

PROJECT MANUAL

OWNER:

SAPULPA FIRE DEPARTMENT
CITY OF SAPULPA, OK
425 E. DEWEY AVE.
SAPULPA, OK 74066



PROJECT:

SAPULPA FIRE DEPARTMENT TRAINING FACILITY

15 SAHOMA LAKE RD

SAPULPA, OK 74066

ARCHITECT:



ph: 918.298.7257 | 424 e. main st.
wb: gshelms.com | jenks, ok 74037

M.E.P. CONSULTANTS:



MECHANICAL ELECTRICAL DESIGN CONSULTANTS

5809 EAST SKELLY DRIVE
SUITE 1100
TULSA, OKLAHOMA 74135
PH 918.749.3000 FAX 918.749.3003

OKLA. CERT. OF AUTHORIZATION: #4724
EXPIRATION DATE: 06.30.27

CIVIL ENGINEERING CONSULTANT:

WALLACE ENGINEERING
STRUCTURAL AND CIVIL CONSULTANTS
123 N. MARTIN LUTHER KING JR. BLVD.
TULSA, OKLAHOMA 74103
PH 918.584.5858 FAX 918.584.8689

OKLAHOMA CERTIFICATE OF AUTHORIZATION: #1460
EXPIRATION DATE: 06.30.27

STRUCTURAL ENGINEERING CONSULTANT:



**RICHARDS &
ASSOCIATES, INC.**

424 EAST MAIN STREET JENKS, OK
405.627.9584 FAX 918.355.9309
C.A. #4458 EXP. DATE 06.30.27

ISSUE:

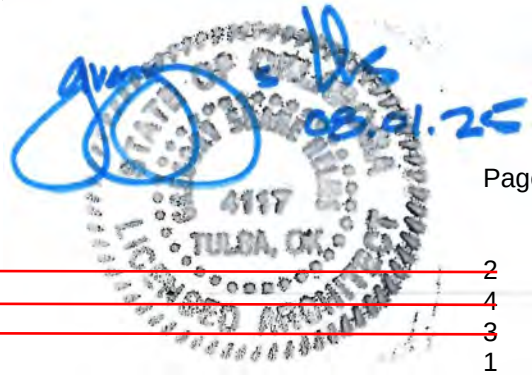
CONSTRUCTION DOCUMENTS

PROJECT NOS.:
17-00901

SET NUMBER:

ISSUE DATE:
AUGUST 1, 2025

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NON-COLLUSION AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF _____)

_____, of lawful age, being first duly sworn, on oath says that (she) he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any state official or employee as to quantity, quality, or price in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

Subscribed and sworn to before me this _____ day of _____, 2025.

Company Representative

Notary Public

My Commission Expires:

END OF SECTION

SECTION 000160
BUSINESS RELATIONSHIP AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF _____)

_____, of lawful age, being first duly sworn, on oath says that (she) he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the nature of any partnership, joint venture, or other business relationship presently in effect or which existed within one (1) year prior to the date of this statement with the Architect, Engineer, or other party to the project is as follows:

Affiant further states that any such business relationship presently in effect or which existed within one (1) year prior to the date of this statement between any officer or director of the bidding company, any officer or director of the architectural or engineering firm or other party to the project is as follows:

Affiant further states that the names of all persons having any such business relationships and the positions they hold with their respective companies or firms are as follows:

(If none of the business relationships herein above mentioned exist, affiant should so state.)

Company Representative

Subscribed and sworn to before me this _____ day of _____, 2025.

Notary Public

My Commission Expires:

END OF SECTION

SECTION 000170
NON-DISCRIMINATION AFFIDAVIT

The Contractor affirms and states that he/she complies with the following:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, sex, religion, national origin or age. The Contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, sex, religion, national origin or age. 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 setting forth the requirements of these nondiscrimination provisions.
2. The Contractor will state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will receive consideration for employment without regard to race, color, sex, religion, national origin or age."

Company Representative

Subscribed and sworn to before me this _____ day of _____, 2025.

Notary Public

My Commission Expires:

END OF SECTION

SECTION 000205

INSTRUCTIONS TO BIDDERS

SCOPE:

1. GENERAL CONDITIONS:

Standard form "General Conditions of the Contract for Construction," The American Institute of Architects, Document A201, 2017 Edition, ("General Conditions") shall apply to the Work, except insofar as the General Conditions are modified, amended, waived, or changed by these Supplementary General Conditions. The following paragraph numbers refer to the paragraphs in the above referenced "General Conditions":

- (a) Paragraph 1. 1. 1: The last sentence is amended to read as follows: "The Contract Documents include the advertisement or invitation to bid, notice to bidders, instructions to bidders, sample forms, the Contractor's bid or proposal, any addenda relating to the foregoing and any other documents specifically enumerated in the Owner-Contractor Agreement."
- (b) Paragraph 3.7. 1. is amended to read as follows: "When applicable, Contractor shall secure all permits, licenses and inspections necessary for the proper execution and completion of the Work. Owner will not reimburse Contractor for any fees paid by Contractor for permits and inspections."
- (c) Paragraph 13.6.1 is amended to read as follows: "Any moneys not paid within thirty (30) days after they become due and payable under the terms of this Contract shall bear interest at the rate of six percent (6%) per annum from and after said thirty (30) day period."
- (d) Paragraph 8.3.1 is amended to read as follows: "The Contractor shall not be entitled to compensation for any loss, cost or expense, sustained by reason of delay in completion of the Work from any cause whatever."
- (e) Paragraph 11.3.1 is amended to read as follows: "The Contractor shall purchase and maintain, at Contractor's expense, property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of Owner, Contractor, Subcontractor and Sub-subcontractors in the Work and shall insure against perils of fire and extended coverage on a 'broad-form, all risk' basis for physical loss of damage, including theft, vandalism and malicious mischief. Such insurance shall be purchased from a carrier licensed to do business in the State of Oklahoma. Certificates of such insurance shall be delivered to the Department Manager of Building Planning, Maintenance and Plant Operations of Owner prior to commencement of the Work. Said certificates shall provide that the carrier must give Owner at least thirty (30) days prior written notice before cancellation or reduction of the coverage for any reason. If not covered by the above insurance, Contractor shall also purchase and maintain similar coverage on portions of the Work stored off site or in transit when such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2. Until substantial completion of the Work, all risk of loss shall be upon Contractor."
- (f) Paragraph 11.3.4 is eliminated.
- (g) Paragraph 3.6.1 is amended by adding the following "Contractor assumes full responsibility for the payment of all contributions and payroll taxes (State and Federal) for all employees engaged on the Work and provide proof of worker compensation coverage for all employees."

2. **DEFINITIONS:**

Wherever the words herein defined, or pronouns used in the stead, occur in this contract and these specifications, they shall have the meanings herein given.

- (a) The word "OWNER" shall mean the City of Sapulpa, Oklahoma.
- (b) The word "CONTRACTOR" shall mean the person, persons. Partnership, company, firm or corporation entering into the contract for the performance of the Work, and the legal representative of said party, or agent appointed to act for said party in the performance of the Work.
- (c) The word "SURETY" or "SURETIES" shall mean the bondsman or party of parties who have made sure the fulfillment of the requirement of the contract by bonds, including the Payment Bond, and whose signatures are attached to said bonds.
- (d) The word "ADVERTISEMENT" shall mean all of the legal publications pertaining to the Work.
- (e) The word "SPECIFICATIONS" shall mean, collectively, all of the terms and stipulations contained in those portions of the contract known as Instructions to Bidders, General, Mechanical and Electrical Specifications.
- (f) The word "PLAN" shall mean, collectively, all of the drawings pertaining to the contract and made part thereof, and also such supplementary drawings as may be issued from time to time in order to elucidate the drawings or for the purpose of showing changes in the Work as authorized under the section "Changes and Alterations," or for showing details which are not shown thereon.
- (g) The words "CONTRACT PRICE" shall mean either the unit prices or unit price, or lump sum price, named in the contract or the total of all payments according to schedule or prices in the contract, as the case may be.
- (h) The word "BID" or "BIDS" shall mean the written statements duly filed with the City Clerk of Sapulpa, OK, Creek County, Oklahoma, for the person or persons, partnership, company, firm or corporation proposing to do the Work and furnish materials called for on plans at the prices named on said statement.
- (i) The word "CALENDAR DAYS" shall mean the actual days to complete the contract excluding days due to inclement weather.

3. **BONDS:**

If the Contract Price is in excess of **\$100,000.00**, Contractor will furnish the following bonds: (i) a Payment Bond (the "statutory" bond required by Section I of Title 6 1, Okla. State, as amended) in an amount equal to 100% of the Contract Price; and (ii) a Performance Bond in such form as directed by Owner in an amount equal to 100% of the Contract Price for work on the project(s) as security for the proper and prompt completion of the Work in accordance with the contract and bidding documents; and (iii) a Warranty Bond in an amount equal to 100% of the Contract Price for work on the project(s) to protect Owner against defects in workmanship and materials for a period of one (1) year from Owner's acceptance of the Project(s); or (iv) a Letter of Eligibility notarized by the bonding company verifying the ability of the Contractor to be bonded for the total amount of the project as specified in the project manual. The Surety on all bonds of the successful bidder must be approved in the Treasury Department Circular 570. If the Surety Company is not on the list, those bids shall be rejected.

Where the Contract Price is **\$100,000.00** or less, the above bonds will not be required. However, in lieu of the Payment Bond, as to contracts where the Contract Price is \$50,000.00 or less,

Contractor shall submit an affidavit of the payment of all indebtedness incurred by the Contractor, Subcontractors, and all material men for labor, material, rental of machinery or equipment and repair of and parts for equipment as are used or consumed in the performance of the contract. The execution of the affidavit with knowledge that any of the contents of the affidavit are false, upon conviction, shall constitute perjury, punishable as provided by law.

4. CORPORATE SURETY BONDS:

To be acceptable, a corporate surety bond (including both a bid bond and the payment/performance/warranty bonds of the successful bidder) must be signed by BOTH the bidder, as principal, and by a properly authorized representative of the bonding company. If the bonding company is a corporation, the bond must have attached a power of attorney from the corporation authorizing the person signing the bond on behalf of the bonding company to sign bonds for the bonding company. Only original executed instruments will be acceptable.

The corporate surety issuing the bond must be licensed by the Oklahoma State Insurance Commissioner to issue corporate surety bonds in the State of Oklahoma. The Owner reserves the right to require the bidder to submit evidence that the corporate Surety Company is so authorized. The Corporate Surety on all bonds of the successful bidder must be approved in the Treasury Departments Circular 570. If the Surety Company is not on the list, those bids shall be rejected. A bond written by an "offshore" (non-United States) surety company will not be acceptable.

5. LETTERS OF CREDIT:

If a bidder submits an irrevocable letter of credit in lieu of a bond (either a bid bond or a payment/performance/warranty bond), the irrevocable letter of credit must be issued by a financial institution having an office in the State of Oklahoma and insured by the Federal Deposit Insurance Corporation or Federal Savings and Loan Insurance Corporation. The letter of credit must be written on a form acceptable to the Owner.

6. SPECIFICATIONS REGARDING EQUALS:

It is not the intent of these documents to have closed specifications and the brand names shown are the desired materials to be used. The name of a certain brand, make or manufacturer does not restrict proposals to the specified brand, make or manufacturer named unless a brand, model or manufacturer is labeled "No Substitution" in the bid. It is not intended to exclude other products, but to convey the type, functional characteristics and quality of the item desired. Any item that the Owner or Architect, determines and approves to be the equal of that specified considering quality, workmanship, economy of operation and suitability for the purpose intended will be considered. Thus "equal" products of other manufacturers may be considered if the products meet or exceed the stated specifications, and if a detailed explanation of a claim of equivalency is submitted ten (10) days prior to the bid opening. It will be the responsibility of the Bidder to provide data on all products so that the Owner can compare.

7. COMPLETION:

Upon completion of the project, the Contractor will notify Owner and Owner's Representative will make a final inspection of the work. The project shall be completed in good and workmanlike manner and to the satisfaction of the Owner.

