Company, Plano, Texas, and shall conform to ASTM D3350, Material grade PE4710. Minimum cell classification shall be 445574 C as referenced in ASTM D 3350.
  3. Design: The pipe supplied under this specification shall have a nominal DIPS (Ductile Iron Pipe Size) OD unless otherwise specified. The SDR (Standard Dimension Ratio) of the pipe shall be SDR 11, 200 psi unless otherwise noted.
  4. Joints: Low-pressure flow systems shall be joined by use of the heat fusion technique of butt fusion resulting in a monolithic pipe. All joints shall be fully restrained and as strong as the pipe in both tension and hydrostatic loading. The joining of pipes of dissimilar materials shall be made using approved transition coupling and shall provide a permanent and watertight connection that will withstand the hydrostatic test pressure.
  5. Fittings: The fittings for low-pressure systems shall be molded from a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe or shall be manufactured using a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe supplied under this specification. All fittings supplied under this specification shall be of the same manufacturer as the pipe being supplied. Minimum cell classification shall be 445574 C as referenced in ASTM D335.
- F. Stainless Steel Tube and Fittings:
1. Tubing and fittings shall be 304 stainless steel conforming to ASTM A269.

2. Fitting shall be flared.

### 2.03 TAPPING SLEEVES AND VALVES

#### A. Main Service Taps

1. For tapping mains during construction, the following 3/4" I.P. thread service tapping saddles shall be used with a ball valve corporation stop, BALLCORP TYPE FB1100 by Ford Meter Box Company, or an approved equal.

Pipe Size	----- Tapping Saddle ----	
	PVC Main	DIP Main
2"	Ford S71-203	
3"	Ford S71-303	
4"	Ford S71-403	101B-540
6"	Ford S71-603	101B-750
8"	Ford S71-803	101B-962
10"	Ford S71-1003	101B-1212

#### B. Plastic Service Lines

1. The following described plastic service line shall be installed where water mains are constructed of Class 200 PVC. Plastic service line shall be a Proguard 200 polyethylene plastic or resin rated for municipal, yard, and rural service and a maximum working pressure of 200 psi, as manufactured by Vanguard Plastics, Inc., or approved equal. The plastic shall be manufactured from premium, heavy-duty polyethylene conforming to all applicable requirements in the latest revisions of ASTM D2737 Standard for Polyethylene PE 3408. The pipe shall be 3/4" nominal diameter and shall be approved for use with potable drinking water by the National Sanitation Foundation. The service line shall be marked with size, type of plastic material (PE 3408), standard dimension ratio (SDR 9), working pressure of (200 psi), ASTM specification (D 2737), manufacturer's name, the NSF seal of approval, and installed according to manufacturer's recommendations with CTS compression fittings.

#### C. Copper Service Lines

1. Contractor shall install 3/4" type K copper tube and service bore under all State Highways and/or asphalt pavement as indicated on the drawings. Copper service lines shall be 3/4" copper tube, size in conformance with ASTM D-2666 and be manufactured for use with standard flare or compression fittings not requiring heat, flame, cements, solvent welding, or special adapters. Tubing shall be approved for use with potable drinking water by the National Sanitation Foundation. The Contractor shall furnish the proper adapters for both ends of the service for the purpose of connecting the service line to the tap and to the meter setters.

### 2.04 BACKFLOW PREVENTERS

- A. Backflow preventers shall consist of a dual check valve assembly with reduced pressure zones between the check valves. Backflow preventers shall be a 6" "AMES 2000SSNRS" or approved

equal with bronze body and flanged couplings. Valves shall conform to AWWA C-515 and C-550 and be USC-listed.

## **2.05 SHOP PAINTING**

- A. Prepare surfaces and paint or coat all buried valves and interior of exposed valves and all related accessories standard of the manufacturer, unless otherwise specified herein.
- B. Exposed valves shall have exterior coating conforming to Division 9.
- C. Paint and coatings shall be suitable for the service intended.

## **2.06 ACCESSORIES**

- A. Thrust Restraints: As specified in Section 330509 - Thrust Restraint for Utility Piping.
- B. Air-Release Valves:
  - 1. As located on Drawings.
- C. Pipe Markers: As specified in Section 330597 - Identification and Signage for Utilities.
- D. Vaults: As specified in Section 330563 - Concrete Vaults and Chambers.
- E. Metering Equipment: As specified in Section 331419 – Valves and Hydrants for Water Utility Service.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation examination.
- B. Verify that building service connections and municipal utility water main sizes, locations, and elevations are as indicated on Drawings.

### **3.02 ACCEPTANCE**

- A. Pipe will be inspected by the Engineer for acceptance by the owner at the construction site. Acceptance at the job site shall be paramount. Prior approval or payment for pipe rejected at the job site shall be null and void. Acceptance by the Engineer at a point in the sequence of manufacture, delivery, and installation will not relieve the Contractor of his responsibilities as set forth in the Contract Documents. Manufacturing defects that prohibit installed pipe from successfully passing leakage tests shall constitute rejection of the defective pipe.

### **3.03 PREPARATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation preparation.

- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.
- C. Remove scale and dirt on the inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.
- E. Protect and support existing distribution piping and appurtenances as Work progresses.

### **3.04 INSTALLATION**

- A. Install pipe in accordance with Section 330506 of Division 33.
- B. General Application: Use mechanical joint end valves for 3-inch and larger buried installation. Use threaded and flanged end valves for installation in pits and inside the building.
- C. Gate Valves: Comply with AWWA C600. Install buried valves with the stem pointing up and with a cast-iron valve box.
- D. Thoroughly clean and remove all shipping materials prior to setting. Operate all valves from fully opened to totally closed.

### **3.05 PIPING SYSTEM SCHEDULES**

- A. SYSTEM 1 – Potable Water Piping
  - 1. Test requirements: Potable Water Service, Corrosion Resistant – see Section 33 05 06.
  - 2. All materials must comply with NSF/ANSI/CAN 61.
  - 3. Gaskets and O-rings:
    - a. O-rings: Neoprene or rubber
    - b. Flanged, push-on, and mechanical joints (ductile iron): Rubber, AWWA/ANSI C111/A21.11
    - c. Grooved coupling joints: Rubber, AWWA C606
    - d. Elastomeric gaskets with water-tight seal conforming to ASTM D3139, ASTM D3212, and ASTM F477 (PVC).
  - 4. Pipe, Exposed Service, 3/4 to 3 IN:
    - a. Material: T304 Stainless Steel, Schedule 40, ASTM A312
    - b. Lining: None.
    - c. Coating: None
    - d. Fittings: Threaded, NPT.
    - e. Joints: Restrained.
  - 5. Pipe, Buried Service, 3/4 to 3 IN:
    - a. Material: HDPE, 200 psi, DR-9 CTS (ASTM D2737)
    - b. Lining: None.
    - c. Coating: None.
    - d. Fittings: Fully restrained compression or fusion welded
    - e. Joints: Restrained, fusion welded.
    - f. Tracer wire and warning tape per Division 33, Specification Section 330597.
  - 6. Pipe, Exposed Services, 4 to 54 IN:
    - a. Materials: Ductile iron, special thickness class 53, AWWA/ANSI C115/A21.15
    - b. Lining: Cement (with asphaltic seal coat) AWWA/ANSI C104/A21.4.
    - c. Coating: Primer (no asphaltic coating) and finish in compliance with Division 9, Specification Section 099000.
    - d. Fittings: AWWA/ANSI C110/A21.10 ductile iron flanged or grooved gasket.



- e. Joints: Restrained.
- 7. Pipe, Buried Services, 4 to 54 IN:
  - a. Materials: PVC, AWWA C-900, Class 235, DR 18
  - b. Lining: None.
  - c. Coating: None.
  - d. Fitting: AWWA/ANSI C110/A21.10 ductile iron restrained or AWWA/ANSI C153/A21.53 ductile iron compact fittings restrained. Polyethylene Encasement per AWWA C105.
  - e. Joints: Restrained, Thrust Blocked
  - f. Tracer wire and warning tape per Division 33, Specification Section 330597.

END OF SECTION

## SECTION 33 14 19

### VALVES AND HYDRANTS FOR WATER UTILITY SERVICE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section Includes:

1. Valves.
2. Valve boxes.
3. Fire hydrants.

B. Related Requirements:

1. Section 033000 - Cast-in-Place Concrete: Concrete for thrust restraints.
2. Section 099000 - Painting and Coating: Exterior finish for fire hydrants.
3. Section 310516 - Aggregates for Earthwork: Fire hydrant drainage gravel.
4. Section 330110 - Disinfection of Water Utility Piping Systems: Requirements for flushing and disinfecting.
5. Section 330509 - Thrust Restraint for Utility Piping: Thrust restraints as required by this Section.
6. Section 331413 - Public Water Utility Distribution Piping: Pressure testing of valves and hydrants.
7. Section 331416 - Site Water Utility Distribution Piping: Pressure testing of valves and hydrants.
8. Section 331417 - Site Water Service Utility Laterals: Piping, trenching, backfilling, and compaction requirements.

##### 1.02 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
2. AWWA C502 - Dry-Barrel Fire Hydrants.
3. AWWA C503 - Wet-Barrel Fire Hydrants.
4. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
5. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

B. National Fire Protection Association:

1. NFPA 291 - Recommended Practice for Fire Flow Testing and Marking of Hydrants.

C. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

##### 1.03 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit manufacturer information regarding component materials, fittings, assembly and parts diagram, and accessories.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- E. Source Quality-Control Submittals: Indicate results of shop or factory tests and inspections.
- F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- G. Qualifications Statements:
  - 1. Submit qualifications for manufacturer and installer.
  - 2. Submit manufacturer's approval of installer.

#### **1.04 CLOSEOUT SUBMITTALS**

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of valves and hydrants.

#### **1.05 QUALITY ASSURANCE**

- A. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
- B. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.
- C. Perform Work according to Missouri Department of Natural Resources (MDNR) standards.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Delivery:
  - 1. Seal valve and hydrant ends to prevent entry of foreign matter.
  - 2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Provide additional protection according to manufacturer instructions.

## **PART 2 - PRODUCTS**

### **2.01 GATE VALVES 2-1/2" AND LARGER:**

- A. Acceptable Manufacturers:
  - 1. American.
  - 2. M&H.
  - 3. Mueller.
  - 4. Or approved equal.
  
- B. Gate valves from 3" - 12" size shall conform to AWWA C-515 and C-550:
  - 1. Valves shall have a minimum design working pressure of 200 psi.
  - 2. Valves shall open counterclockwise and be non-rising stem.
  - 3. Valves stems shall use double O-ring seals.
  - 4. Buried valves shall have mechanical joint ends.
  - 5. Exposed valves shall have flanged ends. The valve interior shall be coated with the manufacturer's standard epoxy coating. The exterior coating shall conform to Division 9.
  - 6. Bolts shall be stainless steel. Gaskets and seals shall be non-asbestos materials.
  - 7. Buried valves shall be operated with a 2" x 2" nut and valve box unless a handwheel is indicated on drawings. Exposed valves shall have hand wheel operators.
  - 8. All valves shall be NSF approved.
  
- C. Cast iron or ductile iron gate valves of sizes other than those listed above installed in the process water or the sludge process systems shall conform to AWWA C500 and shall be as follows:
  - 1. Valves 2 ½" and smaller shall be designed for a 200 psig minimum working pressure. Valves over 12" shall have a 150 psig minimum working pressure.
  - 2. Double disc type.
  - 3. Mechanical joint ends for buried valves.
  - 4. Flanged ends for exposed and interior valves.
  - 5. Shall have a handwheel operator for exposed valves. Buried valves shall be operated with nut and valve box unless handwheel is indicated on drawings.
  - 6. Valves shall be non-rising stem and open counterclockwise unless otherwise stated.
  - 7. Stems shall be sealed with double O-rings.

### **2.02 FIRE HYDRANTS**

- A. Fire hydrant bonnet, upper barrel, and lower barrel and shoe shall be cast iron ASTM A126, CL. B.
  
- B. Operating nut, pumper nozzle, hose nozzle, upper valve plate drain ring, seat ring, and hold-down nut shall be bronze, ASTM B584.
  
- C. Acceptable Manufacturers
  - 1. American-Darling, B-84-B.
  - 2. Mueller Centurion.
  - 3. Or approved equal.
  
- D. Fire Hydrants to Conform With AWWA C502

1. Hydrant shall have a minimum design working pressure of 200 psig or 400 pig test pressure.
2. Hydrant to have 2-2½-inch hose connections.
3. Hydrants to have one - 4½-inch NTS pumper connection.
4. Post-type dry barrel design.
5. Dry top design with O-ring sealed oil reservoir.
6. Break-away stem couplings.
7. Compression-type main valve closes with pressure.
8. Operating nut to open by turning left.
9. Wrench nut and nozzle cap nuts shall be 1 1/2 inch National Pentagon in shape.
10. Have field replaceable hose and pumper nozzles.
11. Hose and pumper nozzles have large radius full-flow openings for low-friction flow.
12. Contoured shoe to be designed for full flow.
13. Have dual, bronze drain valves to provide effective barrel drainage.
14. The size of the hydrant main opening shall be 5¼inch.
15. The hydrant standpipe shall be 25% in excess of the main valve opening.
16. Top of hydrant shall be of sufficient height above the ground surface to enable nozzles to be removed without wrench coming within approximately 2 inches of the ground surface.
17. The hub inlet shall be 6-inch mechanical joint.
18. The hydrant shall be painted bright red.
19. The hydrant shall be for 48-inch burial.
20. All hydrant hose threads shall have the thread pattern used by the Owner's fire department.
21. Gate valve and box. See specification Section 02510 - Potable and Non-Potable Water Piping.
22. Pipe and pipe fittings, see specification Section 02510 - Potable and Non-Potable Water Piping.

E. Hydrant Wrenches

1. The Contractor shall provide two wrenches for opening and closing the hydrant.

**2.03 ACCESSORIES**

- A. Thrust Restraints: As specified in Section 330509 - Thrust Restraint for Utility Piping.
- B. Valve Box Aligner: High-strength plastic device designed to automatically center valve box base and to prevent it from shifting off center during backfilling.
- C. Fire Hydrant Drainage Gravel: As specified in Section 310000 - Earthwork.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation examination.
- B. Determine exact location and size of valves from Drawings.
- C. Identify required lines, levels, contours, and datum locations.
- D. Verify that elevations of existing facilities prior to excavation and installation of valves and hydrants are as indicated on Drawings.

### **3.02 PREPARATION**

- A. Section 330506 – Pipe Installation and Testing: Requirements for installation preparation.
- B. Locate, identify, and protect from damage utilities to remain.
- C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
  - 1. Notify Architect/Engineer not less than 2 days in advance of proposed utility interruption.
  - 2. Do not proceed without written permission from Architect/Engineer.