8. ETHICS IN PUBLIC CONTRACTING:

By submitting their bid, Bidders certify that their bids are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder, supplier, manufacturer or subcontractor in connection with their proposal, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than

nominal value, present or promised unless consideration of substantially equal or greater value was exchanged.

9. NON-DISCRIMINATION:

Contractor agrees Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin. Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, age 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. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting for the provisions of this non-discrimination clause.

10. ERRORS OR OMISSIONS:

The Bidder shall not be allowed to take advantage of any errors or omissions in the specifications. Where they occur, the Bidder shall promptly notify the contact person listed. Inconsistencies in the specifications are to be reported before bids are submitted.

11. BID FORM:

The bid MUST be submitted on the bid form provided in the bid packet. A Xerox copy of this bid form is acceptable. All blanks must be completed.

END OF SECTION

SECTION 000260

NO KICK-BACK STATEMENT

A duplicate of the following statement is required to be signed, notarized, and submitted with each and every copy of the AIA Document G702, "Application and Certificate for Payment", that is presented to the Owner for payment.

STATE OF OKLAHOMA)
) ss.
COUNTY OF _____)

The undersigned Contractor, of lawful age, being first duly sworn an oath, says that this invoice is true and correct. Affiant further states that the services as shown by the invoice have been completed in accordance with the contract. Affiant further states that he has made no payment directly or indirectly to any elected official, officer or employee of the State of Oklahoma, any county or local subdivision of the state, of money or any other things of value to obtain payment.

Contractor

(Title)

By _____

Subscribed and sworn to before me this _____ day of _____, 20____.

Notary Public

My Commission Expires:

[SEAL]

END OF SECTION

SECTION 011000

SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: **CITY OF SAPULPA, OKLAHOMA
SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
- B. Owner: City of Sapulpa, Oklahoma
Sapulpa Fire Department
425 E. Dewey Ave.
Sapulpa, OK 74066
- C. Architect: GSHELMS & Associates, LLC
424 E. Main Street
Jenks, OK 74037
918-298-7257
- D. Project Location: Sapulpa Fire Department Training Facility
15 Sahoma Lake Road
Sapulpa, OK 74066
- E. Project Overview: Renovation of an existing pre-engineered metal building for new Administrative Offices and Training Center, foundations and first floor concrete slab for new Fire Simulator Training Tower (by Owner) and associated site work, interior finishes and site utilities. Project includes five (5) Add Alternates.
- F. **PRE-BID CONFERENCE:** Monday, August 25, 2025 at 2:00 pm CDT at the Project Site
- G. Project Completion: Project shall be Substantially Complete no later than September 1, 2026 with Final Completion no later than September 22, 2026, including submittal of all Close-Out Documents and Final Payment Application.

1.02 OWNER OCCUPANCY

- A. Owner will occupy the facility upon Substantial Completion.

1.03 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Arrange use of site and premises to allow:
1. Work by Others, including construction of Fire Simulator Training Tower.
 2. Work by Owner.

END OF SECTION

SECTION 012300

ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

- A. This section identifies the various Alternates to be bid as part of this project. It describes the general changes to be included in the project if the Alternate is made a part of the Work. The Alternates can only be made part of the Work by specific inclusion in the Owner-Contractor Agreement or by Change Order.
- B. Each Alternate will be reviewed by the Owner and the Architect and either accepted or rejected at the Owner's decision.
- C. Alternate Bid prices shall remain in effect for 90 days beyond date of execution of the Owner-Contractor Agreement.
- D. Alternate Bid prices shall be included in the spaces provided on the Bid Form. All Alternates must be bid, or the Bid may be rejected.
- E. Owner retains all rights to choose any one, combination of, or none of the alternates.

1.02 DESCRIPTION OF ALTERNATES

A. **ALTERNATE #1 – BLACK PVC COATED PERIMETER FENCING, POSTS & GATES**

Provide cost to furnish and construct PVC Coated Chain Link Fencing and Gates in lieu of galvanized, where shown on Sheet G1.2 and as specified in Section 323113 – Chain Link Fences and Gates.

B. **ALTERNATE #2 – ORNAMENTAL FENCING**

Provide cost to furnish and construct Ornamental Fencing and Gates in lieu of PVC Coated Chain Link Fencing and Gates, where shown on Sheet G1.2 and as specified in Section 323100 – Ornamental Fences and Gates.

C. **ALTERNATE #3 – 5 BAY EQUIPMENT BUILDING**

Provide cost to furnish and construct 5 Bay Equipment Building, including but not limited to foundations, Pre-Engineered Metal Building structure and related plumbing, mechanical and electrical requirements. Refer to Sheets G1.2, S100, S200, A0.1, A1.1, A1.3, A1.5, A3.3 and A4.3.

This Alternate would not be accepted if Alternate #4 is accepted.

Building pad shall be provided as part of Base Bid.

D. **ALTERNATE #4 – 3 BAY EQUIPMENT BUILDING**

Provide cost to furnish and construct 3 Bay Equipment Building, including but not limited to foundations, Pre-Engineered Metal Building structure and related plumbing, mechanical and electrical requirements. Refer to Sheets G1.2, S100, S200, A0.1, A1.1, A1.3, A1.5, A3.3 and A4.3.

This Alternate would not be accepted if Alternate #3 is accepted.

Building pad shall be provided as part of Base Bid.

E. **ALTERNATE #5 – CONNECTING CANOPY**

Provide cost to furnish and construct an Extruded Aluminum Canopy between Administrative Office Building and Equipment Building as specified in Section 105300 – Extruded Aluminum Canopies, including all related foundations and electrical requirements. Refer to Sheets G1.2, A1.8, A1.9, A3.1, A3.2 and A3.3.

Concrete slab shall be provided as part of Base Bid.

END OF SECTION

SECTION 012900
PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.

1.02 SCHEDULE OF VALUES

- A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in Agreement Between Owner and Contractor.
- B. Present required information in typewritten form.
- C. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet using continuation sheets when required. Any other form submitted must be pre-approved by Owner and Architect.
- D. Execute certification by signature of authorized officer.
- E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
- F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- G. Submit three copies of each Application for Payment.
- H. Include the following with the application:
 - 1. Transmittal letter as specified for Submittals.
 - 2. Partial release of liens from major Subcontractors and vendors.
- I. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of Certificate for Payment submitted. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

- A. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.
- B. Construction Change Directive: Architect may issue a document, signed by Jenks Public Schools, instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time.

2. Promptly execute the change in Work.
- C. Proposal Request: Architect may issue a document which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 10 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 016000.
- E. Computation of Change in Contract Amount:
 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 3. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
 1. On request, provide following data:
 - a. Quantities of products, labor, and equipment.
 - b. Insurance, and bonds.
 - c. Overhead and profit. (max 15% for sub contractor and 5% for general contractor)
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract on AIA G701.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 017800.
2. Submit Consent of Surety.
3. Submit No Kickback Statement.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Submittals for review, information, and project closeout.
- E. Number of copies of submittals.
- F. Submittal procedures.

1.02 RELATED SECTIONS

- A. Section 017300 – Execution Requirements
- B. Section 017800 - Closeout Submittals: Project record documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Contractor will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner's designated Representative.
 - 2. Architect
 - 3. Contractor's Project Manager.
 - 4. Contractor's Jobsite Superintendent for this project.
- C. Agenda:
 - 1. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 2. Designation of personnel representing the parties to Contract and Architect.
 - 3. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal requests, Change Orders, and Contract closeout procedures.
 - 4. Scheduling.
- D. Contractor shall record minutes and distribute copies to Owner, Architect, Attendees and affected parties.

3.02 PROGRESS MEETINGS

- A. Contractor shall schedule and administer meetings throughout progress of the Work at weekly intervals.
- B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner's Representative, Architect and Consultants as appropriate to agenda topics for each meeting.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress during the past period.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule. Provide detailed two-week look-ahead schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Maintenance of quality and work standards.
 - 11. Effect of proposed changes on progress schedule and coordination.
 - 12. Other business relating to Work.
- D. Contractor shall record minutes and distribute copies to Owner, Architect, Attendees and affected parties.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Contractor shall prepare a Construction Schedule.

3.04 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Contractor and Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. Electronic submittals are acceptable for documents on 11x17 size format and smaller. Submittals of format size larger than 11x17 shall be made in hard copy form. All samples shall be made in hard copy form, no color selection reviews or verifications shall be made electronically.
- E. After review, provide copies in accordance with NUMBER OF COPIES OF SUBMITTALS article below. Distribute in accordance with SUBMITTAL PROCEDURES article below, and for record documents purposes described in Section 017800 - CLOSEOUT SUBMITTALS.

3.05 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.

2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, provide approved copies at project closeout:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
 6. Submit for Owner' benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
 1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect.
 2. Larger Sheets, Not Larger Than 30 x 42 inches: Submit the number of opaque reproductions which Contractor requires, plus three copies which will be retained by Contractor Architect.
 3. Provide three (3) electronic copies of all submittals in PDF format on thumb drives.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one reproduction of reviewed submittal. Submit one extra of submittals for information.
- D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

- A. Transmit each submittal with approved form.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetical suffix.
- C. Identify Project, Contractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Deliver submittals to Contractor at business address.
- F. Schedule submittals to expedite the Project, and coordinate submission of related items.
- G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

- H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor's and Architect's review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Contractor, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.
- C. Related Requirements:
 - 1. Section 011000 – Summary
 - 2. Section 017300 – Execution

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

- D. Pre-Construction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For testing agencies specified in "Quality Assurance" Article to determine their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.

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

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Contractor-performed tests and inspections cannot be performed by the special inspector.
 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
- C. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. **Factory-Authorized Service Representative's Reports:** Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. **Permits, Licenses, and Certificates:** For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.8 QUALITY ASSURANCE

- A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in the State of Oklahoma and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented

according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Pre-Construction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Owner, with copy to Contractor and to authorities having jurisdiction. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Special Inspector: Special Inspectors shall meet the more stringent of the qualifications listed in this section and the requirements listed in the Statement of Special Inspections submitted to the Authority Having Jurisdiction on this site or otherwise required by the Authority Having Jurisdiction.
- L. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed unless otherwise indicated.
- M. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

- B. Contractor Responsibilities: No testing shall be paid for by owner unless owner decides during construction to have testing of a material performed in addition to contractor's required testing.

Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not, including Special Inspections.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting / Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
 - 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: It will be the contractor's responsibility to contract for Special Inspections to conduct special tests and inspections required by authorities having jurisdiction as follows:
 - 1. Verifying manufacturer's certification by submittal of documentation.
 - 2. Notifying Architect, Owner and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Owner, with copy to Contractor and to authorities having jurisdiction.
 - 4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 5. Retesting and reinspecting corrected work.

6. Submitting a final report of special tests and inspections at Substantial Completion, which shall include descriptions of satisfactory resolutions achieved for all previously reported deficiencies.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 – Execution Requirements.
 2. Protect construction exposed by or for quality-control service activities.
 3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 PRODUCTS

- A. Provide interchangeable components of the same manufacture for components being replaced.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named at least ten (10) days prior to bid date. Approvals of substitution request are not valid unless noted by Addendum issued prior to bid date. Substitutions shall not be permitted after bid date.

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products of types and in quantities specified in

individual specification sections.

- B. Deliver to Project site; obtain receipt prior to final payment.
- C. For flooring products, provide 5% attic stock of each type of flooring (round up to next full carton). Only provide full cartons, partial cartons shall not be accepted.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner, and Architect for review or redesign services associated with re-approval by authorities.
- D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- E. Substitution Submittal Procedure:
 - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect will notify all bidders in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.03 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.

- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 017300

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner's personnel.
- H. Closeout procedures, except payment procedures.