### **3.03 INSTALLATION**

- A. Perform trench excavation, backfilling, and compaction as specified in Division 31.
- B. Install valves and hydrants in conjunction with pipe laying.
- C. Provide buried valves with valve boxes installed flush with finished grade.
- D. Provide support blocking and drainage gravel while installing fire hydrants; do not block drain hole.
- E. Orientation:
  - 1. Set valves and hydrants plumb.
  - 2. Set fire hydrants with pumper nozzle facing roadway.
  - 3. Set fire hydrants with centerline of pumper nozzle 18 inches above finished grade and with safety flange not more than 6 inches nor less than 2 inches above grade.
- F. After main-line pressure testing, flush fire hydrants and check for proper drainage.

### **3.04 FIELD QUALITY CONTROL**

- A. Section 330506 - Quality Requirements: Requirements for inspecting and testing.

END OF SECTION

## SECTION 33 14 20

### PIPE SUPPORTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. This Section includes the design and installation of all pipe hangers, supports, restraints, guides, anchors and concrete inserts required to properly support new and modified piping systems.
- B. Furnish and install all hangers, supports guides and anchors required to support all piping systems.

##### 1.02 REFERENCES

- A. Hangers and supports shall be designed and installed in accordance with the following codes and standards:
  - 1. ANSI/ASME B31 - Code for Pressure Piping.
  - 2. ASME Boiler and Pressure Vessel Code, Section III.
  - 3. ASTM A36, Standard Specification for Carbon Structural Steel.
  - 4. ASTM A276, Standard Specification for Steel bars, Carbon, Merchant Quality, M-Grades.
  - 5. ASTM A575, Standard Specification for Steel bars, Carbon, Hot-Wrought, Special Quality.
  - 6. ASTM A917, Standard Specification for Steel Sheet, Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface (General Requirements).
  - 7. ASTM A918, Standard Specification for Steel Sheet, Zinc-Nickel Alloy Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
  - 8. ASTM B633, Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
  - 9. AWS D1.1, Structural Welding Code – Steel
  - 10. AWS D2.6, Structural Welding Code – Stainless Steel
  - 11. MSS SP-58 Pipe Hangers and Supports, Materials, Design and Manufacture.
  - 12. MSS SP-69 Pipe Hangers and Supports, Selection and Application.
  - 13. MSS SP-89 Pipe Hangers and Supports, Fabrication and Installation Practices.

##### 1.03 COMPLIANCE SUBMITTAL

- A. Submit as specified in Division 1.
- B. Submit the following for acceptance:
  - 1. Acknowledgement that products submitted meet requirements of standards referenced.
  - 2. Manufacturer's installation instructions.
  - 3. Itemized list of wall sleeves, anchors, support devices and all other items related to pipe support system.
  - 4. Scaled hanger and support assembly drawings.
  - 5. Scaled hanger and support location plan.
  - 6. Bill of material for each hanger and support.

7. When required by the Contract Documents, provide detailed design calculations for the pipe support system. Calculations shall analyze each pipe system for all loads and forces on hangers and supports and their reaction forces to the structure to which they are fastened. Calculations shall be keyed to scaled drawings and sealed by a licensed professional engineer.

#### **1.04 RESPONSIBILITY**

- A. It is the Contractor's responsibility to design, furnish, and install all pipe hangers, supports, restraints, guides, anchors and concrete inserts required. At specific locations, Engineer has provided minimum design requirements for thrust restraint and pipe supports.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- A. Each engineered hanger assembly will be individually bundled and tagged ready for installation.
- B. Hanger material for piping 2 inch and smaller shall be shipped loose.
- C. Handle all hanger material in a manner to insure that hangers and accessories will not be damaged.

### **PART 2 PRODUCTS**

#### **2.01 ACCEPTABLE MANUFACTURER**

- A. ANVIL International.
- B. ITT Grinnell.
- C. Unistrut
- D. B-Line Systems, Inc.
- E. Or approved equal.

#### **2.02 DESIGN REQUIREMENTS**

- A. Supports shall be capable of supporting the pipe for all service and testing conditions. Provide a factor of safety of five (5).
- B. Allow free expansion and contraction of the piping to prevent excessive stress resulting from service and testing conditions or from weight transferred from piping or attached equipment.
- C. Design supports and hangers to allow for proper pitch of piping.
- D. For chemical and waste piping, design, materials of construction and installation of pipe hangers, supports, guides, restraints, and anchors:
  1. ASME B31.3.
  2. MSS SP-58 and MSS SP-69
  3. Except where modified by this specification
- E. Check all physical clearances between piping, support system and structure. Provide for vertical adjustment after erection.



- F. Support vertical pipe runs in pipe chases at base of riser. Support pipes for lateral movement with clamps or brackets.
- G. Place hangers are to be installed on outside of pipe insulation.
  - 1. Use a pipe covering protection saddle for insulated pipe at support point.
  - 2. Insulated piping 1-1/2 IN and less, provide a 9 IN length of high-density perlite or high-density calcium silicate at saddle.
  - 3. Insulated piping over 1-1/2 IN, provide a 12 IN length of high-density perlite or high-density calcium silicate at saddle.

H. Pipe Support Spacing.

- 1. General.
  - a. Factor loads by specific weight of liquid conveyed if specific weight is greater than water.
  - b. Locate pipe supports at maximum spacing scheduled unless indicated otherwise in the drawings
  - c. Provide at least one support for each length of pipe at each change of direction at each valve.
- 2. Steel, stainless steel, cast-iron pipe support schedule.

Pipe Sizes, IN	Maximum Span, FT
1-1/2 and less	5.0
2 thru 4	10.0
5 thru 8	15.0
10 and greater	20.0

3. Copper pipe support schedule.

Pipe Sizes, IN	Maximum Span, FT
2-1/2 and less	5.0
3 thru 6	10.0
8 and greater	15.0

4. PVC pipe support schedule

Pipe Sizes, IN	Maximum Span, FT
1-1/4 and less	3.0
1-1/2 thru 3	4.0
4 and greater	5.0

- 5. Support each length and every fitting
  - a. Bell and spigot piping shall have at least one hanger applied at the bell
  - b. Mechanical couplings joints shall have hanger placed within 2 FT of each side of fittings to keep pipes in alignment.

6. Space supports for soil and waste pipe and other piping systems not included above every 5 FT.
7. Provide Unistrut Unicushion wrap of pipe, or equivalent, at each support.

**2.03 MATERIALS**

- A. Galvanized components:
  1. Electro-galvanized components:
    - a. Bar, forged or cast fabrication: ASTM B633, SC4
    - b. Rolled sheet fabrications: ASTM A917 and ASTM A918, 50N50NU
  2. Hot-dipped galvanized components: See Division 5, Specification Section 05500.

**2.02 HANGERS AND ACCESSORIES**

- A. Hanger rods shall be fabricated of ASTM A36 steel and have a minimum allowable tensile stress of 12,000 PSI at 650 DEG F per MS SP-58. Hanger rods shall be continuously threaded and electro-galvanized or cadmium plated after threads are cut
- B. Hanger rods shall have the following load limits:

NOMINAL ROD DIAMETERS, IN	MAXIMUM SAFE LOADS (LBS)
3/8 (MIN)	610
1/2	1,130
5/8	1,810
3/4	2,710
7/8	3,770
1	4,960

- C. Hangers for use directly on copper pipe shall be coper of cadmium plated. All other hangers shall be cadmium plated or galvanized..
- D. Hangers 4 IN and less shall be ANVIL Figure 180 with Figure 114, or approved equal.
- E. Hangers over 4 IN shall be ANVIL Figure 590, or approved equal.
- F. Hangers for use in chemical storage areas and as indicated on the drawings for corrosion resistance shall be CorPro CP – Hanger, or approved equal.
- G. Concrete inserts for hanger rods shall be ANVIL Figure 281 or approved equal. For inserts with continuous slots, Unistrut #P1000 or approved equal.
- H. Beam clamps for hanger rods shall be ANVIL Figure 133, standard duty, or approved equal.
- I. Trapeze Hangers for suspended piping

1. Construct with galvanized steel using angles, channels or other structural shapes. Provide curved roller surfaces at support point corresponding with the type of hanger required.:
2. In chemical feed and storage areas, construct with FRP and support with fiberglass Unistrut channel or equal..

## **2.05 PIPE STANDS**

- A. Provide pipe support saddles for pipe located 3 FT or less from floor elevations, except as otherwise indicated on the drawings. Pipe support saddle shall be ANVIL figure 264, or approved equal.
- B. Pipe support risers shall be galvanized, schedule 40 pipe, sized per manufacturer's recommendations.
- C. Pipe support base plate shall be 4 IN (MIN) larger than support. Provide a 3/16 IN collar thickness, circular in shape, and sleeve type connection to the pipe. Collar fitted over outside of support pipe and extended 2 IN from floor plate. Collar shall be welded to the floor plate. All edges shall be ground smooth. The pipe support base plate assembly shall be hot-dipped galvanized after fabrication.
- D. Pipe covering protection saddle for insulated pipe at point of support, provide ANVIL Figure 167, Type B or approved equal.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install hangers and supports at locations determined by weight balance calculations.
- B. Installation shall conform with manufacturer's recommendations.
- C. Furnish and install all necessary brackets, angles, and clips which are not a part of the building structure but which are required to properly support the piping system.
- D. Adjust hangers and supports as follows:
  1. Prior to putting the piping system into service, remove travel stops, adjust all spring hangers to the correct cold load, adjust all solid hangers to correct position, and remove all temporary hangers used in erection and testing.
- E. Furnish and install all concrete inserts required to properly support all piping systems.
- F. Field painting shall comply with Division 9, Specification Section 09910-Painting (Industrial)

### **3.02 INSPECTION**

- A. Inspection for acceptance of hangers and hanger material will be conducted by the Engineer as soon as practical after arrival at the jobsite.
- B. Jobsite inspection takes precedence over any prior inspection.

END OF SECTION

## SECTION 33 31 00

### SANITARY SEWERAGE PIPING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. Section Includes:

1. Sanitary sewerage piping.

B. Related Requirements:

1. Section 330561 - Concrete Manholes: Manholes for sanitary sewerage piping.
2. Section 330597 - Identification and Signage for Utilities: Pipe markers.

##### 1.02 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
7. AWWA C153 - Ductile-Iron Compact Fittings.

C. ASTM International:

1. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM C14 - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
3. ASTM C14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe (Metric).
4. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
5. ASTM C76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric).
6. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
7. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
8. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
9. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.

10. ASTM C923M - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals (Metric).
11. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>).
12. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>).
13. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
14. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
15. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
16. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
17. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
18. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
19. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
20. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
21. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

### **1.03 SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information indicating pipe material to be used and pipe accessories.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Source Quality-Control Submittals: Indicate results of shop and/or factory tests and inspections.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- F. Qualifications Statement:
  1. Submit qualifications for manufacturer and installer.

### **1.04 CLOSEOUT SUBMITTALS**

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Project Record Documents: Record finished locations of pipe runs, connections, manholes, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Storage:
  - 1. Store materials according to manufacturer instructions.
  - 2. Store valves in shipping containers with labeling in place.
- C. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Block individual and stockpiled pipe lengths to prevent moving.
  - 3. Provide additional protection according to manufacturer instructions.

### 1.06 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

### 1.07 PIPING SYSTEM DESCRIPTIONS

- A. Piping is grouped into designated systems according to the chemical and physical properties of the fluid conveyed, system pressure, piping size and system materials of construction. The table below identifies each piping classification, its utility designation and the system classification for each utility designation.

SYMBOL	SYSTEM	UTILITY DESIGNATOR	SIZE (IN)	PIPE MATERIAL	TEST PRESSURE (PSIG)
SAN	2	Sanitary Sewer - Gravity	4 to 36	PVC	5

## PART 2 - PRODUCTS

### 2.01 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE AND FITTINGS

- A. Plastic Pipe:
  - 1. PVC sewer pipe and fittings, sizes 4-inch through 15-inch, shall conform to ASTM D-3034, SDR 26. PVC sewer pipe and fittings, sizes 18-inch through 36-inch, shall conform to ASTM F-679.
  - 2. All PVC sewer pipe and fittings shall be made of PVC plastic having a cell classification of 12454-B or 12454-C, as defined by ASTM D1784.
  - 3. Joints shall be of the bell and spigot type. The bell shall contain a factory-installed elastomeric gasket which is positively retained. Joint shall be in conformance with ASTM D3212.
  - 4. The gasket shall be molded or extruded and spliced from a high-grade, properly vulcanized elastomeric compound, consisting of a synthetic rubber and shall meet the low head requirements of ASTM F477.

5. Molded fittings shall be supplied with factory-installed gaskets and shall be suitable for use with SDR-35 gravity sewer pipe. Fittings shall not deflect more than pipe when loaded and bedded in the same manner.
6. All 90° bends shall be accomplished by using two 45° bends.
7. Flexible Joints (Unrestrained), where indicated on the drawings for buried piping shall be one of the following:
  - a. Mechanical joint.
  - b. Sleeve Coupling:
    - 1) Ford FC1.
    - 2) Romac 501.
    - 3) Smith Blair 411.
    - 4) Or approved equal.
  - c. Sleeve couplings shall be cast iron, ductile iron, or fusion-bonded epoxy coated steel. Bolts and nuts shall be Type 304 or 316 stainless steel.

## **2.02 ACCESSORIES**

- A. Pipe Markers: As specified in Section 330597 - Identification and Signage for Utilities.

## **2.03 SOURCE QUALITY CONTROL**

- A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Provide shop inspection and testing of pipe.
- C. Certificate of Compliance:
  1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
  2. Specified shop tests are not required for Work performed by approved manufacturer.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that excavation base is ready to receive Work of this Section.
- C. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

### **3.02 PREPARATION**

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Type of correcting materials (fine aggregate, coarse aggregate, or lean concrete) depends on type of subsoil, percolation characteristics, and compaction requirements.
- C. Correct over-excavation with fine aggregate.

- D. Remove large stones or other hard materials that could damage pipe or impede consistent backfilling or compaction.
- E. Protect and support existing sewer lines, utilities, and appurtenances.

### **3.03 INSTALLATION**

- A. Bedding:
  - 1. Excavate pipe trench as specified in Section 312316 - Trenching.
  - 2. Place bedding material at trench bottom.
  - 3. Level materials in continuous layer not exceeding 8 inches.
  - 4. Maintain optimum moisture content of bedding material to attain required compaction density.
- B. Piping:
  - 1. Install pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.
  - 2. Lay pipe to slope gradients as indicated on drawings.
  - 3. Begin at downstream end of system and progress upstream.
  - 4. Bedding: Install at sides and over top of pipe, to minimum compacted thickness of 12 inches.
- C. Manholes: As specified in Section 330561 - Concrete Manholes.
- D. Backfilling: As specified in Section 310000 - Earthwork.