1.02 SUBMITTALS

- A. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.03 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.
- C. Noise Control: Provide methods, means, and facilities to minimize noise from workers and noise produced by construction operations.
- D. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.04 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to

ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of work of separate sections.
- F. After Owner's occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.
- B. Verify that demolition is complete in alterations areas and areas are ready for installation of new work.
- C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- D. Examine and verify specific conditions described in individual specification sections.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore at completion.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate ducts and piping to prevent condensation in exposed areas.
- E. Prepare surfaces and remove surface finishes to provide for proper installation of new work and finishes.
- F. Clean substrate surfaces prior to applying next material or substance.
- G. Seal cracks or openings of substrate prior to applying next material or substance.
- H. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections, coordinate with Owner and Architect a pre-installation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Owner and Architect at least four days in advance of meeting date.
- D. Record minutes and distribute copies within two days after meeting to participants, with electronic copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

- A. Promptly notify Architect of any discrepancies discovered.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. Install Products as specified in individual sections.
- B. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new Work abuts or aligns with existing, perform a smooth and even transition.
- C. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
- D. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- E. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

- F. Re-cover and refinish work that exposes mechanical and electrical work exposed accidentally during the work.

3.06 CUTTING AND PATCHING

- A. Execute cutting and patching including excavation and fill to complete the work, to uncover work to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit Products together to integrate with other work.
- B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- C. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- E. Restore work with new Products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- I. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

3.09 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner's representative seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion. Provide documentation stating Owner's personnel were properly trained, and signed by the personnel who were trained.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season 30 days prior to the start of that season.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

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

3.12 FINAL CLEANING

- A. The Contractor shall be responsible for damaged or broken glass and at completion of the Work shall replace such damaged or broken glass.
- B. Execute final cleaning following completion of the Work and prior to Substantial Completion. Final cleaning shall consist of no less than the following:
 - 1. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
 - 2. Remove all temporary protections.
 - 3. Remove marks, stains, fingerprints and other soil or dirt from all surfaces and other work.
 - 4. Remove spots, mortar, plaster, soil and paint from ceramic tile, marble and other finish materials from all surfaces and other work.
 - 5. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
 - 6. Clean fixtures, cabinets and other casework and equipment by removing any and all stains, paint, dirt, etc., and leave in an undamaged and new condition.
 - 7. Dust all walls that exhibit dust as was created by performance of this Work.
 - 8. Replace filters of operating equipment.
 - 9. Clean debris from roofs, gutters, downspouts, and drainage systems.
 - 10. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 11. Remove waste and surplus materials, rubbish, and construction facilities from the site.
 - 12. ALL surfaces and other work to be cleaned in accordance with recommendations of the manufacturer of the surface and/or equipment being cleaned.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect.
- B. Notify Architect when work is considered ready for Substantial Completion.
- C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for General Contractor's and Architect's review.
- D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- E. Notify Architect when work is considered finally complete.
- F. Complete items of work determined by Owner's and Architect's final inspection.

END OF SECTION

SECTION 017800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 SUBMITTALS

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 2. Field changes of dimension and detail.
 - 3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

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

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and

alignment, adjusting, balancing, and checking instructions.

- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide control diagrams by controls manufacturer as installed.
- J. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- L. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- M. Include test and balancing reports.
- N. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Binders: Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.

- b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
- 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.
- J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

SECTION 018000

PROJECT SIGN

PART 1 GENERAL

1.01 DESCRIPTION

- A. Project sign identifying Owner, Project Name, Architect, Consultants and Contractor

PART 2 PRODUCTS

2.01 MATERIALS

- A. Four feet by Eight feet sheet of overlayed plywood
- B. Primer Coat compatible with finish paint material
- C. Finish Colors and Text shall be provided by Owner and Architect.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install sign in accordance with all laws and codes.
- B. Field locate sign location with Owner and Architect prior to installation.
- C. Erect sign plumb and level.

3.02 MAINTENANCE

- A. Maintain sign plumb and level for the duration of the project.
- B. Maintain vegetation around sign (weed killer, trimming, mowing, etc.) in good condition.

3.03 REMOVAL

- A. At completion of project, remove sign from property.

END OF SECTION

SECTION 023200
GEOTECHNICAL INFORMATION

See Attached *Subsurface Exploration Report* performed by
Belongia Consultants, Inc.

Report #1202035 July 23, 2020

Addendum Letter December 28, 2020

SUBSURFACE EXPLORATION REPORT

**FIRE TRAINING CENTER
SAPULPA, OKLAHOMA
Project No. 1205035
July 23, 2020**

Prepared for:

**GS HELMS & ASSOCIATES, LLC
Jenks, Oklahoma**

Prepared by:

**BELONGIA CONSULTANTS INC.
Broken Arrow, Oklahoma**

BELONGIA CONSULTANTS, INC.

2145 W. Concord Circle
Broken Arrow, OK 74012
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(918) 251-5500

July 23, 2020

GS HELMS & Associates, LLC
424 East Main Street
Jenks, Oklahoma 74037

Attention: Mr. Greg Helms

Re: Subsurface Exploration Report
Proposed Fire Training Center
Sapulpa, Oklahoma
Project No. 1205035

Dear Mr. Helms:

We are submitting, herewith, the results of the subsurface exploration performed for the fire training center to be constructed at 15 Sahoma Lake Road in Sapulpa, Oklahoma.

Variable subsurface conditions were encountered at the site. The subsurface conditions consisted of lean clay, lean to fat clay and fat clay with occasional sandstone seams. Some of the clays have high plasticity and low strength. The overburden soil was underlain by highly weathered shale bedrock. Based on the subsurface conditions encountered at the site, it would be feasible to support the building addition on footing foundations. Because of the variation in support conditions and the presence of expansive clays, we recommend the training tower be supported on drilled pier foundations bearing in the shale bedrock. Also, because of the variable strength soil and high plasticity clays, special procedures will be required to provide adequate support for floor slabs.

Specific recommendations regarding the design and construction of foundations and the support of floor slabs, relative to the subsurface conditions encountered in the borings, are presented in the following report.

If you have any questions regarding the contents of this report or if we can be of further service, please do not hesitate to contact us.

Sincerely,
BELONGIA CONSULTANTS INC.

David L. Belongia

David L. Belongia, P.E.
Oklahoma No. 12908



Copies to: Addressee (1)

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SUBSURFACE EXPLORATION REPORT

FIRE TRAINING CENTER SAPULPA, OKLAHOMA

**Project No. 1205035
July 23, 2020**

INTRODUCTION

This report presents the results of the subsurface exploration and geotechnical engineering services for the proposed fire training center to be constructed at 15 Sahoma Lake Road in Sapulpa, Oklahoma. Three soil borings extending to depths ranging from about 15 to 29 feet were drilled as part of our exploration. The results of the borings and a boring location diagram are attached.

We understand the project involves constructing a training tower and a one story, slab on grade building addition. We anticipate maximum isolated column and continuous wall loads for the building addition will be less than 50 kips and 2 kips per lineal foot, respectively. We anticipate maximum isolated column loads for the training tower will be less than 100 kips. We understand cuts up 8 feet will be required to develop grades for the training tower slab.

The purpose of this report is to describe the subsurface conditions encountered in the borings; analyze the data obtained; and provide recommendations regarding the design and construction of foundations and the support of floor slabs, relative to the subsurface conditions encountered in the borings.

SUBSURFACE EXPLORATION PROCEDURES

As part of the subsurface exploration, three soil borings were drilled for the project. The borings were located in the field by taping distances from the available reference features shown on the location diagram. The boring locations should be considered accurate only to the degree implied by the methods used to make the measurements.

The borings were drilled with a truck-mounted drill rig using continuous hollow stem augers to advance the borings. Representative soil samples were obtained using the split-barrel sampling procedure in general accordance with the appropriate ASTM procedure.

Disturbed samples are obtained in the split-barrel sampling procedure by driving a 2-inch O.D. split-barrel sampler into the ground using a 140-pound automatic hammer falling 30 inches. The number of blows required to advance the sampler were recorded in the field

and are shown on the boring logs as the standard penetration resistance (SPT-N) value. The number of blows required to advance the sampler the final 12 inches or less of a standard 18-inch sampling interval indicate the in-place relative density of granular soils and, to a lesser degree of accuracy, the consistency of cohesive soils, and the hardness of weathered bedrock.

A greater efficiency is achieved with the automatic hammer, compared to the conventional safety hammer operated with a cathead and rope. The effect of this increased efficiency has been considered in interpreting the standard penetration resistance values for this project.

The soil samples obtained in the field were sealed and returned to our laboratory for further examination, testing and classification.

During the drilling operation, field boring logs were prepared by the drill crew. These logs report drilling and sampling methods, sampling intervals, soil and groundwater conditions encountered, and the driller's visual evaluation of the conditions between samples. The final boring logs, included in this report, have been prepared based on the driller's field logs and have been modified, where appropriate, based on the results of the laboratory observation and testing.

LABORATORY TESTING PROGRAM

Moisture content and, where applicable, calibrated hand penetrometer tests were performed on the split-barrel samples. The calibrated penetrometer test provides an indication of the unconfined compressive strength of a cohesive soil. In addition, Atterberg limits tests were performed on selected soil samples. The Atterberg limits indicate the plasticity of a cohesive soil and are used to approximate the soil's potential for volume change with variation in moisture content. The laboratory test results are reported on the boring logs.

The soil samples were examined in our laboratory by an experienced geotechnical engineer and were classified based on the soil's texture and plasticity in accordance with the attached General Notes and Unified Soil Classification System. The estimated Unified System group symbols are shown on the boring logs. A brief description of the Unified Soil Classification System is attached. Bedrock materials were classified in accordance with the attached General Notes and described using commonly accepted geotechnical terminology.

SITE AND SUBSURFACE CONDITIONS

The proposed construction area contains an existing building and some gravel surfacing and concrete paving. Some grass, brush and trees are also present on the property. The majority of the construction area is relatively flat, except for a portion of the training site area that rises in elevation to the north.

The subsurface conditions encountered in the borings are shown on the boring logs and are briefly described below. The stratification lines on the boring logs represent the approximate boundary between soil and rock types; in-situ, the transition between materials may be gradual and indistinct.

At boring B-1, about 5 inches of concrete was encountered at the surface. At borings B-2 and B-3, about 4 inches of gravel was encountered at the surface.

At borings B-1 and B-2, the surface materials were underlain by fill material consisting of brown and dark brown, lean clay, trace sand and gravel to about 2 feet. At boring B-1, the fill had a hydrocarbon odor. The fill was underlain by brown and reddish brown, lean and lean to fat clay, trace sand, gravel and sandstone seams to depths of about 6 to 9 feet. The above materials were underlain by olive brown and gray, shaley lean clay, which extended to depths of about 13 to 14 feet. The shaley clay was underlain by olive brown to gray, highly weathered shale to the bottom of the borings.

At boring B-3, about 4 inches of gravel was encountered at the surface. The gravel was underlain by fill material consisting of brown, dark brown and reddish brown, lean clay with gravel to about 2 feet. The fill was underlain by brown, dark brown and gray, fat clay with varying amounts of gravel to about 14 feet. The overburden soil was underlain by olive brown and gray, highly weathered shale, which extended to the bottom of the boring.

GROUNDWATER CONDITIONS

Groundwater level observations were made while drilling and after completing the borings to evaluate groundwater conditions. As shown in the lower left corner of the boring logs, no groundwater was encountered in the borings at these times.

The groundwater level observations made during our exploration provide an indication of the groundwater conditions at the time the borings were performed. Longer monitoring in piezometers or cased holes would be required to evaluate longer-term groundwater conditions. Fluctuations in the amount of perched water, if any, and groundwater levels

should be expected throughout the years depending upon variations in the amount of rainfall, runoff, evaporation, and other hydrological factors not apparent at the time of our exploration.

ANALYSIS AND RECOMMENDATIONS

Geotechnical Considerations

Variable subsurface conditions were encountered at the site. The subsurface conditions consisted of lean clay, lean to fat clay and fat clay with occasional sandstone seams. Some of the clays have high plasticity and low strength. The overburden soil was underlain by highly weathered shale bedrock.

Based on the subsurface conditions encountered at the site, it would be feasible to support the building addition on footing foundations. Because of the variation in support conditions and the presence of expansive clays, we recommend the training tower be supported on drilled pier foundations bearing in the shale bedrock. Also, because of the variable strength soil and high plasticity clays, special procedures will be required to provide adequate support for floor slabs.

Specific recommendations regarding the design and construction of foundations and the support of floor slabs, relative to the subsurface conditions encountered in the borings, are presented in the following report.

General Site Preparation and Grading

The recommendations presented below apply to site preparation and grading for the building areas and any other areas where structural fills will be constructed.

Areas to be graded should be stripped of all surface vegetation, topsoil, pavements and below grade appurtenances from previous construction. After completing any required cuts, the exposed subgrade should be proofrolled with a loaded dump truck, scraper, or other rubber-tired construction equipment weighing at least 25 tons to help identify the presence of any low strength, unstable soils. Unstable soils identified by the proofrolling procedure should be removed and replaced with approved engineered fill, if they cannot be satisfactorily densified in-place.

After proofrolling and completing any required overexcavations, the exposed subgrade should be scarified to a depth of at least 8 inches, adjusted in moisture content to a level at least 1 percentage point above the material's optimum moisture content, and compacted to at least 95 percent of the material's maximum laboratory dry density determined in accordance with the standard Proctor procedure, ASTM D-698.

Imported fill should consist of an approved, low-volume change material having a plasticity index of 8 to 18 and containing at least 20 percent fines (material passing the No. 200 sieve, based on dry weight).

Off site select fill should be placed in loose lifts not exceeding 9 inches in thickness, at a moisture content equal to minus one percent to plus three percent of the material's optimum moisture content, and compacted to at least 95 percent of the material's maximum laboratory dry density, determined in accordance with ASTM D-698.

The recommended moisture content should be maintained in the scarified and compacted zone and fills, until fills are completed and slabs and pavements are constructed.

Care should be taken in the design and during construction to develop and maintain positive drainage away from the building and pavement areas. In addition to sloping the ground surface, establishing proper drainage in landscape areas adjacent to the building and discharging roof drainage away from the building would reduce the potential for moisture fluctuations in the slab subgrade soils. Planters located within 10 feet of the buildings should be self-contained or include drainage systems to prevent water from accessing slab on grade subgrade soils.

PROPOSED BUILDING ADDITION

Footing Foundations

As discussed above, fill material was encountered to about 2 feet. The fill was underlain by moderate strength, lean to fat clay to about 5 feet. Footings extending through the fill and bearing in the underlying moderate strength, brown and reddish brown, lean to fat clay, can be designed using a maximum net allowable soil bearing pressure of 2,500 psf. The maximum net allowable bearing pressure is the stress that can be applied at the base of the footing in excess of the minimum surrounding overburden pressure. We recommend a geotechnical engineer, or his representative, observe, test and approve all footing excavations to help verify that the recommended bearing materials have been encountered.

Continuous formed footings should have a minimum width of at least 16 inches, and

isolated column footings should have a minimum width of at least 30 inches.

To reduce the potential for volume change below the bearing level and encounter suitable bearing materials, we recommend that footings bear at a depth of at least 36 inches below final adjacent grade. This depth will also provide frost protection. Care should be taken to prevent wetting or drying of the bearing materials during construction. This can be facilitated by placing concrete as soon as possible after the excavation is completed.

We estimate total long-term movement of footings, designed and constructed as recommended, should be less than 3/4 inch.

Floor Slab

Subgrade preparation and fill placement should be performed in accordance with the procedures outlined in the "General Site Preparation and Grading" section of this report. Because of the moderate to high plasticity clay subgrade soils, the floor slab would be subject to movements due to volume change of the underlying clay soils. To reduce the potential for slab movement, we recommend constructing a minimum 24-inch thick layer of low volume change, select fill beneath the floor slab. This thickness is in addition to any granular leveling material constructed beneath the slab. If moisture sensitive floor coverings will be used, a vapor barrier should be constructed beneath the slab.

By constructing a layer of low volume change material beneath the floor slabs, closely controlling the moisture and density of the scarified soils and new fill materials, and closely controlling moisture migration beneath the floor slabs, we believe the potential for large floor slab movement would be effectively reduced. However, because of the remaining thickness of moderate to high plasticity soils, the potential for some future movement would still exist. To further reduce the potential slab movement, a greater thickness of low volume change fill would be required beneath the slab.

TRAINING TOWER

Drilled Pier Foundations

Based on the subsurface conditions and the proposed grades, potentially variable subsurface conditions could be encountered at foundation level. We recommend the structure can be supported on straight shaft drilled piers. Piers extending at least 2 feet into the olive brown and gray shale bedrock, can be designed using a maximum net allowable total load end bearing pressure of 30,000 pounds per square foot (psf). The net allowable bearing pressure refers to the pressure at the foundation bearing level in excess of the minimum surrounding overburden pressure. The above described bedrock

materials were encountered in the borings at depths of about 13 to 14 feet below the existing ground surface. We recommend a Site Class D be used per IBC Code.

We recommend piers have a minimum diameter of 18 inches. If the pier drilling equipment is not capable of adequately cleaning the bearing surface, a larger shaft diameter may be required to permit sufficient cleaning. All loose or disturbed material or water should be removed from pier excavations before placing reinforcing steel and concrete. A heavy duty drill rig with special cutting bits will be required to penetrate the shale bedrock and possible sandstone seams.

Based on the results of the borings, temporary casing should not be required to complete pier excavations. To facilitate pier construction, concrete should be on-site and ready for placement as soon as the pier excavation is completed. Perimeter grade beams should extend at least 24 inches below the final adjacent ground surface to provide frost protection.

Long-term settlement of drilled piers, constructed as recommended above, could be on the order of 1/2 inch.

On Grade Slab

Subgrade preparation and fill placement should be performed in accordance with the procedures outlined in the "General Site Preparation and Grading" section of this report. Low strength, expansive fat clay soils were encountered in boring B-3 at depths of about 3.5 to 12 feet below the existing ground surface. Based on proposed grades, it is likely the on grade slab in this area would be supported on the expansive, fat clay soils. A slab supported on these materials would be subject to movements due to consolidation and volume change. To reduce the potential for slab movement, we recommend constructing a minimum 30-inch thick layer of low volume change, select fill beneath the slab. This thickness is in addition to any granular leveling material constructed beneath the slab. If moisture sensitive floor coverings will be used, a vapor barrier should be constructed beneath the slab. If some slab movement can be tolerated, this thickness could be reduced.

By constructing a layer of low volume change material beneath the slab, closely controlling the moisture and density of the scarified soils and new fill materials, and closely controlling moisture migration beneath the floor slabs, we believe the potential for large slab movement would be effectively reduced. However, because of the remaining thickness of moderate to high plasticity soils, the potential for some future movement would still exist. To further reduce the potential slab movement, a greater thickness of low volume change fill would be required beneath the slab.

Construction Considerations

It should be noted that subsurface conditions could vary beneath the existing building. Some sandstone seams were encountered above the shale bearing material at depths of about 3 to 4 feet below the existing ground surface. A heavy duty pier drilling rig with special cutting bits will be required to penetrate the sandstone seams.

GENERAL COMMENTS

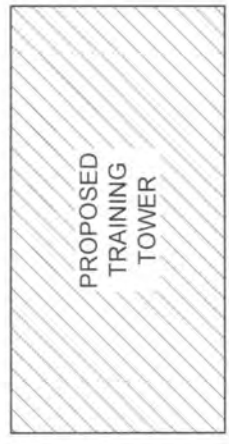
Belongia Consultants Inc. should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations appear, it will be necessary to reevaluate the recommendations of this report.

The scope of services for this project does not include either specifically or by implication any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If owner is concerned about the potential for such contamination, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Belongia Consultants reviews the changes, and either verifies or modifies the conclusions of this report in writing.

B3



B2



B1

NORTH SPOCOGEE STREET

NORTH WALLACE STREET



LEGEND



SOIL BORING LOCATION

DIAGRAM IS FOR GENERAL LOCATION ONLY,
AND IS NOT INTENDED FOR CONSTRUCTION
PURPOSES

SOIL BORING LOCATION DIAGRAM
PROPOSED FIRE TRAINING CENTER
SAPULPA, OKLAHOMA

Project Mgr: DLB	Belongia Consultants Inc. 2145 W. Concord Circle Broken Arrow, OK 74012	Project No. 01205035
Designed By: DLB		Scale: Not to Scale
Checked By: DLB		Date: JUNE 2020
Approved By: DLB		Drawn By: DLB
File Name: 01205035		Figure No. 1

Page 1 of 1

Page 1 of 1

BOREHOLE 1205035 GPJ BELONGIA 7/13/20

WATER LEVEL OBSERVATIONS, ft

WL	 None	WD

WL		

WL	

Belongia Consultants, Inc.

BORING STARTED	6-30-20

BORING COMPLETED 6-30-20

RIG	CME 45	FOREMAN	TB

APPROVED	DLB	JOB #	1205035

LOG OF BORING NO. B-2

Page 1 of 1

CLIENT		ARCHITECT								
SITE		PROJECT								
15 Sahoma Lake Road Sapulpa, Oklahoma		GS HELMS & Associates, LLC Fire Training Center								
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES			TESTS			
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf
	4" Gravel FILL: LEAN CLAY, TRACE GRAVEL brown and dark brown			1	HS SS	8	22	20.1		S-2 LL=43 PL=19 PI=24
2			CL	2	SS	8	7/6" 50/6"	29.0		
3	LEAN CLAY, TRACE GRAVEL dark brown			3	SS HS	1	50/1"			
4	HIGHLY WEATHERED SANDSTONE brown		CH							
	LEAN CLAY, TRACE SAND AND GRAVEL brown		CL	4	SS	2	11	17.1	*2500	
					HS					
9			CL	5	SS	14	41	21.2	*4000	
	SHALEY LEAN CLAY olive brown and gray	10			HS					
13										
	HIGHLY WEATHERED SHALE olive gray			6	SS HS	6	50/6"	13.5		
		15								
				7	SS HS	5	50/6"	10.2		
		20								
23				8	SS HS	3	50/4"			
	WEATHERED SHALE gray	25								
28.8				9	SS	2	50/3"	8.4		

S-2
LL=43
PL=19
PI=24

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft

WL	None WD	
WL		
WL		

Belongia Consultants, Inc.

BORING STARTED		6-30-20	
BORING COMPLETED		6-30-20	
RIG	CME 45	FOREMAN	TB
APPROVED	DLB	JOB #	1205035

BOREHOLE 1205035 GPJ BELONGIA 7/13/20

LOG OF BORING NO. B-3

Page 1 of 1

CLIENT		ARCHITECT									
SITE		PROJECT									
15 Sahoma Lake Road Sapulpa, Oklahoma		GS HELMS & Associates, LLC Fire Training Center									
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
				NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf		UNCONFINED STRENGTH, psf
	4" Gravel FILL: LEAN CLAY WITH GRAVEL brown, reddish brown and dark brown	3.5		1	HS SS	12	12	12.0		S-2 LL=39 PL=19 PI=15	
	FAT CLAY brown and dark gray	5	CH	3	SS	12	10	26.0			
	FAT CLAY WITH GRAVEL dark brown and gray	7.5	CH GC	4	SS	7	4	27.0	*1000		
	FAT CLAY olive gray	12			HS					S-5 LL=53 PL=22 PI=31	
	LEAN CLAY, TRACE GRAVEL olive brown and gray	14	CH	5	SS	2	12	29.8	*2500		
					HS						
	HIGHLY WEATHERED SHALE olive brown and gray	14.5		6	SS	8	15/6" 50/6"	15.8			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft

WL	None WD	
WL		
WL		

Belongia Consultants, Inc.