### **3.04 PROTECTION**

- A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
- C. Cap open ends of piping during periods of Work stoppage.

### **3.05 PIPING SYSTEM SCHEDULES**

- A. SYSTEM 2 – Sanitary Sewer – Gravity Service
  - 1. Test requirements: Non-potable Service, Corrosion Resistant – see Section 330506.
  - 2. Gaskets and O-rings:
    - a. O-rings: Neoprene or rubber
    - b. Push-on (PVC): Ruber, AWWA/ANSI D3212
    - c. Elastomeric gaskets with watertight seal conforming to ASTM D3139, ASTM D3212 and ASTM F477 (PVC).
  - 3. Pipe, Buried Service, 4 to 15 IN:
    - a. Material: PVC, SDR-26 (ASTM D3034)
    - b. Lining: None.
    - c. Coating: None
    - d. Fittings: N/A
    - e. Joints: Unrestrained



4. Pipe, Buried Services, 18 to 36 IN:
  - a. Materials: PVC, ASTM F679
  - b. Lining: None.
  - c. Coating: None.
  - d. Fitting: N/A
  - e. Joints: Unrestrained.

END OF SECTION

STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES APPENDIX A  
MISSOURI CLEAN WATER COMMISSION



## MISSOURI STATE OPERATING PERMIT

### General Operating Permit

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No MOR100038

Owner: OA-Facilities Mgmt, Design, and Construc  
Address: 301 West High Street, Hst Rm 370  
Jefferson City, MO 65101

Continuing Authority: OA Facilities Mgmt Design Construction  
301 West High St.  
HST SOB Rm 730  
Jefferson City, MO 65102

Facility Name: Office of Administration  
Facility Address: OA-FMDC, PO Box 809 301 W High street  
JEFFERSON CITY, MO 65102

Legal Description: Land Grant 02681, Cole County  
UTM Coordinates: 571840.000/4270368.000  
Receiving Stream: Tributary to Wears Creek (U)  
First Classified Stream - ID#: 100K Extent-Remaining Streams (C) 3960.00  
USGS# and Sub Watershed#: 10300102 - 1304

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein.

### **FACILITY DESCRIPTION** All Outfalls SIC #1629

All Outfalls - Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading, filling and other activity that results in the destruction of the root zone and/or land disturbance activity that is reasonably certain to cause pollution of waters of the state)

Issued to a city, county, state or federal agency, other governmental jurisdiction, or other private area-wide projects as determined by the Department on a case-by-case basis

This permit authorizes only wastewater, including storm water, discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System, it does not apply to other regulated areas. This permit may be appealed in accordance with RSMo Section 644.051.6 and 621.250, 10 CSR 20-6.020, and 10 CSR 20-1.020.

August 01, 2022

Issue Date

Chris Wieberg, Director  
Water Protection Program

July 04, 2027

Expiration Date

## **I. APPLICABILITY**

### **A. Permit Coverage and Authorized Discharges**

1. This Missouri State Operating Permit (permit) authorizes the discharge of stormwater and certain non-stormwater discharges from land disturbance sites that disturb one or more acres, or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project.

A Missouri State Operating Permit must be issued before any site vegetation is removed or the site disturbed. Any site owner/operator subject to these requirements for stormwater discharges and who disturbs land prior to permit issuance from the Missouri Department of Natural Resources (Department) is in violation of both State regulations per 10 CSR 20-6.200(1)(A) and Federal regulations per 40 CFR 122.26. The owner/operator of this permit is responsible for compliance with this permit [10 CSR 20-6.200 (3)(B)].

2. This general permit is issued to a city, county, state or federal agency, other governmental jurisdiction, or other private area-wide projects as determined by the Department on a case-by-case basis, for land disturbance projects performed by or under contract to the permittee.
3. This permit authorizes stormwater discharges from land disturbance support activities (e.g., equipment staging yards, material storage areas, excavated material disposal areas, borrow areas, concrete, or asphalt batch plants) provided appropriate stormwater controls are designed, installed, and maintained and the following conditions are met and addressed in the Stormwater Pollution Prevention Plan (SWPPP). The permittee is responsible for compliance with this permit for any stormwater discharges from construction support activity.
  - (a) The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
  - (b) The support activity is not a commercial operation or serve multiple unrelated construction sites;
  - (c) The support activity does not continue to operate beyond the completion of the construction activity at the project it supports;
  - (d) Sediment and erosion controls are implemented in accordance with the conditions of this permit; and
  - (e) The support activity is strictly stormwater discharges or non-stormwater discharges listed in PART I, APPLICABILITY, Condition A.4. Support activities which discharge process water shall apply for separate coverage (e.g., a concrete batch plant discharging process water shall be covered under a MOG49).
4. This permit authorizes non-stormwater discharges associated with your construction activity from the following activities provided that these discharges are treated by appropriate Best Management Practices (BMPs) where applicable and addressed in the permittee's site specific SWPPP required by this general permit:
  - (a) Discharges from emergency fire-fighting activities;
  - (b) Hydrant flushing and water line flushing, provided the discharged water is managed to avoid instream water quality impacts;
  - (c) Landscape watering, including to establish vegetation;
  - (d) Water used to control dust;
  - (e) Waters used to rinse vehicles and equipment, provided there is no discharge of soaps, solvents, or detergents used for such purposes;
  - (f) External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (e.g., paint or caulk containing polychlorinated biphenyls (PCBs))
  - (g) Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. Directing pavement wash waters directly into any water of the state, storm drain inlet, or stormwater conveyance (constructed or natural site drainage features), unless the conveyance is connected to an effective control, is prohibited;
  - (h) Uncontaminated air conditioning or compressor condensate;
  - (i) Uncontaminated, non-turbid discharges of ground water or spring water;
  - (j) Foundation or footing drains where flows are not contaminated with process materials; and
  - (k) Uncontaminated construction dewatering water discharged in accordance with requirements found in this permit for specific dewatering activities.

## **B. Permit Restrictions and Limitations**

1. This permit does not authorize the discharge of process wastewaters, treated or otherwise.
2. For sites operating within the watershed of any Outstanding National Resource Water (which includes the Ozark National Riverways and the National Wild and Scenic Rivers System), sites that discharge to an Outstanding State Resource Water, or facilities located within the watershed of an impaired water as designated in the Clean Water Act (CWA) Section 303(d) list with an impairment for sedimentation/siltation:
  - (a) This permit authorizes stormwater discharge provided no degradation of water quality occurs due to discharges from the permitted facility per 10 CSR 20-7.031(3)(C).
  - (b) A site with a discharge found to be causing degradation or contributing to an impairment by discharging a pollutant of concern, during an inspection or through complaint investigations, may be required to become a no discharge facility or obtain a site-specific permit with more stringent monitoring and SWPPP requirements.
3. This permit does not allow placement of fill material into any stream or wetland, alteration of a stream channel, or obstruction of stream flow unless the appropriate CWA Section 404 permitting authority provides approval for such actions or determines such actions are exempt from Section 404 jurisdiction. Additionally, this permit does not authorize placement of fill in floodplains unless approved or determined exempt by appropriate federal and/or state floodplain development authorities.
4. This operating permit does not affect, remove, or replace any requirement of the National Environmental Policy Act; the Endangered Species Act; the National Historic Preservation Act; the Comprehensive Environmental Response, Compensation and Liability Act; the Resource Conservation and Recovery Act; or any other relevant acts. Determination of applicability to the above mentioned acts is the responsibility of the permittee. Additionally, this permit does not establish terms and conditions for runoff resulting from silvicultural activities listed in Section 402(1)(3)(a) of the Clean Water Act.
5. Compliance with all requirements in this permit does not supersede any requirement for obtaining project approval from an established local authority nor remove liability for compliance with county and other local ordinances.
6. The Department may require any facility or site authorized by a general permit to apply for a site-specific permit [10 CSR 20-6.010(13)(C)].
7. If a facility or site covered under a current general permit desires to apply for a site-specific permit, the facility or site may do so by contacting the Department for application requirements and procedures.
8. Any discharges not expressly authorized in this permit and not clearly disclosed in the permit application cannot become authorized or shielded from liability under CWA section 402(k) or Section 644.051.16, RSMo, by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including any other permit applications, funding applications, the SWPPP, discharge monitoring reporting, or during an inspection. Discharges at the facility not expressly authorized by this permit must be covered by another permit, be exempt from permitting, or be authorized through some other method.

## **II. EXEMPTIONS FROM PERMIT REQUIREMENTS**

1. Sites that discharge all stormwater runoff directly to a combined sewer system (as defined in 40 CFR 122.26 and 40 CFR 35.2005) connecting to a publicly owned treatment works which has consented to receive such a discharge are exempt from Department stormwater permit requirements.
2. Land disturbance activities that disturb less than one (1) acre of total land area which are not part of a common plan or sale where water quality standards are not exceeded are exempt from Department stormwater permit requirements.

3. Oil and gas related activities as listed in 40 CFR 122.26(a)(2)(ii) where water quality standards are not exceeded are exempt from Department stormwater permit requirements.
4. Linear, strip, or ribbon construction or maintenance operations meeting one (1) of the following criteria are exempt from Department stormwater permit requirements:
  - (a) Grading of existing dirt or gravel roads which does not increase the runoff coefficient and the addition of an impermeable surface over an existing dirt or gravel road;
  - (b) Cleaning or routine maintenance of roadside ditches, sewers, waterlines, pipelines, utility lines, or similar facilities;
  - (c) Trenches two (2) feet in width or less; or
  - (d) Emergency repair or replacement of existing facilities as long as BMPs are employed during the emergency repair.

### **III. REQUIREMENTS**

1. The permittee shall post a public notification sign at the main entrance to the site, or a publically visible location, with the specific MOR100 permit number. The public notification sign must be visible from the public road that provides access to the site's main entrance. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the site is finalized.
2. The permittee shall be responsible for notifying the land owner and each contractor or entity (including utility crews and city employees or their agents) who will perform work at the site of the existence of the SWPPP and what actions or precautions shall be taken while on site to minimize the potential for erosion and the potential for damaging any BMP. The permittee is responsible for any damage a subcontractor may do to established BMPs and any subsequent water quality violation resulting from the damage.
3. Ensure the design, installation, and maintenance of effective erosion and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed, and maintained to:
  - (a) Control stormwater volume, velocity, and peak flow rates to minimize soil erosion;
  - (b) Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion and scour;
  - (c) Minimize the amount of exposed soil during construction activity;
  - (d) Minimize the disturbance of steep slopes;
  - (e) Minimize sediment discharges from the site. Address factors such as:
    - 1) The amount, frequency, intensity, and duration of precipitation;
    - 2) The nature of resulting stormwater runoff;
    - 3) Expected flow from impervious surfaces, slopes, and drainage features; and
    - 4) Soil characteristics, including the range of soil particle size expected to be present on the site.
  - (f) Provide and maintain natural buffers around surface waters as detailed in Part V. BMP REQUIREMENTS Condition 7, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration and filtering, unless infeasible; and
  - (g) Minimize soil compaction and preserve topsoil where practicable.

A 2-year, 24-hour storm event can be determined for the project location using the National Oceanic and Atmospheric Administration's National Weather Service Atlas 14 which can be located at [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html](https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html), or the permittee can determine local rainfall distribution for a 2-year, 24 hours storm event using multi-decade local high density rain gauge data, as approved by the Department.

4. BMPs for land disturbance [10 CSR 20-6.200(1)(D)2] are a schedule of activities, practices, or procedures that reduces the amount of soil available for transport or a device that reduces the amount of suspended solids in runoff before discharge to waters of the state. The term BMPs are also used to describe the sediment and erosion controls and other activities used to prevent stormwater pollution. BMPs are divided into two main categories: structural or non-structural; and they are also classified as temporary or permanent. Temporary BMPs may be added and removed as necessary with updates to the SWPPP as specified in the requirements below.

5. Installation of BMPs necessary to prevent soil erosion and sedimentation at the downgradient project boundary (e.g. buffers, perimeter controls, exit point controls, storm drain inlet protection) must be complete prior to the start of all phases of construction. By the time construction activity in any given portion of the site begins, downgradient BMPs must be installed and operational to control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities. Additional BMPs shall be installed as necessary throughout the life of the project.
6. All BMPs shall be maintained and remain in effective operating condition during the entire duration of the project, with repairs made within the timeframes specified elsewhere in this permit, until final stabilization has been achieved.
  - (a) Ensure BMPs are protected from activities that would reduce their effectiveness.
  - (b) Remove any sediment per the BMP manufacturer's instructions or before it has accumulated to one-half of the above-ground height of any BMP that collects sediment (i.e., silt fences, sediment traps, etc.)
  - (c) The project is considered to achieve final stabilization when Part V. BMP REQUIREMENTS, Condition 13 is met.
7. Minimize sediment trackout from the site and sediment transport onto roadways.
  - (a) Restrict vehicle traffic to designated exit points.
  - (b) Use appropriate stabilization techniques or BMPs at all points that exit onto paved roads or areas outside of the site.
  - (c) Use additional controls or BMPs to remove sediment from vehicle and equipment tires prior to exit from facility where necessary.
  - (d) Any sediment or debris that is tracked out past the exit pad or is deposited on a roadway after a precipitation event shall be removed by the shorter of either the same business day (for business days only), or by the end of the next business day if track-out occurs on a non-business day, and before predicted rain events. Remove the track-out sediment by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. Sediment or debris tracked out on pavement or other impervious surfaces shall not be disposed of into any stormwater conveyance, storm drain inlet, or water of the state.
  - (e) Stormwater inlets susceptible to receiving sediment or other pollutants from the permitted land disturbance site shall have curb inlet protection. This may include inlets off the active area where track out from vehicles and equipment could impact the stormwater runoff to those inlets.
8. Concrete washout facilities shall be used to contain concrete waste from the activities onsite, unless the washout of trucks and equipment is managed properly at an off-site location. The washout facility shall be managed to prevent solid and/or liquid waste from entering waters of the state by the following:
  - (a) Direct the wash water into leak-proof containers or pits designed so that no overflows can occur due to inadequate sizing or precipitation;
  - (b) Locate washout activities away from waters of the state, stormwater inlets, and/or stormwater conveyances where practicable. If not practicable, use BMPs to reduce risk of waste leaving the washout facility;
  - (c) Washout facilities shall be cleaned, or new facilities must be constructed and ready for use, once the washout is 75% full;
  - (d) Designate the washout area(s) and conduct such activities only in these areas.
  - (e) Ensure contractors are aware of the location, such as by marking the area(s) on the map or signage visible to the truck and/or equipment operators.
9. Good housekeeping practices shall be maintained at all times to keep waste from entering waters of the state.
  - (a) Provide solid and hazardous waste management practices, including providing trash containers, regular site cleanup for proper disposal of solid waste such as scrap building material, product/material shipping waste, food/beverage containers, spent structural BMPs;
  - (b) Provide containers and methods for proper disposal of waste paints, solvents, and cleaning compounds.
  - (c) Manage sanitary waste. Portable toilets shall be positioned so that they are secure and will not be tipped or knocked over and so that they are located away from waters of the state and stormwater inlets and stormwater conveyances.
  - (d) Ensure the storage of construction materials be kept away from drainage courses, stormwater conveyances, storm drain inlets, and low areas.