BORING STARTED		6-30-20	
BORING COMPLETED		6-30-20	
RIG	CME 45	FOREMAN	TB
APPROVED	DLB	JOB #	1205035

BOREHOLE 1205035 GPJ BELONGIA 7/23/20

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS: Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted
 ST: Thin-Walled Tube - 2" O.D., unless otherwise noted
 RS: Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted
 DB: Diamond Bit Coring - 4", N, B
 BS: Bulk Sample or Auger Sample

HS: Hollow Stem Auger
 PA: Power Auger
 HA: Hand Auger
 RB: Rock Bit
 WB: Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL: Water Level
 WCI: Wet Cave in
 DCI: Dry Cave in
 AB: After Boring

WS: While Sampling
 WD: While Drilling
 BCR: Before Casing Removal
 ACR: After Casing Removal

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

<u>Unconfined Compressive Strength, Qu, psf</u>	<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Consistency</u>
< 500	<2	Very Soft
500 - 1,000	2-3	Soft
1,001 - 2,000	4-6	Medium Stiff
2,001 - 4,000	7-12	Stiff
4,001 - 8,000	13-26	Very Stiff
8,000+	26+	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Standard Penetration or N-value (SS) Blows/Ft.</u>	<u>Relative Density</u>
0 - 3	Very Loose
4 - 9	Loose
10 - 29	Medium Dense
30 - 49	Dense
50+	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 - 29
Modifier	> 30

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 - 12
Modifiers	> 12

GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1-10
Medium	11-30
High	30+

GENERAL NOTES

Sedimentary Rock Classification

DESCRIPTIVE ROCK CLASSIFICATION:

Sedimentary rocks are composed of cemented clay, silt and sand sized particles. The most common minerals are clay, quartz and calcite. Rock composed primarily of calcite is called limestone; rock of sand size grains is called sandstone, and rock of clay and silt size grains is called mudstone or claystone, siltstone, or shale. Modifiers such as shaly, sandy, dolomitic, calcareous, carbonaceous, etc. are used to describe various constituents. Examples: sandy shale; calcareous sandstone.

LIMESTONE	Light to dark colored, crystalline to fine-grained texture, composed of CaCO_3 , reacts readily with HCl.
DOLOMITE	Light to dark colored, crystalline to fine-grained texture, composed of $\text{CaMg}(\text{CO}_3)_2$, harder than limestone, reacts with HCl when powdered.
CHERT	Light to dark colored, very fine-grained texture, composed of micro-crystalline quartz (SiO_2), brittle, breaks into angular fragments, will scratch glass.
SHALE	Very fine-grained texture, composed of consolidated silt or clay, bedded in thin layers. The unlaminated equivalent is frequently referred to as siltstone, claystone or mudstone.
SANDSTONE	Usually light colored, coarse to fine texture, composed of cemented sand size grains of quartz, feldspar, etc. Cement usually is silica but may be such minerals as calcite, iron-oxide, or some other carbonate.
CONGLOMERATE	Rounded rock fragments of variable mineralogy varying in size from near sand to boulder size but usually pebble to cobble size ($\frac{1}{2}$ inch to 6 inches). Cemented together with various cementing agents. Breccia is similar but composed of angular, fractured rock particles cemented together.

PHYSICAL PROPERTIES:

DEGREE OF WEATHERING

Slight	Slight decomposition of parent material on joints. May be color change.
Moderate	Some decomposition and color change throughout.
High	Rock highly decomposed, may be extremely broken.

HARDNESS AND DEGREE OF CEMENTATION

Limestone and Dolomite:

Hard	Difficult to scratch with knife.
Moderately Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Soft	Can be scratched with fingernail.

Shale, Siltstone and Claystone

Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be easily dented but not molded with fingers.

Sandstone and Conglomerate

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING AND JOINT CHARACTERISTICS

Bed Thickness	Joint Spacing	Dimensions
Very Thick	Very Wide	> 10'
Thick	Wide	3' - 10'
Medium	Moderately Close	1' - 3'
Thin	Close	2" - 1'
Very Thin	Very Close	.4" - 2"
Laminated	—	.1" - .4"
Bedding Plane	A plane dividing sedimentary rocks of the same or different lithology.	
Joint	Fracture in rock, generally more or less vertical or transverse to bedding, along which no appreciable movement has occurred.	
Seam	Generally applies to bedding plane with an unspecified degree of weathering.	

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy (Pitted)	Rock having small solution pits or cavities up to $\frac{1}{2}$ inch diameter, frequently with a mineral lining.
Porous	Containing numerous voids, pores, or other openings, which may or may not interconnect.
Cavernous	Containing cavities or caverns, sometimes quite large.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests^A

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A					Soil Classification	
					Group Symbol	Group Name ^B
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$		GW	Well-graded gravel ^F
			$Cu < 4$ and/or $1 > Cc > 3^E$		GP	Poorly graded gravel ^F
		Gravels with Fines More than 12% fines ^C	Fines classify as ML or MH		GM	Silty gravel ^{F,G,H}
			Fines classify as CL or CH		GC	Clayey gravel ^{F,G,H}
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$		SW	Well-graded sand ^I
			$Cu < 6$ and/or $1 > Cc > 3^E$		SP	Poorly graded sand ^I
		Sands with Fines More than 12% fines ^D	Fines classify as ML or MH		SM	Silty sand ^{G,H,I}
			Fines Classify as CL or CH		SC	Clayey sand ^{G,H,I}
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	$PI > 7$ and plots on or above "A" line ^J		CL	Lean clay ^{K,L,M}
			$PI < 4$ or plots below "A" line ^J		ML	Silt ^{K,L,M}
		organic	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{K,L,M,N}
			Liquid limit - not dried			Organic silt ^{K,L,M,O}
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line		CH	Fat clay ^{K,L,M}
			PI lots below "A" line		MH	Elastic Silt ^{K,L,M}
		organic	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{K,L,M,P}
			Liquid limit - not dried			Organic silt ^{K,L,M,Q}
Highly organic soils	Primarily organic matter, dark in color, and organic odor				PT	Peat

^A Based on the material passing the 3-in. (75-mm) sieve

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

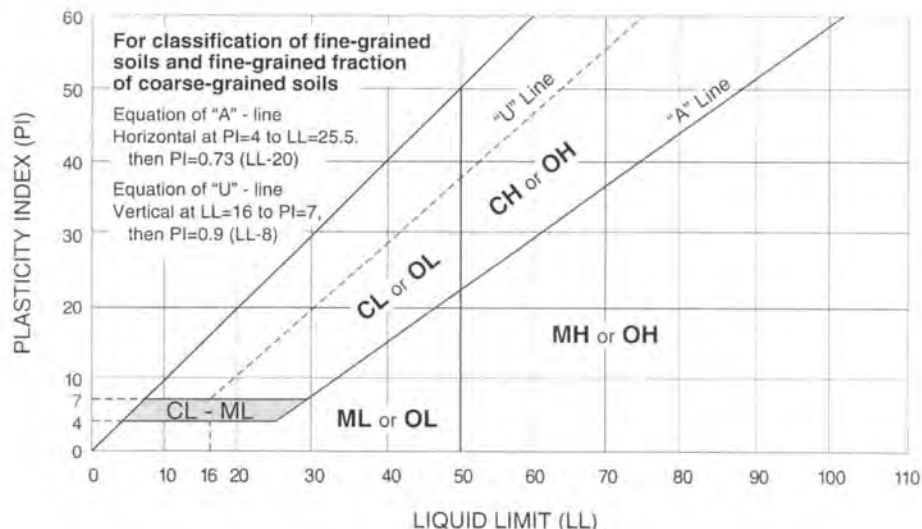
^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.



BELONGIA CONSULTANTS, INC.

2145 W. Concord Circle
Broken Arrow, OK 74012
dlbelongia@peoplepc.com
(918) 251-5500

December 28, 2020

GS HELMS & Associates, LLC
424 East Main Street
Jenks, Oklahoma 74037

Attention: Mr. Greg Helms

Re: Addendum Letter
Fire Training Center
Sapulpa, Oklahoma
Project No. 1205035A

Dear Mr. Helms:

Belongia Consultants, Inc. performed a subsurface exploration and geotechnical report for the above project and submitted the results of that exploration in Belongia Consultants report dated July 23, 2020. The report presented recommendations for support of foundations and on grade floor slab, as related to the subsurface conditions encountered at the boring locations. We understand recommendations for support of pavements is desired at this time.

Pavement Considerations

Based on the borings, the pavement subgrade could consist of lean clay, lean to fat clay and fat clay with varying amounts of gravel. The above described clay's have variable strength. As a minimum, we recommend the subgrade be undercut sufficiently to construct a layer of select fill beneath the pavement section.

After completing stripping and any cutting required to develop grade, the exposed pavement subgrade should be proofrolled as outlined in the "*General Site Preparation and Grading*" section. At this time, any areas exhibiting instability should be removed and replaced with engineered fill, if they cannot be stabilized in-place. Fill construction in the pavement areas should be performed as outlined in the "*General Site Preparation and Grading*" section.

We recommend the subgrade be undercut sufficiently to construct a minimum 10-inch thick layer of select fill. The thickness of select fill does not include the thickness of the aggregate base course in the recommended pavement sections. Select fill should consist of an approved, low plasticity material having a plasticity index of 8 to 18 and containing at least 15 percent fines (material passing the No. 200 sieve, based on dry weight). Silty soils including those that classify with a Unified System Group Symbol of ML, CL-ML, or SM should not be used as select fill unless

Fire Training Center
Sapulpa, Oklahoma
Project No. 1205035A
December 28, 2020

they are stabilized with Class "C" fly ash. Select fill materials should be tested to verify that they are suitable and approved prior to their use. Depending on weather conditions at the time of construction, a greater thickness of select fill could be required.

Preliminary pavement sections are presented below. These sections are based on a 15-year design life and a subgrade CBR value of 3 for the subgrade soils. Also, these sections assume the light-duty pavements will only be traveled by automobiles, and the heavy-duty pavements will be traveled by no more than 5 trucks per day having a gross weight of 80,000 pounds or equivalent trafficking. Some periodic maintenance should be expected to realize the 15-year life. Other pavement sections could be considered.

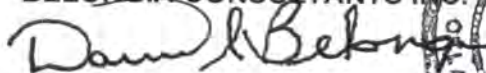
	<u>HEAVY-DUTY</u>	<u>LIGHT-DUTY</u>
<u>PAVEMENT SECTION I</u>		
(Asphaltic Concrete Over	2.0" Type "C"*	2.0" Type "C"*
Aggregate Base Over	6.0" Type "A"*	2.0" Type "A"*
Select Fill*)	6.0" Aggregate Base*	6.0" Aggregate Base*
	10.0" Select Fill	10.0" Select Fill
<u>PAVEMENT SECTION II</u>		
(3,500 psi Air	7.0" Concrete	5.0" Concrete
Entrained Portland	4.0" Aggregate Base	10.0" Select Fill
Cement Concrete	10.0" Select Fill	

*Oklahoma Department of Transportation Standard Specifications

All other recommendations presented in the July 23 report remain applicable. If you have any questions or if we can be of further service, please contact us.

Sincerely,

BELONGIA CONSULTANTS INC.



David L. Belongia, P.E.
Oklahoma No. 12908



Copies To: Addressee (1)

SECTION 032000
REINFORCING STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel bars, wire fabric, and accessories for cast-in-place concrete.
- B. Products Furnished, Not Installed Under This Section

1.02 RELATED SECTIONS

- A. Section 033000 – Cast In Place Concrete

1.03 REFERENCES

- A. American Concrete Institute (ACI)
 - 1. ACI 301, Specifications for Structural Concrete for Buildings.
 - 2. ACI 315, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
 - 3. ACI 318, Building Code Requirements for Reinforced Concrete.
- B. American Society for Testing Materials (ASTM)
 - 1. ASTM A185, Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement.
 - 2. ASTM A615, Standard Specification for Deformed and Plain Billet – Steel Bars.
 - 3. ASTM A706, Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
- C. American Welding Society, AWS D1.4, "Structural Welding Code" – Reinforcing Steel"
- D. Concrete Reinforcing Steel Institute (CRSI)
 - 1. Manual of Standard Practice.
 - 2. CRSI 63 – Recommended Practice for Placing Reinforcing Bars
 - 3. CRSI 65 – Recommended Practice for Placing Bar Supports

1.04 SUBMITTALS

- A. Shop Drawings: Submit detailed shop and installation drawings showing material grades, spacing, length, size and quantities of bars, bending diagrams, installation instructions and details of bar support and their spacing.
 - 1. Requirement for Submittals
 - a. Review of shop drawings is for bar sizes, spacing, details and general compliance with the Contract Drawings only.
 - b. Reproduction of Contract Drawings shall not be used for shop drawings.
 - c. Do not begin fabrication of materials prior to review of shop drawings.
 - d. Material quantities, fit, verification of job conditions and coordination with other trades are the responsibility of the contractor.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Deliver materials in tagged bundles grouped in bar size and length.
- B. Store bars on skids off of the ground and stacked to permit drainage. Prevent buildup of rust

and dirt on bars. Protect bars from contamination that would prevent bonding of concrete.