10. All fueling facilities present shall at all times adhere to applicable federal and state regulations concerning underground storage, above ground storage, and dispensers.
11. Any hazardous wastes that are generated onsite shall be managed, stored, and transported according to the provisions of the Missouri Hazardous Waste Laws and Regulations.
12. Store all paints, solvents, petroleum products, petroleum waste products, and storage containers (such as drums, cans, or cartons) so they are not exposed to stormwater or provide other prescribed BMPs (such as plastic lids and/or portable spill pans) to prevent the commingling of stormwater with container contents. Commingled water may not be discharged under this permit. Provide spill prevention, control, and countermeasures to contain the spill. Any containment system used to implement this requirement shall be constructed of materials compatible with the substances contained and shall prevent the contamination of groundwater.
13. Implement measures intended to prevent the spillage or loss of fluids, oil, grease, fuel, etc. from vehicles and equipment to thereby prevent the contamination of stormwater from these substances. This may include prevention measures such as, but not limited to, utilizing drip pans under vehicles and equipment stored outdoors, covering fueling areas, using dry clean-up methods, use of absorbents, and cleaning pavement surfaces to remove oil and grease.
14. Spills, Overflows, and Other Unauthorized Discharges.
  - (a) Any spill, overflow, or other discharge not specifically authorized in the permit above are unauthorized.
  - (b) Should an unauthorized discharge cause or permit any contaminants, other than sediment, or hazardous substance to discharge or enter waters of the state, the unauthorized discharge must be reported to the regional office as soon as practicable but no more than 24 hours after the discovery of the discharge. If the spill or overflow needs to be reported after normal business hours or on the weekend, the facility must call the Department's Environmental Emergency Response hotline at (573) 634-2436. Leaving a message on a Department staff member voice-mail does not satisfy this reporting requirement.
  - (c) A record of all spills shall be retained with the SWPPP and made available to the Department upon request.
  - (d) Other spills not reaching waters of the state must be cleaned up as soon as possible to prevent entrainment in stormwater but are not required to be reported to the Department.
15. The full implementation of this operating permit shall constitute compliance with all applicable federal and state statutes and regulations in accordance with RSMo 644.051.16 and the CWA §402(k); however, this permit may be reopened and modified or alternatively revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under Clean Water Act §§ 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) if the effluent standard or limitation so issued or approved contains different conditions or is otherwise more stringent than any effluent limitation in the permit or controls any pollutant not limited in the permit. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, termination, notice of planned changes, or anticipated non-compliance does not stay any permit condition.

#### **IV. STORMWATER POLLUTION PREVENTION PLAN (SWPPP) MANAGEMENT REQUIREMENTS**

1. The primary requirement of this permit is the development and implementation of a SWPPP which incorporates site specific practices to best minimize the soil exposure, soil erosion, and the discharge of pollutants, including solids for each site covered under this permit.

The purpose of the SWPPP is to ensure the design, implementation, management, and maintenance of BMPs in order to prevent sediment and other pollutants in stormwater discharges associated with the land disturbance activities [40 CFR 122.44 (k)(4)] from entering waters of the state above established general and narrative criteria; compliance with Missouri Water Quality Standards; and compliance with the terms and conditions of this general permit.

- (a) **The SWPPP must be developed and implemented prior to conducting any land disturbance activities and must be specific to the land disturbance activities at the site.**
- (b) The permittee shall fully implement the provisions of the SWPPP required under this permit as a condition of this general permit throughout the term of the land disturbance project. Failure to develop, implement, and maintain a SWPPP may lead to immediate enforcement action.

- (c) The SWPPP shall be updated any time site conditions warrant adjustments to the project or BMPs.
  - (d) Either an electronic copy or a paper copy of the SWPPP, and any required reports, must be accessible to anyone on site at all times when land disturbance operations are in process or other operational activities that may affect the maintenance or integrity of the BMP structures and made available as specified under Part VIII. STANDARD PERMIT CONDITIONS, Condition 1 of this permit. The SWPPP shall be readily available upon request and should not be sent to the Department unless specifically requested
2. Failure to implement and maintain the BMPs chosen, which can be revised and updated, is a permit violation. The chosen BMPs will be the most reasonable and cost effective while also ensuring the highest quality water discharged attainable for the facility. Facilities with established SWPPPs and BMPs shall evaluate BMPs on a regular basis and change the BMPs as needed if there are BMP deficiencies.
  3. The SWPPP must:
    - (a) List and describe the location of all outfalls;
    - (b) List any allowable non-stormwater discharges occurring on site and where these discharges occur;
    - (c) Incorporate required practices identified below;
    - (d) Incorporate sediment and erosion control practices specific to site conditions;
    - (e) Discuss whether or not a 404 Permit is required for the project; and
    - (f) Name the person(s) responsible for inspection, operation, and maintenance of BMPs. The SWPPP shall list the names and describe the role of all owners/primary operators (such as general contractor, project manager) responsible for environmental or sediment and erosion control at the land disturbance site.
  4. The SWPPP briefly must describe the nature of the land disturbance activity, including:
    - (a) The function of the project (e.g., low density residential, shopping mall, highway, etc.);
    - (b) The intended sequence and timing of activities that disturb the soils at the site; and
    - (c) Estimates of the total area expected to be disturbed by excavation, grading, or other land disturbance support activities including off-site borrow and fill areas;
  5. In order to identify the site, the SWPPP shall include site information including size in acres. The SWPPP shall have sufficient information to be of practical use to contractors and site construction workers to guide the installation and maintenance of BMPs.
  6. The function of the SWPPP and the BMPs listed therein is to prevent or minimize pollution to waters of the state. A deficiency of a BMP means it was not effective in preventing or minimizing pollution of waters of the state.

The permittee shall select, install, use, operate and maintain appropriate BMPs for the permitted site. The following manuals are acceptable resources for the selection of appropriate BMPs.

*Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*, (Document number EPA 833-R-06-004) published by the United States Environmental Protection Agency (USEPA) in May 2007. This manual as well as other information, including examples of construction SWPPPs, is available at the USEPA internet site at [https://www.epa.gov/sites/production/files/2015-10/documents/sw\\_swppp\\_guide.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/sw_swppp_guide.pdf); and <https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp>.

The latest version of *Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri*, published by the Department. This manual is available at: <https://dnr.mo.gov/document-search/protecting-water-quality-field-guide>.

The permittee is not limited to the use of these guidance manuals. Other guidance publications may be used to select appropriate BMPs. However, all BMPs must be described and justified in the SWPPP. Although the use of these manuals or other resources is recommended and may be used for BMP selection, they do not supersede the conditions of this permit. They may be used to inform in the decision making process for BMP selection but they are not themselves part of the permit conditions.



The permittee may retain the SWPPP, inspection reports, and all other associated documents (including a copy of this permit) electronically pursuant to RSMo 432.255. The documents must be made available to all interested persons in either paper or electronic format as required by this permit and the permittee must remit a copy (electronic or otherwise) of the SWPPP and inspection reports to the Department upon request.

7. The SWPPP must contain a legible site map, multiple maps if necessary, identifying:
  - (a) Site boundaries of the property;
  - (b) Locations of all waters of the state (including wetlands) within the site and half a mile downstream of the site's outfalls;
  - (c) Location of all outfalls;
  - (d) Direction(s) of stormwater flow (use arrows) and approximate slopes before and after grading activities;
  - (e) Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);
  - (f) Location of structural and non-structural BMPs, including natural buffer areas, identified in the SWPPP;
  - (g) Locations where stabilization practices are expected to occur;
  - (h) Locations of on-site and off-site material, waste, borrow, or equipment storage areas and stockpiles;
  - (i) Designated points where vehicles will exit the site;
  - (j) Location of stormwater inlets and conveyances including ditches, pipes, man-made conduits, and swales; and
  - (k) Areas where final stabilization has been achieved.
8. An individual shall be designated by the permittee as the environmental lead. This environmental lead shall have knowledge in erosion, sediment, and stormwater control principles, knowledge of the permit, and the site's SWPPP. The environmental lead shall ensure all personnel and contractors understand any requirements of this permit may be affected by the work they are doing. The environmental lead or designated inspector(s) knowledgeable in erosion, sediment, and stormwater control principles shall inspect all structures that function to prevent or minimize pollution of waters of the state.
9. Throughout coverage under this permit, the permittee shall amend and update the SWPPP as appropriate during the term of the land disturbance activity. All SWPPP modifications shall be signed and dated. The permittee shall amend the SWPPP to incorporate any significant site condition changes which impact the nature and condition of stormwater discharges. At a minimum, these changes include whenever the:
  - (a) Location, design, operation, or maintenance of BMPs is changed;
  - (b) Design of the construction project is changed that could significantly affect the quality of the stormwater discharges;
  - (c) The permittee's inspections indicate deficiencies in the SWPPP or any BMP;
  - (d) Department notifies the permittee in writing of deficiencies in the SWPPP;
  - (e) SWPPP is determined to be ineffective in minimizing or controlling erosion and sedimentation (e.g., there is visual evidence of excessive site erosion or sediment deposits in streams, lakes, or downstream waterways, sediment or other wastes off site); and/or
  - (f) Department determines violations of water quality standards may occur or have occurred.
10. Site Inspections: The environmental lead, or a designated inspector, shall conduct regularly scheduled inspections. These inspections shall be conducted by a qualified person, one who is responsible for environmental matters at the site, or a person trained by and directly supervised by the person responsible for environmental matters at the site. Site inspections shall include, at a minimum, the following:
  - (a) For disturbed areas that have not achieved final stabilization, all installed BMPs and other pollution control measures shall be inspected to ensure they are properly installed, appear to be operational, and are working as intended to minimize the discharge of pollutants.
  - (b) For areas on site that have achieved either temporary or final stabilization, while at the same time active construction continues on other areas, ensure that all stabilization measures are properly installed, appear to be operational, and are working as intended to minimize the discharge of pollutants.
  - (c) Inspect all material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit. Inspect for conditions that could lead to spills, leaks, or other accumulations of pollutants on the site.
  - (d) Inspect all areas where stormwater typically flows within the site, including drainage ways designed to divert, convey, and/or treat stormwater.

- (e) All stormwater outfalls shall be inspected for evidence of erosion, sediment deposition, or impacts to the receiving stream. If a discharge is occurring during an inspection, the inspector must observe and document the visual quality of the discharge and take note of the characteristics of the stormwater discharge, including turbidity, color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.
  - (f) When practicable the receiving stream shall also be inspected for a minimum of 50 feet downstream of the outfall.
  - (g) The perimeter of the site shall be inspected for evidence of BMP failure to ensure concentrated flow does not develop a new outfall.
  - (h) The SWPPP must explain how the environmental lead will be notified when stormwater runoff occurs.
11. Inspection Frequency: All BMPs must be inspected in accordance to one of the schedules listed below. The inspection frequency shall be documented in the SWPPP, and any changes to the frequency of inspections, including switching between the options listed below, must be documented on the inspection form:
- (a) At least once every seven (7) calendar days and within 48 hours after any storm event equal to or greater than a 2-year, 24-hour storm has ceased during a normal work day or within 72 hours if the rain event ceases during a non-work day such as a weekend or holiday; or
  - (b) Once every 14 calendar days and within 24 hours of the occurrence of a storm event of 0.25 inches of precipitation or greater, or the occurrence of runoff from snowmelt. To determine if a storm event of 0.25 inches or greater has occurred on the site, the permittee shall either keep a properly maintained rain gauge on site, or obtain the storm event information from a weather station near the site location.
    - 1) Inspections are only required during the project's normal working hours.
    - 2) An inspection must be conducted within 24 hours of a storm event which has produced 0.25 inches. The inspection shall be conducted within 24 hours of the event end, or within 72 hours if the rain event ceases during a non-work day such as a weekend or holiday.
    - 3) If it is elected to inspect every 14 calendar days and there is a storm event at the site that continues for multiple days, and each day of the storm produces 0.25 inches or more of rain, the permittee shall conduct an inspection within 24 hours of the end of the storm or within 72 hours if the rain event ceases during a non-work day such as a weekend or holiday.
  - (c) Areas on site that have achieved stabilization, while at the same time active construction continues on other areas, may reduce inspection frequency to monthly, for those stabilized areas, if the following conditions exist:
    - 1) For areas where disturbed portions have undergone temporary stabilization, inspections shall occur at least once a month while stabilized and when re-disturbed shall follow either frequency outlined in (a),(b), or (c) above.
    - 2) Areas on site that have achieved final stabilization must be inspected at least once per month until the permit is terminated.
  - (d) If construction activities are suspended due to frozen conditions, the permittee may temporarily reduce site inspections to monthly until thawing conditions begin to occur if all of the following are met:
    - 1) Land disturbances have been suspended; and
    - 2) All disturbed areas of the site have been stabilized in accordance with Part V. BMP REQUIREMENTS, Condition 13.
    - 3) The change shall be noted in the SWPPP.
  - (e) Any basin dewatering shall be inspected daily when discharge is occurring. The discharge shall be observed and dewatering activities shall be ceased immediately if the receiving stream is being impacted. These inspections shall be noted on a log or on the inspection report.

If weather conditions or other issues prevent correction of BMPs within seven calendar days, the reasons for the delay must be documented (including pictures), and there must be a narrative explaining why the work cannot be accomplished within the seven day time period. The documentation must be filed with the regular inspection reports. The corrections shall be made as soon as weather conditions or other issues allow.