- C. Do not bend, twist or warp bars during handling.

1.06 ALLOWANCE

- A. Include an allowance in bid price for 1,000 pounds of reinforcing steel to be fabricated and placed as directed by Architect or Engineer. Allowance is to include, but not limited to, material, detailing, fabrication, shipping, installation, overhead and profit.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Reinforcing Steel
 - 1. Deformed bars: new billet steel conforming to ASTM A615 of required grades.
 - 2. Welded wire mesh: conform to ASTM A185.
 - 3. Reinforcing bars to be welded: conform to ASTM A706 Grade 60.
 - 4. Spirals: smooth bars conforming to ASTM A615 Grade 60.

2.02 ACCESSORIES

- A. Bar Supports: Comply with ACI 315.
 - 1. Provide plastic-tipped chairs of suitable color where concrete soffits will be exposed to view.
 - 2. Provide continuous supports with spacers for slab reinforcement.

2.03 FABRICATION

- A. Shop Fabrication
 - 1. Cut bars to required length.
 - 2. Bend bars cold with suitable equipment. Do not heat or stretch material. Bend radii and extension shall comply with ACI 318.
 - 3. Do not use bars with kinks or un-required bends.
 - 4. Do not re-straighten bars bent more than 30 degrees.
- B. Tolerances: comply with ACI 318.
- C. Marking: mark bars to correspond with shop drawings.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean reinforcing of rust, mill scale, dirt, oil and grease.

3.02 PLACEMENT

- A. Place reinforcement of required sizes and quantities in proper position. Use sufficient supports and spacers to maintain position during placement of concrete. Comply with ACI 301.
 - 1. Do not place bar supports against exposed faces of precast panels, beams, walls or copings.

- B. Secure reinforcement in position with wire ties complying with ACI 318.
 - 1. Clip or bend tails or tie wire away from exposed faces, do not leave tie wire within 1 ½" of any exposed surface.
- C. Maintain position of reinforcing mats in walls with metal spacers between the mats.
- D. Place reinforcing in conformance with ACI 318 and ACI 301 to provide required concrete cover over reinforcement.

3.03 TOLERANCES

- A. Placement of top bars in slabs and beams:
 - 1. Members 8 inches deep or less: $\pm \frac{1}{4}$ inch.
 - 2. Members more than 8 inches but not over 2 feet deep: $\pm \frac{1}{2}$ inch.
 - 3. Members more than 2 feet deep: $\pm$ one inch.
- B. Lengthwise of members: $\pm$ 2 inches.
- C. Concrete cover to formed surfaces: $\pm \frac{1}{4}$ inch.
- D. Minimum spacing between bars: $\pm \frac{1}{4}$ inch.

3.04 FIELD QUALITY CONTROL

- A. Testing Laboratory Services
 - 1. Inspect bar sizes, quantities and placement.
 - 2. Inspect support and securement of reinforcing.
 - 3. Inspect condition of reinforcing.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Piers.
 - 2. Grade Beams
 - 3. Foundation walls.
 - 4. Retaining walls.
 - 5. Pit walls.
 - 6. Slabs-on-grade.
 - 7. Slabs on metal deck.
 - 8. Concrete toppings.
 - 9. Concrete formwork.
 - 10. Steel reinforcement.
- B. Related Sections:
 - 1. Section 013000 – Submittal Procedures
 - 2. Section 014000 – Quality Requirements
 - 3. Section 032000 – Reinforcing Steel

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data in accordance with specifications indicating product compliance to these specifications.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Indicate the following for each mix design submittal:
 - 1. Building element designation.
 - 2. Proportions of cement, fine and coarse aggregates, and water.
 - 3. Water-cement ratio, design strength, slump and air content.
 - 4. Type of cement and aggregates.
 - 5. Type and dosage of admixtures.
 - 6. Documentation of average strength for each type of concrete.

- D. Construction Joints: Submit drawings indicating proposed locations of construction joints and joint configuration.
- E. Steel Reinforcement Shop Drawings: Submit detailed shop and installation drawings showing material grade, spacing, length, size and quantities of bars and bending diagrams. The reinforcement shop drawings shall be prepared showing all beams, pedestals and walls in elevation view. Reinforcement schedules alone are not acceptable. The reinforcement shop drawings shall also include sections and details showing reinforcement placement. Other installation instructions and details of bar support and their spacing shall be provided.
 - 1. Submit three bond sets of shop drawings for review by the Structural Engineer-of-Record. The Structural Engineer-of-Record will mark three sets with red and will return one set to the contractor through the architect. The contractor shall make the number of photocopies required of the approved shop drawings for distribution to other parties, and the contractor shall be responsible for transmitting the original red-marked set to the fabricator for corrections.
 - 2. Requirements for Submittals:
 - a. Review of shop drawings is for bar sizes, spacing, details and general compliance with the Contract Drawings only.
 - b. Only complete shop drawing submittals will be reviewed. Shop drawings not in compliance with the Submittal portion of this document will be rejected. Time required by Wallace Engineering Structural Consultants, Inc. to review shop drawing submittals a second or third time will be billed to the General Contractor at Wallace Engineering Structural Consultants, Inc. hourly rates.
 - c. Reproduction of Contract Drawings shall not be used for shop drawings.
 - d. Do not begin fabrication of materials prior to review of shop drawings.
 - e. Material quantities, fit, verification of job conditions and coordination with other trades are the responsibility of the General Contractor.
- F. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- G. Formwork Product Data:
 - 1. Form oil.
 - 2. Form release agent.
 - 3. Form sealer.
 - 4. Void forms: Provide data for materials and installation requirements.
 - 5. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- H. Samples: For waterstops and vapor retarder.
- I. Welding certificates.
- J. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Fiber reinforcement.
 - 6. Waterstops.
 - 7. Curing compounds.
 - 8. Floor and slab treatments.
 - 9. Bonding agents.
 - 10. Adhesives.

- 11. Vapor retarders.
 - 12. Semi-rigid joint filler.
 - 13. Joint-filler strips.
 - 14. Repair materials.
 - 15. Geosynthetic fill material
- K. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
- 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- L. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- M. Field quality-control test and inspection reports.
- N. Minutes of preinstallation conference.

1.5 ALLOWANCE

- A. Include an allowance in bid price for **2,000** pounds of reinforcing steel to be fabricated and placed as directed by Architect or Engineer as provided as part of Section 032000 – Reinforcing Steel. Allowance is to include, but not limited to, material, detailing, fabrication, shipping, installation, overhead and profit.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
- 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code - Reinforcing Steel."

- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete."
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation.
- H. Mockups: Cast concrete formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.
 - 1. Build panel approximately 100 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- I. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - e. Special concrete finish subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi-rigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.
- J. Concrete Formwork:
 - 1. Design and construct forms to withstand stresses due to weight of fresh concrete, vibration during consolidation and loads of equipment and workmen. Comply with ACI 318.
 - 2. Limit deflection of forms to provide smooth, straight surfaces without unsightly bulges and deformations.
 - 3. Limit deformations of forms for architecturally exposed surfaces to 0.0025 times the span of each component (facing materials, studs and walers).

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Transporting: Ready-mixed concrete supplier shall have sufficient capacity and adequate facilities to provide continuous delivery at the rate required for continuous placement throughout any sequence of placement.
- B. Storage of Concrete Materials:
 - 1. Store cement in weather tight buildings or bins which prevent intrusion of moisture or contaminants. Store different types of cement in separate facilities.
 - 2. Stockpile aggregates to prevent segregation and contamination with other materials. Thaw frozen aggregates before use.
 - 3. Sand shall be drained to a uniform moisture content before use.

4. Store admixtures securely to prevent contamination, evaporation damage or temperature variation in excesses of the range recommended by the manufacturer.
- C. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- D. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
- E. Formwork:
 1. Store materials off of the ground and protected from weather.
 - a. Prevent warpage, twisting and excessive moisture gain of wood materials.
 - b. Discard damaged or deformed materials.
 2. Protect smooth faces of form liner materials from abrasion, denting or scarring during handling.
 3. Deliver void forms and installation instructions in manufacturer's packaging.

PART 2 PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Architectural Appearance Quality Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints. Coordinate snap-tie hole layout and spacing with architect.
 1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- G. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

- H. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Coordinate snap-tie hole layout and spacing with architect.
 - 2. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 3. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 4. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- C. Steel Bar Mats: ASTM A 184, fabricated from ASTM A 615, Grade 60, or A706, deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A 82, as drawn.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I, II or III. Cement shall be supplied from a single manufacturer. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or F. Use only one type and source throughout project.
 - 2. Blended Hydraulic Cement: ASTM C 595, Type IP, portland-pozzolan, or Type I (PM), pozzolan-modified portland cement.
- B. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33 coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: As noted in "Concrete Mixtures for Building Elements." Coarse aggregate shall conform to applicable requirements of ASTM C 33 gravel or crushed stone, suitably processed, washed and screened, consisting of hard, durable particles without adherent coatings.
 2. Fine Aggregate: conform to applicable requirements of ASTM C 33, natural bank or river sand, washed and screened, consisting of hard, durable, uncoated particles free of deleterious matter, free of materials with deleterious reactivity to alkali in cement, and graded from coarse to fine to produce a minimum percentage of voids.
- D. Water: ASTM C 94 and potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
 7. Water-Reducing Admixture shall be compatible with flooring products and adhesives.

2.6 WATERSTOPS

- A. Preformed Plastic Adhesive Waterstops: Provide preformed, non-expansive, self-sealing, plastic adhesive waterstop. Representative product:
1. Synko-Flex SF302 – Waterstop.

2.7 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A, single or multi-layer, not less than 15 mils thick:
1. Maximum perm rating of 0.01 perms (U.S.) per ASTM E 96 or F 1249.
 2. Puncture resistance of 2200g or greater per ASTM D 1709, B.
 3. Include manufacturer's recommended adhesive or pressure-sensitive joint tape, and include manufacturer's proprietary penetration flashing for all through-slab penetrations.
 4. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Vapor Block 15; Raven Industries Inc.
 - b. Stego Wrap, 15 mil; Stego Industries, LLC.
 - c. Moistop Ultra 15; Fortifiber Corporation.
 - d. Viper II 15 mil; Insolation Solutions, Inc.
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

- C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
 - b. BASF Construction Chemicals - Building Systems; Confilm.
 - c. ChemMasters; SprayFilm.
 - d. Conspec by Dayton Superior; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film (J-74).
 - f. Edoco by Dayton Superior; BurkeFilm.
 - g. Euclid Chemical Company (The), an RPM company; Eucobar.
 - h. Kaufman Products, Inc.; Vapor-Aid.
 - i. Lambert Corporation; LAMBCO Skin.
 - j. L&M Construction Chemicals, Inc.; E-CON.
 - k. Meadows, W. R., Inc.; EVAPRE.
 - l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group; MONOFILM.
 - n. Sika Corporation; SikaFilm.
 - o. SpecChem, LLC; Spec Film.
 - p. Symons by Dayton Superior; Finishing Aid.
 - q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
 - r. Unitex; PRO-FILM.
 - s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
 - b. BASF Construction Chemicals - Building Systems; Kure 200.
 - c. ChemMasters; Safe-Cure Clear.
 - d. Conspec by Dayton Superior; W.B. Resin Cure.
 - e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
 - f. Edoco by Dayton Superior; Res X Cure WB.
 - g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
 - h. Kaufman Products, Inc.; Thinfil 420.
 - i. Lambert Corporation; AQUA KURE - CLEAR.
 - j. L&M Construction Chemicals, Inc.; L&M Cure R.
 - k. Meadows, W. R., Inc.; 1100-CLEAR.
 - l. Nox-Crete Products Group; Resin Cure E.