12. Site Inspection Reports: A log of each inspection and/or copy of the inspection report shall be kept readily accessible and must be made available upon request by the Department. Electronic logs are acceptable as long as reports can be provided within 24 hours. If inspection reports are kept off site, the SWPPP must indicate where they are stored. The inspection report shall be signed by the environmental lead or designated inspector (electronically or otherwise).
- (a) The inspection report is to include the following minimum information:
    - 1) Inspector's name and title.
    - 2) Date and time of inspection.
    - 3) Observations relative to the effectiveness of the BMPs and stabilization measures. The following must be

documented:

- a. Whether BMPs are installed, operational, and working as intended;
  - b. Whether any new or modified stormwater controls are needed;
  - c. Facilities examined for conditions that could lead to spill or leak;
  - d. Outfalls examined for visual signs of erosion or sedimentation at outfalls. Excessive erosion or sedimentation may be due to BMP failure or insufficiency. Response to observations should be addressed in the inspection report.
- 4) Corrective actions taken or necessary to correct the observed problem.
  - 5) Listing of areas where land disturbance operations have permanently or temporarily stopped.
13. Any structural or maintenance deficiencies for BMPs or stabilization measures shall be documented and corrected as soon as possible but no more than seven (7) calendar days after the inspection.
- (a) Corrective action documentation shall be stored with the associated site inspection report.
  - (b) Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events.
  - (c) If weather conditions or other issues prevent correction of BMPs within seven calendar days, the reasons for the delay must be documented (this may include pictures) and there must be a narrative explaining why the work cannot be accomplished within the seven day time period. The permittee shall correct the problem as soon as weather conditions or issues allow.
  - (d) Corrective actions may be required by the Department. The permittee must comply with any corrective actions required by the Department as a result of permit violations found during an inspection.

## **V. BMP REQUIREMENTS**

1. The information, practices, and BMP requirements in this section shall be implemented on site and, where noted, provided for in the SWPPP.
2. Existing vegetation and trees shall be preserved where practicable. The permittee is encouraged to preserve topsoil where practicable.
3. The permittee shall select appropriate BMPs for use at the site and list them in the SWPPP. When selecting effective BMPs, the permittee shall consider stormwater volume and velocity. A BMP that has demonstrated ineffectiveness in preventing or minimizing sediment or other pollutants from leaving a given site shall be replaced with a more effective BMP, or additional and sequential BMPs and treatment devices may be incorporated as site conditions allow. The permittee should consider a schedule for performing erosion control measures when selecting BMPs.
4. The SWPPP shall include a description of both structural and non-structural BMPs that will be used at the site.
  - (a) The SWPPP shall provide the following general information for each BMP which will be used one or more times at the site:
    - 1) Physical description of the BMP;
    - 2) Site conditions that must be met for effective use of the BMP;
    - 3) BMP installation/construction procedures, including typical drawings; and
    - 4) Operation and maintenance procedures and schedules for the BMP.
  - (b) The SWPPP shall provide the following information for each specific instance where a BMP is to be installed:
    - 1) Whether the BMP is temporary or permanent;
    - 2) When the BMP will be installed in relation to each phase of the land disturbance procedures to complete the project; and
    - 3) Site conditions that must be met before removal of the BMP if the BMP is not a permanent BMP.
5. Structural BMP Installation: The permittee shall ensure all BMPs are properly installed and operational at the locations and relative times specified in the SWPPP.
  - (a) Perimeter control BMPs for runoff from disturbed areas shall be installed before general site clearing is started. Note this requirement does not apply to earth disturbances related to initial site clearing and establishing entry, exit, or access of the site, which may require that stormwater controls be installed immediately after the earth

disturbance.

- (b) For phased projects, BMPs shall be properly installed as necessary prior to construction activities.
  - (c) Stormwater discharges which leave the site from disturbed areas shall pass through an appropriate impediment to sediment movement such as a sedimentation basin, sediment traps (including vegetative buffers), or silt fences prior to leaving the land disturbance site.
  - (d) A drainage course change shall be clearly marked on a site map and described in the SWPPP.
  - (e) If vegetative stabilization measures are being implemented, stabilization efforts are considered “installed” when all activities necessary to seed or plant the area are completed. Vegetative stabilization is not considered “operational” until the vegetation is established.
6. Install sediment controls along any perimeter areas of the site that are downgradient from any exposed soil or other disturbed areas. Prevent stormwater from circumventing the edge of the perimeter control. For sites where perimeter controls are infeasible, other practices shall be implemented to minimize discharges to perimeter areas of the site.
7. For surface waters of the state, defined in Section 644.016.1(27) RSMo, located on or adjacent to the site, the permittee must maintain a riparian buffer or structural equivalent in accordance with at least one of the following options. The selection and location must be described in the SWPPP.
- (a) Provide and maintain a 50-foot undisturbed natural buffer; or
  - (b) Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or
  - (c) If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.
  - (d) The permittee is not required to comply with (a), (b), or (c) above if one or more of the following exceptions apply and documentation is provided in the SWPPP:
    - 1) As authorized per CWA Section 404 Department of the Army permit and its associated Section 401 Water Quality Certification from the Department.
    - 2) If there is no discharge of stormwater to waters of the state through the area between the disturbed portions of the site and waters of the state located within 50 feet of the site. This includes situations where the permittee has implemented permanent control measures that will prevent such discharges, such as a berm or other barrier.
    - 3) Where no natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for the current development of the site.
      - a. Where some natural buffer exists but portions of the area within 50 feet of the waters of the state are occupied by preexisting development disturbances the permittee is required to comply with (a), (b), or (c) above.
    - 4) For linear projects where site constraints make it infeasible to implement a buffer or equivalent provided the permittee limit disturbances within 50 feet of any waters of the state and/or the permittee provides supplemental erosion and sediment controls to treat stormwater discharges from earth disturbances within 50 feet of the water of the state. The permittee must also document in the SWPPP the rationale for why it is infeasible for the permittee to implement (a), (b), or (c) and describe any buffer width retained and supplemental BMPs installed.
  - (e) Where the permittee is retaining a buffer of any size, the buffer should be measured perpendicularly from any of the following points, whichever is further landward from the water:
    - 1) The ordinary high water mark of the water body, defined as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris; or
    - 2) The edge of the stream or river bank, bluff, or cliff, whichever is applicable.
8. Slopes for disturbed areas must be identified in the SWPPP. A site map or maps defining the sloped areas for all phases of the project must be included in the SWPPP. The disturbance of steep slopes shall be minimized.
9. Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil.
- (a) Locate the piles outside of any natural buffers zones, established under the condition above, and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated;
  - (b) Install a sediment barrier along all downgradient perimeter areas;
  - (c) Divert surface flows around stockpiles to reduce and minimize erosion of the stockpile.

- (d) For piles that will be unused for 14 or more days, provide cover with appropriate temporary stabilization in accordance with Part V. BMP REQUIREMENTS, Condition 13.
  - (e) Rinsing, sweeping, or otherwise placing any soil, sediment, debris, or stockpiled product which has accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the state is prohibited.
10. The site shall include BMPs for pollution prevention measures and shall be noted in the SWPPP. At minimum such measures must be designed, installed, implemented, and maintained to:
- (a) Minimize the discharge of pollutants from equipment and vehicle rinsing; no detergents, additives, or soaps of any kind shall be discharged. Rinse waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
  - (b) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater;
  - (c) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures, including, but not limited to, the installation of containment berms and use of drip pans at petroleum product and liquid storage tanks and containers; and
  - (d) Prevent discharges from causing or contributing to an exceedance of water quality standards including general criteria.
11. Sedimentation Basins: The SWPPP shall include a sedimentation basin for each drainage area with ten or more acres disturbed at one time.
- (a) The sedimentation basin shall be sized, at a minimum, to treat a local 2-year, 24-hour storm.
  - (b) Sediment basins shall not be constructed in any waters of the state or natural buffer zones.
  - (c) Discharges from dewatering activities shall be managed by appropriate controls. The SWPPP shall include a description of any anticipated dewatering methods and specific BMPs designed to treat dewatering water.
    - 1) Appropriate controls include, but are not limited to, sediment socks, dewatering tanks, tube settlers, weir tanks, filtration systems (e.g. bag or sand filters), and passive treatment systems that are designed to remove or retain sediment.
    - 2) Erosion controls and velocity dissipation devices (e.g., check dams, riprap, and vegetated buffers) to minimize erosion at inlets, outlets, and discharge points from shall be utilized.
    - 3) Water with an oil sheen shall not be discharged and shall be marked in SWPPP.
    - 4) Visible floating solids and foam shall not be discharged.
  - (d) Until final stabilization has been achieved, sediment basins and impoundments shall utilize outlet structures or floating skimmers that withdraw water from the surface when discharging.
    - 1) Under frozen conditions, it may be considered infeasible to withdraw water from the surface and an exception can be made for that specific period as long as discharges that may contain sediment and other pollutants are managed by appropriate controls. If determined infeasible due to frozen conditions, documentation must be provided in the SWPPP to support the determination, including the specific conditions or time period when this exception applies.
  - (e) Accumulated sediment shall not exceed 50% of total volume or as prescribed in the design, whichever is less. Note in the SWPPP the locations for disposal of the material removed from sediment basins.
  - (f) Prevent discharges to the receiving stream causing excessive visual turbidity. For the purposes of this permit, visual turbidity refers to a sediment plume or other cloudiness in the water caused by sediment that can be identified by an observer.
  - (g) The SWPPP shall require the basin be maintained until final stabilization of the disturbed area served by the basin.

Where use of a sediment basin is infeasible, the SWPPP shall evaluate and specify other similarly effective BMPs to be employed to control erosion and sediment. These similarly effective BMPs shall be selected from appropriate BMP guidance documents authorized by this permit. The BMPs must provide equivalent water quality protection to achieve compliance with this permit. The SWPPP shall require both temporary and permanent sedimentation basins to have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

12. Soil disturbing activities on site that have ceased either temporarily or permanently shall initiate stabilization immediately in accordance with the options below. For soil disturbing activities that have been temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days:
  - (a) The permittee shall construct BMPs to establish interim stabilization; and
  - (b) Stabilization must be initiated immediately and completed within 14 calendar days.
  - (c) For soil disturbing activities that have been permanently ceased on any portion of the site, final stabilization of disturbed areas must be initiated immediately and completed within 14 calendar days.
    - 1) Allowances to the 14-day completion period for temporary and final stabilization may be made due to weather and equipment malfunctions. The use of allowances shall be documented in the SWPPP. Allowances may be determined unnecessary after review by the Department.
  - (d) Until stabilization is complete, interim sediment control shall consist of well-established and maintained BMPs that are reasonably certain to protect waters of the state from sediment pollution over an extended period of time. This may require adding more BMPs to an area than is normally used during daily operations. The types of BMPs used must be suited to the area disturbed, taking into account the number of acres exposed and the steepness of the slopes. If the slope of the area is greater than 3:1 (three feet horizontal to one foot vertical), then the permittee shall establish interim stabilization within seven days of ceasing operations on that part of the site. The following activities would constitute the immediate initiation of stabilization:
    - 1) Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable;
    - 2) Applying mulch or other non-vegetative product to the exposed areas;
    - 3) Seeding or planting the exposed areas;
    - 4) Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.
  - (e) If vegetative stabilization measures are being implemented, stabilization is considered “installed” when all activities necessary to seed or plant the area are completed. Installed does not mean established.
  - (f) If non-vegetative stabilization measures are being implemented, stabilization is considered “installed” when all such measures are implemented or applied.
    - 1) Non-vegetative stabilization shall prevent erosion and shall be chosen for site conditions, such as slope and flow of stormwater.
  - (g) Final stabilization is not considered achieved until vegetation has grown and established to meet the requirements below.
13. Prior to removal of BMPs, ceasing site inspections, and removing from the quarterly report, final stabilization must be achieved. Final stabilization shall be achieved as soon as possible once land disturbance activities have ceased. Document in the SWPPP the type of stabilization and the date final stabilization is achieved.
  - (a) The project is considered to have achieved final stabilization when perennial vegetation (excluding volunteer vegetation), pavement, buildings, or structures using permanent materials (e.g., riprap, gravel, etc.) cover all areas that have been disturbed. With respect to areas that have been vegetated, vegetation must be at least 70% coverage of 100% of the vegetated areas on site. Vegetation must be evenly distributed.
  - (b) Disturbed areas on agricultural land are considered to have achieved final stabilization when they are restored to their preconstruction agricultural use. If former agricultural land is changing to non-agricultural use, this is no longer considered agricultural land and shall follow condition (a).
  - (c) If the intended function of a specific area of the site necessitates that it remain disturbed, final stabilization is considered achieved if all of the following are met:
    - 1) Only the minimum area needed remains disturbed (i.e., dirt access roads, motocross tracks, utility pole pads, areas being used for storage of vehicles, equipment, materials). Other areas must meet the criteria above.

- 2) Permanent structural BMPs (e.g., rock checks, berms, grading, etc.) or non-vegetative stabilization measures are implemented and designed to prevent sediment and other pollutants from entering waters of the state.
- 3) Inspection requirements in Part IV. SWPPP MANAGEMENT REQUIREMENT, Condition 11 are met and documented in the SWPPP.
- (d) Winter weather and frozen conditions do not excuse any of the above final stabilization requirements. If vegetation is required for stabilization the permittee must maintain BMPs throughout winter weather and frozen conditions until thawing and vegetation meets final stabilization criteria above. Document stabilization attempts during frozen conditions in the SWPPP. Consider future freezing when removing vegetation and plan with temporary stabilization techniques before the ground becomes frozen.

## **VI. SITE FINALIZATION & PERMIT TERMINATION**

1. Until a site is finalized, the permittee must comply with all conditions in the permit, including continuation of site inspections and reporting quarterly to the Department. To finalize the site and remove from this permit coverage, the site shall meet the following requirements:
  - (a) For any areas that (1) were disturbed during construction, (2) are not covered over by permanent structures, and (3) over which the permittee had control during the construction activities, the requirements for final vegetative or non-vegetative stabilization in Part V. BMP REQUIREMENTS, Condition 13;
  - (b) The permittee has removed and properly disposed of all construction materials, waste, and waste handling devices and has removed all equipment and vehicles that were used during construction, unless intended for long-term beyond construction phase;
  - (c) The permittee has removed all temporary BMPs that were installed and maintained during construction, except those that are intended for long-term use or those that are biodegradable; and
  - (d) The permittee has removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following the construction activities.
2. The permit may be terminated if;
  - (a) There has been a transfer of control of all areas of the site for which the current permittee is responsible under this permit to another operator, and that operator has obtained coverage under this permit;
  - (b) Active sites obtain coverage under an individual or alternative general NPDES permit, with land disturbance conditions; or
  - (c) This permit may be terminated when all projects covered under this permit are finalized. In order to terminate the permit, the permittee shall notify the Department by submitting a Request for Termination along with the final quarterly report for the current calendar quarter.