- m. Right Pointe; Clear Water Resin.
 - n. SpecChem, LLC; Spec Rez Clear.
 - o. Symons by Dayton Superior; Resi-Chem Clear.
 - p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
 - q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Anti-Hydro International, Inc.; AH Clear Cure WB.
 - b. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
 - c. ChemMasters; Safe-Cure & Seal 20.
 - d. Conspec by Dayton Superior; Cure and Seal WB.
 - e. Cresset Chemical Company; Crete-Trete 309-VOC Cure & Seal.
 - f. Dayton Superior Corporation; Safe Cure and Seal (J-18).
 - g. Edoco by Dayton Superior; Spartan Cote WB II.
 - h. Euclid Chemical Company (The), an RPM company; Aqua Cure VOX; Clearseal WB 150.
 - i. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
 - j. Lambert Corporation; Glazecote Sealer-20.
 - k. L&M Construction Chemicals, Inc.; Dress & Seal WB.
 - l. Meadows, W. R., Inc.; Vocomp-20.
 - m. Metalcrete Industries; Metcure.
 - n. Nox-Crete Products Group; Cure & Seal 150E.
 - o. Symons by Dayton Superior; Cure & Seal 18 Percent E.
 - p. TK Products, Division of Sierra Corporation; TK-2519 WB.
 - q. Vexcon Chemicals, Inc.; Starseal 309.

2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types I and II, non-load bearing for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Non-Shrink Grout: Pre-mixed, non-shrinking, minimum compressive strength of 5000 psi in 28 days, conforming to U.S. Army Corps of Engineers specifications No. CRD-C621. Grout exposed to view shall be non-oxidizing.

2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109.

2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixtures, strength test records, or field test data, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - 2. Required Average Strength for each type of concrete:
 - a. Where suitable test records for the concrete production facility are available, design strength may be tested on the standard deviation in accordance with ACI 318.
 - b. Where strength test records are not available, design strength and documentation of average strength as noted in ACI 318, Chapter 5.
- B. Cementitious Materials:
 - 1. Minimum cement content:
 - a. Cementitious Materials content shall not be less than 520 pounds per cubic yard, unless noted otherwise in Contract Documents.
 - 2. Use fly ash and pozzolan as needed to reduce the total amount of portland cement, which would otherwise be used. If used, limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - a. Fly Ash: 25 percent maximum, 15 percent minimum.
 - b. Combined Fly Ash and Pozzolan: 25 percent maximum.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing or plasticizing admixture in pumped concrete, and concrete with a water-cementitious materials ratio below 0.50.
 4. Slump limits noted in the following building elements are values before adding water-reducing admixtures. Slump limits shall be no more than 8" after adding the water-reducing admixture.
- D. For concrete exposed to freeze thaw, air content shall be 6 percent plus or minus 1.5 percent, unless noted otherwise in Contract Documents. For concrete not exposed to freeze thaw, do not add air-entraining agents.
- E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup. Reference Contract Drawings for locations.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Piers and Grade Beams: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.44.
 3. Slump Limit: 4 inches plus or minus 1 inch.
 4. Maximum Coarse Aggregate Size: 1 inch.
 5. Minimum Cementitious Materials Content: 470 pounds per cubic yard.
- B. Foundation Walls and Pedestals: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi at 28 days.
 2. Maximum Water-Cementitious Material Ratio: 0.44.
 3. Slump Limit: 4 inches plus or minus 1 inch
 4. Maximum Coarse Aggregate Size: 1 inch.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3500 psi at 28 days.
 2. Maximum Water-Cementitious Material Ratio: 0.51.
 3. Slump Limit: 4 inches plus or minus 1 inch.
 4. Maximum Coarse Aggregate Size: 3/4 inch.
- D. Steel Stair Pans and Slabs on Non-Composite Form Deck: Proportion normal weight concrete mixture as follows:
1. Minimum Composite Strength: 4000 psi at 28 days.
 2. Maximum Water-Cementitious Material Ratio: 0.58.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Maximum Coarse Aggregate Size: 3/4 inch.
- E. Exterior Structural Concrete: Proportion normal weight concrete mixture as follows:
1. Minimum Compressive Strength: 4500 psi at 28 days.
 2. Maximum Water-Cementitious Material Ratio: 0.45.
 3. Slump Limit: 4 inches, plus or minus 1 inch.
 4. Maximum Coarse Aggregate Size: 1 inch.
 5. Air Content: 6 percent, plus or minus 1.5 percent.

2.13 FABRICATING REINFORCEMENT

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

2.14 CONCRETE MIXING

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

PART 3 EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. At Architectural Appearance Quality Smooth-Formed Finished Concrete Walls coordinate snap-tie hole layout and spacing with Architect.
- D. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class C, 1/2 inch for rough-formed finished surfaces.
- E. Construct forms tight enough to prevent loss of concrete mortar.
- F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- I. Install void forms in accordance with manufacturer's written recommendations. Protect forms from moisture and crushing.
- J. Chamfer exterior corners and edges of permanently exposed concrete.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

- L. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- M. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- N. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions. Reference Contract Drawings for locations requiring vapor retarder placement.
 - 1. Lap vapor retarder over footings and seal to foundation walls.
 - 2. Lap joints 6 inches and seal with manufacturer's recommended tape.
 - 3. Seal penetrations (including pipes) per manufacturer's instructions.
 - 4. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches and taping all four sides with manufacturer's recommended tape.
- B. Place vapor retarder on top of the drainage course material and directly below slab at all interior slabs.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Weld reinforcing bars according to AWS D1.4, where indicated on Contract Drawings.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete or as indicated on Contract Drawings.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Do not locate construction joints between lateral bracing elements of walls and columns.
 - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 6. Space vertical joints in walls as indicated on the Contract Drawings or on the approved submittals. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction (Control) Joints in Slabs-on-Grade: Within 12 hours of pouring slabs, form weakened-plane contraction joints, sectioning concrete into areas as indicated on the Contract Drawings. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into concrete when

cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

- a. Primary Method: Soft-Cut System method, by Soff-Cut International, Corona, CA (800) 776-3328. Finisher must have documented successful experience in the use of this method prior to this project. Install cuts within 2 hours after final finish at each saw cut location. Use 1/4 inch thick blade, cutting 1-1/4 inch into slab.
 - b. Optional Method (Where Soft-Cut System Method Equipment is Not Available): Properly time cutting with the set of the concrete. Saw-Cut control joints within 12 hours after finishing. Start cutting as soon as the concrete has hardened sufficiently to prevent aggregates being dislodged by the saw. Complete cutting before shrinkage stresses become sufficient to produce cracking. Use 1/4 inch thick blade, cutting 1-1/4 inch into slab.
2. Spacing: Provide joints at locations as noted on Contract Drawings.
 - a. Placement of saw joints must be coordinated with the tile joints and this requirement governs over locations shown on the Contract Drawings.
- D. Doweled Joints: Install dowel bars and support assemblies at joints as noted on the Contract Drawings. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint. In lieu of dowels, plate dowel system approved by the Engineer of Record may be used at Contractor's option.

3.7 WATERSTOPS

- A. Preformed Plastic Adhesive Waterstops: Install in construction joints and at other locations indicated on Contract Drawings, according to manufacturer's written instruction, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Precautions to protect fresh concrete from developing plastic shrinkage cracks must be taken in advance of concrete placement when evaporation rate due to any combination of temperature, humidity, and wind velocity is expected to approach 0.2 lb./sq. ft./hr. as determined by ACI 305R. Acceptable precautions to reduce the rate of evaporation include use of wind breaks, fog spray, covering with polyethylene sheeting, or wet cover.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by the Structural Engineer-of-Record.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit

duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Lack of Slope: Confirm with Architect before proceeding when Contract Drawings show exterior flatwork without a specific slope.
 6. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1, ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When the average of the highest and lowest ambient temperature from midnight to midnight is expected to be less than 40 degrees F for more than three successive days, deliver concrete to meet the following minimum temperatures immediately after placement:
 - a. 55 degrees F for sections less than 12 inches in the least dimension;
 - b. 50 degrees F for sections 12 to 36 inches in the least dimension;
 - c. 45 degrees F for sections 36 to 72 inches in the least dimension; and
 - d. 40 degrees F for sections greater than 72 inches in the least dimension.
 2. The temperature of concrete as placed shall not exceed these values by more than 20 degrees F.
 3. The minimum requirements may be terminated when temperatures above 50 degrees F occur during more than half of any 24 hour duration.
 4. When the outdoor temperature is less than 40 degrees F, maintain temperature of placed concrete at not less than 50 degrees F for required curing time.
 5. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 6. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301, ACI 305.1, ACI 305R, and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
 3. Precautions to protect fresh concrete from developing plastic shrinkage cracks must be taken in advance of concrete placement when evaporation rate due to any combination of temperature, humidity, and wind velocity is expected to approach 0.2 lb./sq. ft./hr. as determined by ACI 305R. Acceptable precautions to reduce the rate of evaporation include use of wind breaks, fog spray, covering with polyethylene sheeting, or wet cover.
- H. Windy Weather Placement: Comply with ACI 301, ACI 305.1, ACI 305R and as follows:

1. Precautions to protect fresh concrete from developing plastic shrinkage cracks must be taken in advance of concrete placement when evaporation rate due to any combination of temperature, humidity, and wind velocity is expected to approach 0.2 lb./sq. ft./hr. as determined by ACI 305R. Acceptable precautions to reduce the rate of evaporation include use of wind breaks, fog spray, covering with polyethylene sheeting, or wet cover.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities. Fill holes and honeycombs.
 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated on Contract Documents:
 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated on the Contract Drawings.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
 1. Apply scratch finish to surfaces as indicated on the Contract Drawings.

- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces of all slabs.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces of all floor slabs unless noted otherwise on Contract Drawings.
 - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
 - 3. Where floor drains occur, slope slabs uniformly to drains as indicated on Contract Drawings, or if not indicated at 1/4 inch per 12 inch in small areas and 1/8 inch per 12 inch in large areas.
 - 4. Trowel finish shall be by plastic blades to prevent a hard mirror finish.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Contract Drawings. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated on Contract Drawings.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Contract Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Contract Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for

hot-weather protection during curing. Curing shall be continued for a period of 7 days for Type I cement, or 3 days for Type III cement, or until tests indicate that the concrete has attained 75 percent of required strength.

- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h as determined by ACI 305R before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, and 308R by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water – Ponding or continuous sprinkling.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - d. Application of sand kept continuously wet.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period. If used, Contractor is responsible for verifying that compound is compatible with and will have no detrimental effect on adhesives and final finishes specified over the concrete surface.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Notify Architect and Engineer of Record if structural repairs are necessary. Perform structural repairs with prior approval of method and materials from Architect and Engineer of Record. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
 8. Repair shrinkage cracks by filling cracks with pressure epoxy grout. Perform repairs with prior approval of method and materials from Architect and Engineer of Record.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections as noted below along with inspection schedule items included in the Contract Drawings. Testing agency shall prepare tests and inspection reports and submit to Owner and Owner's Consultants.
- B. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Anchor rods.
 5. Verification of use of required design mixture.
 6. Concrete placement, including conveying and depositing.
 7. Curing procedures and maintenance of curing temperature.
 8. Verification of concrete strength before removal of shores and forms from beams and slabs.
 9. All other special inspection items as noted on the Contract Drawings.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. or fraction thereof of each concrete mixture placed each day. For slabs, obtain at least one composite sample for the minimum of each 150 cu. yd. or each 5,000 square feet of slab placed each day. For shotcrete mixtures, obtain at least one composite sample for each 50 cu. yd. or fraction thereof placed each day.
 - a. One composite sample shall consist of a minimum of four cylinders.