## **VII. REPORTING AND SAMPLING REQUIREMENTS**

1. The permittee is not required to sample stormwater under this permit. The Department may require sampling and reporting as a result of illegal discharges, compliance issues related to water quality concerns, or evidence of off-site impacts from activities at a site. If such an action is needed, the Department will specify in writing the sampling requirements, including such information as location and extent. If the permittee refuses to perform sampling when required, the Department may terminate the general permit and require the facility to obtain a site-specific permit with sampling requirements.
2. Electronic Discharge Monitoring Report (eDMR) Submission System. The NPDES Electronic Reporting Rule, 40 CFR Part 127, reporting of any report required by the permit shall be submitted via an electronic system to ensure timely, complete, accurate, and nationally consistent set of data for the NPDES program. The eDMR system is currently the only Department-approved reporting method for this permit unless specified elsewhere in this permit, or a waiver is granted by the Department. The facility must register in the Department's eDMR system through the Missouri Gateway for Environmental Management (MoGEM) before the first report is due.
3. Permittees shall prepare a quarterly report with a list of active land disturbance sites including any off-site borrow or depositional areas associated with the construction project and submit the following information electronically as an

attachment to the eDMR system until such a time when the current or a new system is available to allow direct input of the data:

- (a) The name of the project;
- (b) The location of the project (including the county);
- (c) The name of the primary receiving water(s) for each project;
- (d) A description of the project;
- (e) The number of acres disturbed;
- (f) The percent of completion of the project; and
- (g) The projected date of completion.

The quarterly report(s) shall be maintained by the permittee and readily available for review by the Department at the address provided on the application as well as submitted quarterly via the Department’s eDMR system. The permittee shall submit quarterly reports according to Table A.

<b>Table A</b>	<b>Schedule for Quarterly Reporting</b>
Activity for the months of:	Report is due:
January, February, March (1st Quarter)	April 28
April, May, June (2nd Quarter)	July 28
July, August, September (3rd Quarter)	October 28
October, November, December (4th Quarter)	January 28

**VIII. STANDARD PERMIT CONDITIONS**

1. Records: The permittee shall retain copies of this general permit, the SWPPP and all amendments for the site named in the State Operating Permit, results of any monitoring and analysis, and all site inspection records required by this general permit.
  - (a) The records shall be accessible during normal business hours and retained for a period of at least three (3) years from the date of termination.
  - (b) The permittee shall provide a copy (electronic or otherwise) of the SWPPP to the Department, USEPA, or any local agency or government representative if they request a copy in the performance of their official duties within 24 hours of the request (or next working day), unless given more time by the representative.
  - (c) The permittee shall provide a copy of the SWPPP to those who are responsible for installation, operation, or maintenance of any BMP. The permittee, their representative, and/or the contractor(s) responsible for installation, operation and maintenance of the BMPs shall have a current copy of the SWPPP with them when on the project site.
  
2. Land Ownership and Change of Ownership: Federal and Missouri stormwater regulations [10 CSR 20-6.200(1) (B)] require a stormwater permit and erosion control measures for all land disturbances of one or more acres. These regulations also require a permit for less than one acre lots if the lot is part of a larger common plan of development or sale where that plan is at least one acre in size.
  - (a) If the permittee sells any portion of a permitted site to a developer for commercial, industrial, or residential use, this land remains a part of the common sale and the new owner must obtain a permit prior to conducting any land disturbance activity. Therefore, the original permittee must amend the SWPPP to show that the property has been sold and, therefore, no longer under the original permit coverage.
  - (b) Property of any size which is part of a larger common plan of development where the property has achieved final stabilization and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity unless the activity is by an individual residential building lot owner on a site less than one acre.
  - (c) If a portion of a larger common plan of development is sold to an individual for the purpose of building his or her own private residence, a permit is required if the portion of land sold is equal to or greater than one acre. No permit is required, however, for less than one acre of land sold.
  
3. Permit Transfer: This permit may not be transferred to a new owner.



4. Termination: This permit may be terminated when the project has achieved final stabilization, defined in Part VI. **SITE FINALIZATION & PERMIT TERMINATION.**
  - (a) In order to terminate the permit, the permittee shall notify the Department by submitting the form Request for Termination of Operating Permit Form MO 780-2814. The form should be submitted to the appropriate regional office or through an approved electronic system if it should become available.
  - (b) The Cover Page (Certificate Page) of the Master General Permit for Land Disturbance specifies the “effective date” and the “expiration date” of the Master General Permit. The “issued date” along with the “expiration date” will appear on the State Operating Permit issued to the applicant. **This permit does not continue administratively beyond the expiration date.**
5. Duty to Reapply: If the project or development completion date will be after the expiration date of this general permit, then the permittee must reapply to the Department for a new permit. This permit may be applied for and issued electronically in accordance with Section 644.051.10, RSMo.
  - (a) Due to the nature of the electronic permitting system, a period of time may be granted at the discretion of the Department in order to apply for a new permit after the new version is effective. Applicants must maintain appropriate best management practices and inspections during the discretionary period.
6. Duty to Comply: The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Missouri Clean Water Law and Federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.
7. Modification, Revocation, and Reopening:
  - (a) If at any time the Department determines that the quality of waters of the state may be better protected by reopening this permit, or revoking this permit and requiring the owner/operator of the permitted site to apply for a site-specific permit, the Department may revoke a general permit and require any person to obtain such an operating permit as authorized by 10 CSR20-6.010(13) and 10 CSR 20-6.200(1)(B).
  - (b) If this permit is reopened, modified, or revoked pursuant to this Section, the permittee retains all rights under Chapter 536 and 644 Revised Statutes of Missouri upon the Department’s reissuance of the permit as well as all other forms of administrative, judicial, and equitable relief available under law.
8. Other Information: Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.
9. Duty to Provide Information: The permittee shall furnish to the Department, within 24 hours unless explicitly granted more time in writing, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.
10. Inspection and Entry: The permittee shall allow the Department, or an authorized representative (including an authorized contractor acting as a representative of the Department), upon presentation of credentials and other documents as may be required by law, to:
  - (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of the permit;
  - (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
  - (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
  - (d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Federal Clean Water Act or Missouri Clean Water Law, any substances or parameters at any location.

11. Signatory Requirement:
  - (a) All permit applications, reports required by the permit, or information requested by the Department shall be signed and certified. (See 40 CFR 122.22 and 10 CSR 20-6.010)
  - (b) The Federal Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit (including monitoring reports or reports of compliance or non-compliance) shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six (6) months per violation, or by both.
  - (c) The Missouri Clean Water Law provides that any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than ten thousand dollars, or by imprisonment for not more than six months, or by both.
12. Property Rights: This permit does not convey any property rights of any sort or any exclusive privilege.
13. Notice of Right to Appeal: If you were adversely affected by this decision, you may be entitled to pursue an appeal before the administrative hearing commission (AHC) pursuant to Sections 621.250 and 644.051.6 RSMo. To appeal, you must file a petition with the AHC within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Any appeal should be directed to:

Administrative Hearing Commission  
U.S. Post Office Building, Third Floor  
131 West High Street, P.O. Box 1557  
Jefferson City, MO 65102-1557  
Phone: 573-751-2422  
Fax: 573-751-5018  
Website: <https://ahc.mo.gov>



**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES

STORMWATER DISCHARGES FROM  
THIS LAND DISTURBANCE SITE ARE  
AUTHORIZED BY THE MISSOURI  
STATE OPERATING PERMIT NUMBER:

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ANYONE WITH QUESTIONS OR  
CONCERNS ABOUT STORMWATER  
DISCHARGES FROM THIS SITE,  
PLEASE CONTACT THE MISSOURI  
DEPARTMENT OF NATURAL  
RESOURCES AT

**1-800-361-4827**

**MISSOURI DEPARTMENT OF NATURAL RESOURCES**  
**FACT SHEET FOR MASTER GENERAL PERMIT**  
**MO-R100xxx**

The Federal Water Pollution Control Act [Clean Water Act (CWA)] Section 402 of Public Law 92-500 (as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the CWA). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Missouri Department of Natural Resources (Department) under an approved program operated in accordance with federal and state laws (Federal CWA and Missouri Clean Water Law Section 644 as amended). Permits are issued for a period of five (5) years unless otherwise specified.

Per 40 CFR 124.56, 40 CFR 124.8, and 10 CSR 20-6.020(1)(A)2, a Fact Sheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the permit. A Fact Sheet is not an enforceable part of an MSOP.

**DEFINITIONS FOR THE PURPOSES OF THIS PERMIT:**

Common Promotional Plan: A plan undertaken by one (1) or more persons to offer lots for sale or lease; where land is offered for sale by a person or group of persons acting in concert, and the land is contiguous or is known, designated, or advertised as a common unit or by a common name or similar names, the land is presumed, without regard to the number of lots covered by each individual offering, as being offered for sale or lease as part of a common promotional plan.

Dewatering: The act of draining rainwater and/or groundwater from basins, building foundations, vaults, and trenches.

Effective Operating Condition: For the purposes of this permit, a stormwater control is kept in effective operating condition if it has been implemented and maintained in such a manner that it is working as designed to minimize pollutant discharges.

Emergency-Related Project: A project initiated in response to a public emergency (e.g. earthquakes, extreme flooding conditions, tornado, disruptions in essential public services, pandemic) for which the related work requires immediate authorization to avoid imminent endangerment to human health/safety or the environment or to reestablish essential public services.

Exposed Soils: For the purposes of this permit, soils that as a result of earth-disturbing activities are left open to the elements.

Immediately: For the purposes of this permit, immediately should be defined as within 24 hours.

Impervious Surface: For the purpose of this permit, any land surface with a low or no capacity for soil infiltration including, but not limited to, pavement, sidewalks, parking areas and driveways, packed gravel or soil, or rooftops.

Infeasible: Infeasible means not technologically possible or not economically practicable and achievable in light of best industry practices.

Install or Installation: When used in connection with stormwater controls, to connect or set in position stormwater controls to make them operational.

Land Disturbance Site or Site: The land or water area where land disturbance activities will occur and where stormwater controls will be installed and maintained. The land disturbance site includes construction support activities, which may be located at a different part of the property from where the primary land disturbance activity will take place or on a different piece of property altogether. Off-site borrow areas directly and exclusively related to the land disturbance activity are part of the site and must be permitted.

Larger Common Plan of Development or Sale: A continuous area where multiple separate and distinct construction activities are occurring under one plan, including any off-site borrow areas that are directly and exclusively related to the land disturbance activity. Off-site borrow areas utilized for multiple different land disturbance projects are considered their own entity and are not part of the larger common plan of development or sale. See definition of Common Promotional Plan to understand what a 'common plan' is.

Minimize: To reduce and/or eliminate to the extent achievable using stormwater controls that are technologically available and economically practicable and achievable in light of best industry practices.

Non-structural Best Management Practices (BMPs): Institutional, educational, or pollution prevention practices designed to limit the amount of stormwater runoff or pollutants that are generated in the landscape. Examples of non-structural BMPs include picking up trash and debris, sweeping up nearby sidewalks and streets, maintaining equipment, and training site staff on stormwater control practices.

Operational: for the purposes of this permit, stormwater controls are made "operational" when they have been installed and implemented, are functioning as designed, and are properly maintained.

Ordinary High Water Mark: The line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris.

Peripheral: For the purposes of this permit, peripheral should be defined as the outermost boundary of the area that will be disturbed.

Permanently: For the purposes of this permit, permanently is defined as any activity that has been ceased without any intentions of future disturbance.

Pollution Prevention Controls (or Measures): Stormwater controls designed to reduce or eliminate the addition of pollutants to construction site discharges through analysis of pollutant sources, implementation of proper handling/disposal practices, employee education, and other actions.

Qualified Person (inspections): A person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

Stormwater Control (also referred to as sediment/erosion controls): refers to any temporary or permanent BMP or other method used to prevent or reduce the discharge of pollutants to waters of the state.

Structural BMP: Physical sediment/erosion controls working individually or as a group (treatment train) appropriate to the source, location, and area climate for the pollutant to be controlled. Examples of structural BMPs include silt fences, sedimentation ponds, erosion control blankets, and seeding.

Temporary Stabilization: A condition where exposed soils or disturbed areas are provided temporary vegetation and/or non-vegetative protective cover to prevent erosion and sediment loss. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either final stabilization can be achieved or until further construction activities take place to re-disturb this area.

Treatment Train: A multi-BMP approach to managing the stormwater volume and velocity and often includes erosion prevention and sediment control practices often applied when the use of a single BMP is inadequate in preventing the erosion and transport of sediment. A good option to utilize as a corrective action.

Volunteer Vegetation: A volunteer plant is a plant that grows on its own, rather than being deliberately planted for stabilization purposes. Volunteers often grow from seeds that float in on the wind, are dropped by birds, or are inadvertently mixed into soils. Commonly, volunteer vegetation is referred to as 'weeds'. This does not meet the requirements for final stabilization.

Waters of the State: Section 644.016.1(27) RSMo. defines waters of the state as, "All waters within the jurisdiction of this state, including all rivers, streams, lakes and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased or otherwise controlled by a single person or by two or more persons jointly or as tenants in common."

## **PART I – BASIC PERMIT INFORMATION**

Facility Type: Industrial Stormwater; Land Disturbance  
Facility SIC Code(s): 1629  
Facility Description: Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading, filling, and other activities that result in the destruction of the root zone and/or land disturbance activity that is reasonably certain to cause pollution to waters of the state).

This permit establishes a Stormwater Pollution Prevention Plan (SWPPP) requirement for pollutants of concern from this type of facility or for all facilities and sites covered under this permit. 10 CSR 20-6.200(7) specifies "general permits shall contain BMP requirements and/or monitoring and reporting requirements to keep the stormwater from becoming contaminated".

Land disturbance activities include clearing, grubbing, excavating, grading, filling and other activities that result in the destruction of the root zone and/or other activities that are reasonably certain to cause pollution to waters of the state. A Missouri State Operating Permit for land disturbance permit is required for construction disturbance activities of one or more acres or for construction activities that disturb less than one acre when they are part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project.

The primary requirement of a land disturbance permit is the development of a SWPPP which incorporates site-specific BMPs to minimize soil exposure, soil erosion, and the discharge of pollutants. The SWPPP ensures the design, implementation, management, and maintenance of BMPs in order to prevent sediment and other pollutants from leaving the site.

When it precipitates, stormwater washes over the loose soil on a construction site and various other materials and products being stored outside. As stormwater flows over the site, it can pick up pollutants like sediment, debris, and chemicals from the loose soil and transport them to nearby storm sewer systems or directly into rivers, lakes, or coastal waters.

The Missouri Department of Natural Resources is responsible for ensuring that construction site operators have the proper stormwater controls in place so that construction can proceed in a way that protects your community's clean water and the surrounding environment. One way the department helps protect water quality is by issuing land disturbance permits.

Local conditions are not considered when developing conditions for a general permit. A facility may apply for a site-specific permit if they desire a review of site-specific conditions.

## **PART II – RECEIVING STREAM INFORMATION**

### **APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:**

Per Missouri Effluent Regulations (10 CSR 20-7.015), the waters of the state are divided into seven (7) categories. This permit applies to facilities discharging to the following water body categories:

- ✓ Missouri or Mississippi River [10 CSR 20-7.015(2)]
- ✓ Lakes or Reservoirs [10 CSR 20-7.015(3)]
- ✓ Losing Streams [10 CSR 20-7.015(4)]
- ✓ Metropolitan No-Discharge Streams [10 CSR 20-7.015(5)]
- ✓ Special Streams [10 CSR 20-7.015(6)]
- ✓ Subsurface Waters [10 CSR 20-7.015(7)]
- ✓ All Other Waters [10 CSR 20-7.015(8)]

Missouri Water Quality Standards (10 CSR 20-7.031) defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1<sup>st</sup> classified receiving stream's designated water uses shall be maintained in accordance with 10 CSR 20-7.031(24). A general permit does not take into consideration site-specific conditions.

### **MIXING CONSIDERATIONS:**

This permit applies to receiving streams of varying low flow conditions. Therefore, the effluent limitations must be based on the smallest low flow streams considered, which includes waters without designated uses. As such, no mixing is allowed [10 CSR 20-7.031(5)(A)4.B.(I)(a)]. No Zone of Initial Dilution is allowed. [10 CSR 20-7.031(5)(A)4.B.(I)(b)].

### **RECEIVING STREAM MONITORING REQUIREMENTS:**

There are no receiving water monitoring requirements recommended at this time.

## **PART III – RATIONALE AND DERIVATION OF EFFLUENT LIMITATIONS & PERMIT CONDITIONS**

### **305(B) REPORT, 303(d) LIST, & TOTAL MAXIMUM DAILY LOAD (TMDL):**

Section 305(b) of the Federal CWA requires each state identify waters not meeting Water Quality Standards and for which adequate water pollution controls have not been required. Water Quality Standards protect such beneficial uses of water as whole body contact, maintaining fish and other aquatic life, and providing drinking water for people, livestock, and wildlife. The 303(d) list helps state and federal agencies keep track of waters which are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed which shall include the TMDL calculation. For facilities with an existing general permit before a TMDL is written on their receiving stream, the Department will evaluate the permit and may require any facility authorized by this general permit to apply for and obtain a site-specific operating permit.

**ANTI-BACKSLIDING:**

A provision in the Federal Regulations [CWA Section 303(d)(4); CWA Section 402(c); 40 CFR Part 122.44(I)] requires a reissued permit to be as stringent as the previous permit with some exceptions.

- ✓ Not Applicable: All effluent limitations in this permit are at least as protective as those previously established.

**ANTIDEGRADATION:**

Antidegradation policies ensure protection of water quality for a particular water body on a pollutant by pollutant basis to ensure Water Quality Standards are maintained to support beneficial uses such as fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as an Outstanding National Resource Water or Outstanding State Resource Water [10 CSR 20-7.031(3)(C)]. Antidegradation policies are adopted to minimize adverse effects on water.

The Department has determined the best avenue forward for implementing the Antidegradation requirements into general stormwater permits is by requiring the appropriate development and maintenance of a SWPPP. The SWPPP must identify all reasonable and effective BMPs, taking into account environmental impacts and costs. This analysis must document why no discharge or no exposure options are not feasible at the facility. This selection and documentation of appropriate control measures will then serve as the analysis of alternatives and fulfill the requirements of the Antidegradation Rule and Implementation Procedure 10 CSR 20-7.031(3) and 10 CSR 20-7.015(9)(A)5.

Any facility seeking coverage under this permit which undergoes expansion or discharges a new pollutant of concern must update their SWPPP and select reasonable and cost effective new BMPs. New facilities seeking coverage under this permit are required to develop a SWPPP including this analysis and documentation of appropriate BMPs. Renewal of coverage for a facility requires a review of the SWPPP to ensure the selected BMPs continue to be appropriate.

- ✓ Applicable; the facility must review and maintain stormwater BMPs as appropriate.

**BENCHMARKS:**

When a permitted feature or outfall consists of only stormwater, a benchmark may be implemented at the discretion of the permit writer. Benchmarks require the facility to monitor and, if necessary, replace and update stormwater control measures. Benchmark concentrations are not effluent limitations. A benchmark exceedance, therefore, is not a permit violation; however, failure to take corrective action is a violation of the permit. Benchmark monitoring data is used to determine the overall effectiveness of control measures and to assist the permittee in knowing when additional corrective actions may be necessary to comply with the limitations of the permit.

- ✓ Not applicable; this permit does not contain numeric benchmarks.

**BEST MANAGEMENT PRACTICES (BMPs):**

Minimum site-wide BMPs are established in this permit to ensure all permittees are managing their sites equally to protect waters of the state from certain activities which could cause negative effects in receiving water bodies. While not all sites require a SWPPP because the SIC codes are specifically exempted in 40 CFR 122.26(b)(14), these BMPs are not specifically included for stormwater purposes. These practices are minimum requirements for all industrial sites to protect waters of the state. If the minimum BMPs are not followed, the facility may violate general criteria [10 CSR 20-7.031(4)]. Statutes are applicable to all permitted facilities in the state; therefore, pollutants cannot be released unless in accordance with RSMo 644.011 and 644.016 (17).

**CHANGES IN DISCHARGES OF TOXIC POLLUTANT:**

This special condition reiterates the federal rules found in 40 CFR 122.44(f) and 122.42(a)(1). In these rules, the facility is required to report changes in amounts of toxic substances discharged. Toxic substances are defined in 40 CFR 122.2 as "...any pollutant listed as toxic under section 307(a)(1) or, in the case of "sludge use or disposal practices," any pollutant identified in regulations implementing section 405(d) of the CWA." Section 307 of the CWA then refers to those parameters found in 40 CFR 401.15.



The permittee should also consider any other toxic pollutant in the discharge as reportable under this condition.

**EFFLUENT LIMITATION GUIDELINE:**

Effluent Limitation Guidelines, or ELGs, are found at 40 CFR 400-499. These are limitations established by the EPA based on the SIC code and the type of work a facility is conducting. Most ELGs are for process wastewater and some address stormwater. All are technology based limitations which must be met by the applicable facility at all times.

- ✓ The industries covered under this permit have an associated Effluent Limit Guideline (ELG) which is applicable to the stormwater discharges in this permit and is applied under 40 CFR 125.3(a).

**ELECTRONIC DISCHARGE MONITORING REPORT (EDMR) SUBMISSION SYSTEM:**

The U.S. Environmental Protection Agency (EPA) promulgated a final rule on October 22, 2015, to modernize CWA reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The final rule requires regulated entities and state and federal regulators to use information technology to electronically report data required by the National Pollutant Discharge Elimination System (NPDES) permit program instead of filing paper reports. To comply with the federal rule, the Department is requiring all permittees to begin submitting discharge monitoring data and reports online.

- ✓ Applicable; this permit requires quarterly reports.

**GENERAL CRITERIA CONSIDERATIONS:**

In accordance with 40 CFR 122.44(d)(1), effluent limitations shall be placed into permits for pollutants determined to cause, have reasonable potential to cause, or to contribute to, an excursion above any water quality standard, including narrative water quality criteria. In order to comply with this regulation, the permit writer has completed a reasonable potential determination on whether discharges have reasonable potential to cause or contribute to an excursion of the general criteria listed in 10 CSR 20-7.031(4). In instances where reasonable potential exists, the permit includes limitations within the permit to address the reasonable potential. In discharges where reasonable potential does not exist, the permit may include monitoring to later determine the discharge's potential to impact the narrative criteria. Additionally, RSMo 644.076.1, as well as Standard Permit Conditions Part VIII of this permit state it shall be unlawful for any person to cause or allow any discharge of water contaminants from any water contaminant or point source located in Missouri in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law or any standard, rule, or regulation promulgated by the commission.

**LAND APPLICATION:**

Land application, or surficial dispersion of wastewater and/or sludge, is performed by facilities to maintain a basin as no-discharge. Requirements for these types of operations are found in 10 CSR 20-6.015; authority to regulate these activities is from RSMo 644.026.

- ✓ Not applicable; this permit does not authorize operation of a surficial land application system to disperse wastewater or sludge.

**LAND DISTURBANCE:**

Land disturbance, sometimes called construction activities, are actions which cause disturbance of the root layer or soil; these include clearing, grading, and excavating of the land. 40 CFR 122.26(b)(14) and 10 CSR 20-6.200(3) requires permit coverage for these activities. Coverage is not required for facilities when only providing maintenance of original line and grade, hydraulic capacity, or to continue the original purpose of the facility.

- ✓ Applicable; this permit provides coverage for land disturbance activities. These activities have SWPPP requirements and may be combined with the standard site SWPPP. Land disturbance BMPs should be designed to control the expected peak discharges. The University of Missouri has design storm events for the 25 year 24 hour storm; these can be found at: [http://ag3.agebb.missouri.edu/design\\_storm/comparison\\_reports/20191117\\_25yr\\_24hr\\_comparison\\_able.htm](http://ag3.agebb.missouri.edu/design_storm/comparison_reports/20191117_25yr_24hr_comparison_able.htm); to calculate peak discharges, the website <https://www.lmnoeng.com/Hydrology/rational.php> has the rational equation to calculate expected discharge volume from the peak storm events.

**NUTRIENT MONITORING:**

Nutrient monitoring is required for facilities characteristically or expected to discharge nutrients (nitrogenous compounds and/or phosphorus) when the design flow is equal to or greater than 0.1 MGD per 10 CSR 20-7.015(9)(D)8.

- ✓ This is a stormwater only permit; therefore, it is not subject to provisions found in 10 CSR 20-7.015 per 10 CSR 20-7.015(1)(C).

**OIL/WATER SEPARATORS:**

Oil water separator (OWS) tank systems are frequently found at industrial sites where process water and stormwater may contain oils and greases, oily wastewaters, or other immiscible liquids requiring separation. Food industry discharges typically require pretreatment prior to discharge to municipally owned treatment works. Per 10 CSR 26-2.010(2)(B), all oil water separator tanks must be operated according to manufacturer's specifications and authorized in NPDES permits per 10 CSR 26-2.010(2) or may be regulated as a petroleum tank.

- ✓ Not applicable; this permit does not authorize the operation of OWS. The facility must obtain a separate permit to cover operation of and discharge from these devices.

**PERMIT SHIELD:**

The permit shield provision of the CWA (Section 402(k)) and Missouri Clean Water Law (644.051.16 RSMo) provides that when a permit holder is in compliance with its NPDES permit or MSOP, they are effectively in compliance with certain sections of the CWA and equivalent sections of the Missouri Clean Water Law. In general, the permit shield is a legal defense against certain enforcement actions but is only available when the facility is in compliance with its permit and satisfies other specific conditions, including having completely disclosed all discharges and all facility processes and activities to the Department at time of application. It is the facility's responsibility to ensure that all potential pollutants, waste streams, discharges, and activities, as well as wastewater land application, storage, and treatment areas, are all fully disclosed to the Department at the time of application or during the draft permit review process. Subsequent requests for authorization to discharge additional pollutants or expanded or newly disclosed flows, or for authorization for previously unpermitted and undisclosed activities or discharges, will likely require permit modification or may require the facility be covered under a site specific permit.

**PRETREATMENT PROGRAM:**

This permit does not regulate pretreatment requirements for facilities discharging to an accepting permitted wastewater treatment facility. If applicable, the receiving entity (the publicly owned treatment works - POTW) must ensure compliance with any effluent limitation guidelines for pretreatment listed in 40 CFR Subchapter N per 10 CSR 20-6.100. Pretreatment regulations per RSMo 644.016 are limitations on the introduction of pollutants or water contaminants into publicly owned treatment works or facilities.

- ✓ Not Applicable; the facilities covered under this permit are not required to meet pretreatment requirements under an ELG.

**PUBLIC NOTICE OF COVERAGE FOR AN INDIVIDUAL FACILITY:**

Public Notice of reissuance of coverage is not required unless the facility is a specific type of facility as defined in 10 CSR 20-6.200(1). The need for an individual public notification process shall be determined and identified in the permit [10 CSR 20-6.020(1)(C)5.].

- ✓ Not applicable; public notice is not required for coverage under this permit to individual facilities. The MGP is public noticed in lieu of individual permit PN requirements.

**REASONABLE POTENTIAL ANALYSIS (RPA):**

Federal regulation 40 CFR Part 122.44(d)(1)(i) requires effluent limitations for all pollutants which are or may be discharged at a level which will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard. In accordance with 40 CFR Part 122.44(d)(iii) if the permit writer determines any given pollutant has the reasonable potential to cause or contribute to an in-stream excursion above the water quality standard, the permit must contain effluent limits for the pollutant.

- ✓ The permit writer reviewed industry materials, available past inspections, and other documents and research to evaluate general and narrative water quality reasonable potential for this permit. Permit writers also use the Department's permit writer's manual, the EPA's permit writer's manual (<https://www.epa.gov/npdes/npdes-permit-writers-manual>), program policies, and best professional judgment. For each parameter in each permit, the permit writer carefully considers all applicable information regarding technology based effluent limitations, effluent limitation guidelines, and water quality standards. Best professional judgment is based on the experience of the permit writer, cohorts in the Department and resources at the EPA, research, and maintaining continuity of permits if necessary. For stormwater permits, the permit writer is required per 10 CSR 6.200(6)(B)2 to consider: A. application and other information supplied by the permittee; B. effluent guidelines; C. best professional judgment of the permit writer; D. water quality; and E. BMPs.

#### **SCHEDULE OF COMPLIANCE (SOC):**

Per § 644.051, RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement or if prohibited by other statute or regulation. An SOC includes an enforceable sequence of interim requirements (e.g. actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the CWA, and 40 CFR 122.2. For new effluent limitations, the permit may include interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, an SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

- ✓ Not Applicable: This permit does not contain a SOC.

#### **SETBACKS:**

Setbacks, sometimes called separation distances, are common elements of permits and are established to provide a margin of safety in order to protect the receiving water and other features from accidents, spills, unusual events, etc. Specific separation distances are included in 10 CSR 20-8 for minimum design standards of wastewater structures. While wastewater is considered separately from stormwater under this permit, the guides and Chapter 8 distances may remain relevant to requirements under this permit if deemed appropriate by the permittee.

- ✓ Discharge to the watersheds of a Metropolitan No-Discharge Stream (10 CSR 20-7.031 Table F) is authorized by this permit if the discharges are in compliance with 10 CSR 20-7.015(5) and 10 CSR 20-7.031(7). Discharges to these watersheds are authorized for uncontaminated stormwater discharges only.
- ✓ This permit authorizes stormwater discharges which are located in a way to allow water to be released into sinkholes, caves, fissures, or other openings in the ground which could drain into aquifers (except losing streams) per 10 CSR 20-7.015(7). It is the best professional judgment of the permit writer to allow discharges to losing streams as the effluent is stormwater only.
- ✓ This permit authorizes stormwater discharge in the watersheds of Outstanding state Resource Waters (OSRW); Outstanding National Resources Waters (ONRW), which includes the Ozark National Riverways and the National Wild and Scenic Rivers System; and impaired waters as designated in the 305(b) Report provided no degradation of water quality occurs in the OSRW and ONRW due to discharges from the permitted facility per 10 CSR 20-7.015(6)(B) and 10 CSR 20-7.031(3)(C). Additionally, if the facility is found to be causing degradation or contributing to an impairment by discharging a pollutant of concern during an inspection or through complaint investigations, they will be required to become a no discharge facility or obtain a site specific permit with more stringent monitoring and SWPPP requirements. Missouri's impaired waters can be found at <https://dnr.mo.gov/water/what-were-doing/water-planning/quality-standards-impaired-waters-total-maximum-daily-loads/impaired-waters>. Sites within 1000 feet of a OSRW, ONRW, or water impaired for sediment must operate as a no-discharge facility. These additional protections are borrowed from the USEPA 2021 draft Construction General Permit.

**SLUDGE – DOMESTIC BIOSOLIDS:**

Biosolids are solid materials resulting from domestic wastewater treatment meeting federal and state criteria for beneficial use (i.e. fertilizer). Sewage sludge is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works; including, but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works.

- ✓ This permit does not authorize discharge or land application of biosolids. Sludge/biosolids is not generated by this industry.

**SLUDGE – INDUSTRIAL:**

Industrial sludge is solid, semi-solid, or liquid residue generated during the treatment of industrial process wastewater in a treatment works; including, but not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment process; scum and solids filtered from water supplies and backwashed; and a material derived from industrial sludge.

- ✓ Not applicable; sludge is not generated by this industry.

**SPILL REPORTING:**

Any emergency involving a hazardous substance must be reported to the Department's 24 hour Environmental Emergency Response hotline at (573) 634-2436 at the earliest practicable moment after discovery. The Department may require the submittal of a written report detailing measures taken to clean up a spill. These reporting requirements apply when the spill results in chemicals or materials leaving the permitted property or reaching waters of the state. This requirement is in addition to the noncompliance reporting requirement found in Standard Conditions Part I. <https://dnr.mo.gov/waste-recycling/investigations-cleanups/environmental-emergency-response>.

Underground and above ground storage devices for petroleum products, vegetable oils, and animal fats may be subject to control under federal Spill Prevention, Control, and Countermeasure Regulation and are expected to be managed under those provisions, if applicable. Substances regulated by federal law under the Resource Conservation and Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) which are transported, stored, or used for maintenance, cleaning or repair shall be managed according to the provisions of RCRA and CERCLA.

**STORMWATER POLLUTION PREVENTION PLAN (SWPPP):**

In accordance with 40 CFR 122.44(k), BMPs must be used to control or abate the discharge of pollutants when: 1) Authorized under section 304(e) of the CWA for the control of toxic pollutants and hazardous substances from ancillary industrial activities; 2) Authorized under section 402(p) of the CWA for the control of stormwater discharges; 3) Numeric effluent limitations are infeasible; or 4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA. In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*, (Document number EPA 833-R-06-004) published by the EPA in 2007 [https://www.epa.gov/sites/production/files/2015-10/documents/sw\\_swppp\\_guide.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/sw_swppp_guide.pdf), BMPs are measures or practices used to reduce the amount of pollution entering waters of the state from a permitted facility. BMPs may take the form of a process, activity, or physical structure. Additionally, in accordance with the Stormwater Management, a SWPPP is a series of steps and activities to 1) identify sources of pollution or contamination, and 2) select and carry out actions which prevent or control the pollution of storm water discharges. Additional information can be found in *Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices* (EPA 832-R-92-006; September 1992).

A SWPPP must be prepared if the SIC code for the facility is found in 40 CFR 122.26(b)(14) and/or 10 CSR 20-6.200(2). A SWPPP may be required of other facilities where stormwater has been identified as necessitating better management.

The purpose of a SWPPP is to comply with all applicable stormwater regulations by creating an adaptive management plan to control and mitigate stream pollution from stormwater runoff. Developing a SWPPP provides opportunities to employ appropriate BMPs to minimize the risk of pollutants being discharged during storm events. The following paragraph outlines the general steps the permittee should take to determine which BMPs will work to achieve the benchmark values or limits in the permit. This section is not intended to be all encompassing or restrict the use of any physical BMP or operational and maintenance procedure assisting in pollution control. Additional steps or revisions to the SWPPP may be required to meet the requirements of the permit.

Areas which should be included in the SWPPP are identified in 40 CFR 122.26(b)(14). Once the potential sources of stormwater pollution have been identified, a plan should be formulated to best control the amount of pollutant being released and discharged by each activity or source. This should include, but is not limited to, minimizing exposure to stormwater, good housekeeping measures, proper facility and equipment maintenance, spill prevention and response, vehicle traffic control, and proper materials handling. Once a plan has been developed, the facility will employ the control measures determined to be adequate to prevent pollution from entering waters of the state. The facility will conduct inspections of the BMPs to ensure they are working properly and re-evaluate any BMP not achieving compliance with permitting requirements. For example if the BMP being employed is deficient in controlling stormwater pollution, corrective action should be taken to repair, improve, or replace the failing BMP. If failures do occur, continue this trial and error process until appropriate BMPs have been established.

The EPA has developed factsheets on the pollutants of concern for specific industries along with the BMPs to control and minimize stormwater (<https://www.epa.gov/npdes/stormwater-discharges-industrial-activities>). Along with EPA's factsheets, the International Stormwater BMP database (<https://bmpdatabase.org/>) may provide guidance on BMPs appropriate for specific industries.

For new, altered, or expanded stormwater discharges, the SWPPP shall identify reasonable and effective BMPs while accounting for environmental impacts of varying control methods. The antidegradation analysis must document why no discharge or no exposure options are not feasible. The selection and documentation of appropriate control measures shall serve as an alternative analysis of technology and fulfill the requirements of antidegradation [10 CSR 20-7.031(3)].

Alternative analysis evaluation of the BMPs is a structured evaluation of BMPs which are reasonable and cost effective. The alternative analysis evaluation should include practices designed to be: 1) non-degrading; 2) less degrading; or 3) degrading water quality. The glossary of the *Antidegradation Implementation Procedure* defines these three terms. The chosen BMP will be the most reasonable and effective management strategy while ensuring the highest statutory and regulatory requirements are achieved and the highest quality water attainable for the facility is discharged. The alternative analysis evaluation must demonstrate why "no discharge" or "no exposure" is not a feasible alternative at the facility. This structured analysis of BMPs serves as the antidegradation review, fulfilling the requirements of 10 CSR 20-7.031(3) Water Quality Standards and *Antidegradation Implementation Procedure*, Section II.B.

- ✓ Applicable: A SWPPP shall be developed and implemented for each site and shall incorporate required practices identified by the Department with jurisdiction, incorporate control practices specific to site conditions, and provide for maintenance and adherence to the plan.

#### **UNDERGROUND INJECTION CONTROL (UIC):**

The UIC program for all classes of wells in the State of Missouri is administered by the Missouri Department of Natural Resources and approved by EPA pursuant to section 1422 and 1425 of the Safe Drinking Water Act (SDWA) and 40 CFR 147 Subpart AA. Injection wells are classified based on the liquids which are being injected. Class I wells are hazardous waste wells which are banned by RSMo 577.155; Class II wells are established for oil and natural gas production; Class III wells are used to inject fluids to extract minerals; Class IV wells are also banned by Missouri in RSMo 577.155; Class V wells are shallow injection wells; some examples are heat pump wells and groundwater remediation wells. Domestic wastewater being disposed of sub-surface is also considered a Class V well.

In accordance with 40 CFR 144.82, construction, operation, maintenance, conversion, plugging, or closure of injection wells shall not cause movement of fluids containing any contaminant into Underground Sources of Drinking Water (USDW) if the presence of any contaminant may cause a violation of drinking water standards or groundwater standards under 10 CSR 20-7.031 or other health-based standards or may otherwise adversely affect human health. If the Department finds the injection activity may endanger USDWs, the Department may require closure of the injection wells or other actions listed in 40 CFR 144.12(c), (d), or (e). In accordance with 40 CFR 144.26, the permittee shall submit a Class V Well Inventory Form for each active or new underground injection well drilled, or when the status of a well changes, to the Missouri Department of Natural Resources, Geological Survey Program, P.O. Box 250, Rolla, Missouri 65402. Single family residential septic systems and non-residential septic systems used solely for sanitary waste and having the capacity to serve fewer than 20 persons a day are excluded from the UIC requirements (40 CFR 144.81(9)).

- ✓ Not applicable; this permit does not authorize subsurface wastewater systems or other underground injection. These activities must be assessed under an application for a site specific permit. Certain discharges of stormwater into sinkholes may qualify as UIC. It is important the permittee evaluate all stormwater basins, even those holding water; as sinkholes have varying seepage rates. This permit does not allow stormwater discharges into sinkholes. The facility must ensure sinkholes are avoided in the construction process. The State's online mapping resource <https://modnr.maps.arcgis.com/apps/webappviewer/index.html?id=87ebef4af15d438ca658ce0b2bbc862e> has a sinkhole layer.

**VARIANCE:**

Per the Missouri Clean Water Law Section 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law Section 644.006 to 644.141 or any standard, rule, or regulation promulgated pursuant to Missouri Clean Water Law Section 644.006 to 644.141.

- ✓ Not Applicable: This permit is not drafted under premises of a petition for variance.

**WASTELOAD ALLOCATIONS (WLA) FOR LIMITATIONS:**

Per 10 CSR 20-2.010(78), the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant which may be discharged into the stream without endangering its water quality. Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's Technical Support Document For Water Quality-based Toxics Control (TSD) (EPA/505/2-90-001).

- ✓ Not applicable; water quality limitations were not applied in this permit.

**WATER QUALITY STANDARDS:**

Per 10 CSR 20-7.031(4), General Criteria shall be applicable to all waters of the state at all times, including mixing zones. Additionally, 40 CFR 122.44(d)(1) directs the Department to include in each NPDES permit conditions to achieve water quality established under Section 303 of the CWA, including state narrative criteria for water quality.

**WHOLE EFFLUENT TOXICITY (WET) TEST:**

Per 10 CSR 20-7.031(1)(FF), a toxicity test conducted under specified laboratory conditions on specific indicator organism; and per 40 CFR 122.2, the aggregate toxic effect of an effluent measured directly by a toxicity test. A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with, or through synergistic responses when mixed with receiving water.

- ✓ Not applicable: At this time, permittees are not required to conduct a WET test. This permit is for stormwater only.

## **PART IV – EFFLUENT LIMITATIONS DETERMINATION**

### **EPA Construction General Permit (CGP)**

The CGP was used to research and support best professional judgment decisions made in establishing technology-based conditions for this general permit which are consistent with national standards. The permit writer determined the standards established by the CGP are achievable and consistent with federal regulations. Additionally, the conditions reflecting the best practicable technology currently available are utilized to implement the ELG.

In this general permit, technology-based effluent conditions are established through the SWPPP and BMP requirements. Effective BMPs should be designed on a site-specific basis. The implementation of inspections provides a tool for each facility to evaluate the effectiveness of BMPs to ensure protection of water quality. Any flow through an outfall is considered a discharge. Future permit action due to permit modification may contain new operating permit terms and conditions which supersede the terms and conditions, including effluent limitations, of this operating permit.

## **PART V–REPORTING REQUIREMENTS**

### **SAMPLING:**

The permittee is not required to sample stormwater under this permit. The Department may require sampling and reporting as a result of illegal discharges, compliance issues related to water quality concerns or BMP effectiveness, or evidence of off-site impacts from activities at the facility. If such an action is needed, the Department will specify in writing the sampling requirements, including such information as location and extent. If the permittee refuses to perform sampling when required, the Department may terminate the general permit and require the facility to obtain a site-specific permit with sampling requirements.

### **REPORTING:**

There are quarterly reporting requirements for MO-R100xxx land disturbance permits. Project specific information is required to be report to the Department through the eDMR system.

## **PART VI – RAINFALL VALUES FOR MISSOURI & SURFACE WATER BUFFER ZONES**

Knowledge of the 2-year, 24-hour storm event is used in this permit for two main reasons:

- 1) The design, installation, and maintenance of effective erosion and sediment controls to minimize the discharge of pollutants.
- 2) If the seven-day inspection frequency is utilized, an inspection must occur within 48 hours after any storm event equal to or greater than a 2-year, 24 hour storm has ceased.

For site-specific 2-year, 24-hour storm event information utilize the National Oceanic and Atmospheric Administration’s National Weather Service Atlas 14 (NOAA Atlas 14) which is located at [https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\\_map\\_cont.html](https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html). For more information visit; [https://www.weather.gov/media/owp/oh/hdsc/docs/Atlas14\\_Volume8.pdf](https://www.weather.gov/media/owp/oh/hdsc/docs/Atlas14_Volume8.pdf).

**Surface Water Buffer Zones:** In order to design controls that match the sediment removal efficiency of a 50-foot buffer, you first need to know what this efficiency is for your site. The sediment removal efficiencies of natural buffers vary according to a number of site-specific factors, including precipitation, soil type, land cover, slope length, width, steepness, and the types of erosion and sediment controls used to reduce the discharge of sediment prior to the buffer. For additional information;

[https://www.epa.gov/sites/default/files/2017-02/documents/2017\\_cgp\\_final\\_appendix\\_g\\_-\\_buffer\\_reqs\\_508.pdf](https://www.epa.gov/sites/default/files/2017-02/documents/2017_cgp_final_appendix_g_-_buffer_reqs_508.pdf)

## **PART VII – ADMINISTRATIVE REQUIREMENTS**

On the basis of preliminary staff review and applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the permit. The proposed determinations are tentative pending public comment.

### **PUBLIC MEETING:**

The department hosted three public meetings for this permit. The meetings were held on January 27, February 17, and March 9, 2021.

### **PUBLIC NOTICE:**

The Department shall give public notice when a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest or because of water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and facility must be notified of the denial in writing.

The Department must give public notice of a pending permit or of a new or reissued Missouri State Operating Permit. The public comment period is a length of time not less than thirty (30) days following the date of the public notice, during which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed permit, please refer to the Public Notice page located at the front of this draft permit. The Public Notice page gives direction on how and where to submit appropriate comments.

- ✓ The Public Notice period for this permit is started March 25, 2022 and ended April 25, 2022. Two comment letters were received.

**DATE OF FACT SHEET:** 03/2/2022

### **COMPLETED BY:**

**SARAH WRIGHT**

**MS4 & LAND DISTURBANCE PERMITTING COORDINATOR**

**MISSOURI DEPARTMENT OF NATURAL RESOURCES**

**WATER PROTECTION PROGRAM**

**OPERATING PERMITS SECTION - STORMWATER AND CERTIFICATION UNIT**

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