- b. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
- 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
- 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
- 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
- 5. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure four standard cylinder specimens for each composite sample of 6x12" cylinder specimens or cast and laboratory cure five standard cylinder specimens for each composite sample of 4x8" cylinder specimens.
 - b. Cast and field cure four standard cylinder specimens for each composite sample of 6x12" cylinder specimens or cast and field cure five standard cylinder specimens for each composite sample of 4x8" cylinder specimens.
- 6. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- 8. Test results shall be reported in writing to Architect, Structural Engineer, Owner, Owner's consultant, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests. Inspection reports shall include items inspected, inspection locations and verification of compliance or deviations from the Contract Documents.
- 9. Concrete strength tests made and tested by testing laboratory shall be the sole criteria of concrete strength unless in-situ tests are made in accordance with Building Code by a qualified independent testing laboratory. Concrete for which strength tests do not meet criteria for acceptance shall be considered inadequate until proven otherwise.
- 10. In any case, where strength tests of concrete fail to meet criteria specified herein, Structural Engineer of Record shall be the sole judge of structural adequacy of concrete. In such case, burden of proof of structural adequacy shall be the responsibility of Contractor. Strength evaluation shall conform to requirements of ACI 318. If strength evaluation testing indicates, in opinion of Structural Engineer of Record, that structure is of inadequate strength; portions of structure in questions shall be repaired or removed and replaced as directed by the Structural Engineer of Record at no additional expense to Owner. If strength test falls below specified strength, but not so low as to cause concern for structural adequacy, Architect may request improved conditions curing or modifications of design mixes to improve strength.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION

SECTION 03351

CONCRETE SEALER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single application cure-seal-hardener for new concrete floors.
- B. Precautions for avoiding staining concrete before and after application.

1.2 RELATED SECTIONS

- A. Section 033000 – Cast-In-Place Concrete

1.3 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Material requirements for concrete to which cure-seal-hardener is to be applied, including cement type, water-cement ratio, type of trowel finish, limitations on admixtures, pigments, bonding agents, and bond breakers, etc.
- C. Product Data: Manufacturer's data sheets, including product specifications, test data, preparation instructions and recommendations, storage and handling requirements and recommendations, and installation methods.
- D. Maintenance instructions, including precautions for avoiding staining after application.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Applicator experienced with installation of product and certified by manufacturer, or applicator experienced with similar products and providing manufacturer's field technician on site to advise on application procedures; and providing adequate number of skilled workers trained and familiar with application requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver product in factory numbered and sealed drums, with numbers recorded for Owner's records.
- B. Store products in manufacturer's unopened drums until ready for installation.

1.6 PROJECT CONDITIONS

- A. No satisfactory procedures are available to remove petroleum or rust stains from concrete. Prevention is therefore essential. Take precautions to prevent staining of concrete prior to application of cure-seal-hardener and for minimum of three months after application:
 - 1. Prohibit parking of vehicles on concrete slab.
 - 2. If vehicles must be temporarily parked on slab, place drop cloths under vehicles during entire time parked.
 - 3. If construction equipment must be used for application, diaper all components that might drip oil, hydraulic fluid, or other liquids.
 - 4. Prohibit pipe cutting using pipe cutting machinery on concrete slab.
 - 5. Prohibit temporary placement and storage of steel members on concrete slab.

- B. Do not install products under environmental conditions outside manufacturer's absolute limits.
- C. Do not use frozen material; thaw and agitate prior to use.

1.7 WARRANTY

- A. Provide manufacturer's warranty that a structurally sound concrete surface prepared and treated according to the manufacturer's directions will remain permanently dustproof, hardened and water repellent. If after the specified sealing period the treated surface does not remain dustproof, hardened and water repellent, provide, at manufacturer's expense, sufficient material to reseal defective areas.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Ashford Formula, By Curecrete, which is located at: 1203 W. Spring Creek Pl. ; Springville, UT 84663; Toll Free Tel: 800-998-5664; Tel: 801-489-5663; Email: [request info \(sales@ashfordformula.com\)](mailto:sales@ashfordformula.com); Web: www.ashfordformula.com
- B. Substitutions: Other manufacturers meeting the requirements of this section are acceptable.
- C. Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 MATERIALS

- A. Cure-Seal-Hardener: Ashford Formula; water-based chemically-reactive penetrating sealer and hardener, that seals by densifying concrete so that water molecules cannot pass through but air and water vapor can, while allowing concrete to achieve full compressive strength, minimizing surface crazing, and eliminating dusting.
 - 1. Colorless, transparent, odorless, non-toxic, non-flammable.
 - 2. Containing no solvents or volatile organic compounds.
 - 3. USDA approved for food handling facilities.
 - 4. Allowing traffic on floors within 2 to 3 hours, with chemical process complete within 3 months.
 - 5. No change to surface appearance except a sheen developed due to traffic and cleaning.
- B. Water: Clean, potable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared and are suitable for application of product.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for

achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. If this is the applicator's first project using this product, provide the manufacturer's technical representative on-site to familiarize installers with proper procedures.
- C. Prevent damage to and soiling of adjacent work.
- D. New Concrete: Apply cure-seal-hardener to new concrete as soon as the concrete is firm enough to work on after troweling, except on colored concrete wait minimum of 30 days.
 - 1. Spray on at rate of 200 square feet per gallon (4.8 sq m/L).
 - 2. Keep surfaces wet with cure-seal-hardener for minimum soak-in period of 30 minutes, without allowing drying out or becoming slippery. In hot weather slipperiness may appear before the 30 minute time period has elapsed. If that occurs, apply more cure-seal-hardener as required to keep entire surface in a non-slippery state for the first 15 minutes. For the remaining 15 minutes, mist the surface as needed with water to keep the material in a non-slippery state.
 - 3. After this period, when treated surface becomes slippery lightly mist with water until slipperiness disappears.
 - 4. Wait for surface to become slippery again and then flush entire surface with water removing all residue of cure-seal-hardener.
 - 5. Squeegee surface completely dry, flushing any remaining slippery areas until no residue remains.
 - 6. Wet vacuum or scrubbing machines may be used to remove residue, provided manufacturer's instructions are followed.

3.4 PROTECTION

- A. Protect installed floors until chemical reaction process is complete; at least three months.
 - 1. Comply with precautions listed under PROJECT CONDITIONS.
 - 2. Clean floor regularly in accordance with manufacturer's recommendations because water will accelerate the sealing and scrubbing will impart a shine.
 - 3. Clean up spills immediately and spot-treat stains with good degreaser or oil emulsifier.
- B. Precautions and cleaning are the responsibility of the General Contractor until Substantial Completion.

END OF SECTION

SECTION 036000
NON-SHRINK GROUT

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Grout for steel baseplates

1.02 RELATED SECTIONS

- A. Section 033000 – Structural Concrete

1.03 REFERENCES

- A. Comply with provisions of the latest editions of the following codes, standards and specifications, except as otherwise shown and specified.
- B. Corps of Engineers: CRD-C621, Specification for Non-Shrink Grout.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM C1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

1.04 SUBMITTALS

- A. Product Data: submit manufacturer's data including product compliance for grout.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store grout materials in dry condition above ground.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Non-Shrink, Pre-mixed, High Strength Grout:
 - 1. Compressive strength in 28 days: 5000 psi minimum but not less than specified strength of base concrete.
 - 2. Comply with CRD-C621 and ASTM C1107.
 - 3. Non-oxidizing, if grout will be permanently exposed to view.
 - 4. Acceptable products:
 - a. SonogROUT 10K, manufactured by Sonneborn/ ChemRex, Inc.
 - b. Masterflow 713, manufactured by Master Builders Co.
 - c. Supreme Grout, Manufactured by Gifford-Hill co.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface preparation:

1. Remove dirt and loose material down to sound concrete.
2. Remove oil, grease, and paint from areas of base plates or foundations to be grouted.
3. Roughen adjacent concrete surfaces where possible.
4. Thoroughly wet concrete contact area at least 4 hours prior to grout placement, or as instructed by grout manufacturer. Keep wet, and remove excess water prior to placement.

B. Mixing:

1. Use mechanical mortar mixer.
2. Use the minimum amount of mixing water needed for placement.
3. Comply with manufacturer's recommendations, including the following:
 - a. Quantity of water used in mix.
 - b. Length of mixing time.
4. Do not mix more grout than can be placed within 15 minutes. Do not retemper grout.

C. Forms:

1. Use side forms if grout space is thicker than 1-1/2 inches.
2. When forms are required, use strong, securely anchored forms, sealed to prevent grout leakage.
3. Remove forms only after grout is completely self-supporting.

3.02 APPLICATION

A. Placement:

1. Comply with manufacturer's recommendations for placement.
2. Place grout continuously, and from one side to avoid entrapment of air pockets and to ensure good consolidation.
3. Remove voids by rodding and vibrating during placement. Do not overwork grout.

B. Curing:

1. Comply with manufacturer's recommendations for curing.
2. Avoid vibrating or disturbing grout while curing.

END OF SECTION

SECTION 041000
MORTAR AND GROUT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mortar and Grout for masonry construction.

1.02 RELATED SECTIONS

- A. Section 048100 – Brick Unit Masonry

1.03 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 530, Building Code Requirements for Masonry Structures.
 - 2. ACI 530.1, Specification for Masonry Structures.
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C143, Standard Test Method for Slump of Hydraulic Cement Concrete.
 - 2. ASTM C144, Aggregate for Masonry Mortar.
 - 3. ASTM C150, Portland Cement.
 - 4. ASTM C207, Hydrated Lime for Masonry Purposes.
 - 5. ASTM C270, Mortar for Unit Masonry.
 - 6. ASTM C404, Aggregates for Masonry Grout.
 - 7. ASTM C476, Mortar and Grout for Reinforced Masonry.
 - 8. ASTM C780, Construction Evaluation of Mortars.
 - 9. ASTM C1019, Sampling and Testing Grout.
- C. IMIAC- International Masonry Industry All Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.04 SUBMITTALS

- A. Product Data: Submit in accordance with Specification. Include product data sheets for each named product.
- B. Test Reports: Submit independent laboratory test reports of initial mortar and grout tests, including design mix proportions, for each mortar and grout.
- C. Certification: Submit manufacturer's certification that materials meet specification requirements.

1.05 PRODUCT DELIVERY, STORAGE AND PROTECTION

- A. Deliver and store manufactured products in original, unopened containers.

- B. Store cementitious ingredients in weather-tight enclosures and protect against contamination and warehouse set.
- C. Stockpile and protect aggregates to prevent contamination from foreign materials.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC – International Masonry Industry All Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Portland cement: ASTM C150, Type I, II or III. Provide natural color or white cement as required to produce required mortar color.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Sand: ASTM C144, standard masonry type; clean, dry, protected against dampness, freezing and foreign matter.
- D. Aggregate for Grout: ASTM C404, maximum size 3/8 in. for fine grout and 1/2 in. for coarse grout.
- E. Water: Clean and potable, free of organic matter.
- F. Mortar Color: Finely ground mineral pigment of high purity, non-fading, lime-proof, not detrimental to mortar; color as selected by architect from manufacturer standards.

2.02 MORTAR MIXES

- A. Mortar for Concrete Unit Masonry Walls and Partitions: Proportion and mix in accordance with ASTM C270, Type S.
 - 1. Minimum compressive strength of 1800 psi in 28 days.
 - 2. Maximum air content 12%.
- B. Mortar for Brick Veneer Masonry: ASTM C270, Type N.
- C. Pointing Mortar: ASTM C270, Type S, with a maximum of 2% ammonium stearate or calcium stearate per cement weight.
- D. Mortar for Glass Unit Masonry: ASTM C270, Type S.
- E. Mortar Color shall be standard gray and shall not be required to be produced using an add-mixture.

2.03 MORTAR MIXING

- A. Measure materials by volume, use approved container or equivalent weight. Maintain sand uniformly damp immediately before the mixing process for all colored mortar.

- B. Thoroughly mix ingredients in accordance with ASTM C270 in quantities needed for immediate use.
- C. If water is lost by evaporation, retemper only within two hours of initial mixing.
- D. Use mortar within 2-1/2 hours of initial mixing.
- E. Do not use mortar after it has begun to set.
- F. Do not use anti-freeze compounds.

2.04 GROUT MIXES

- A. Proportion and mix grout in accordance with ASTM C476.
- B. Minimum compressive strength of 2000 psi in 28 days.
- C. Use fine or coarse grout as appropriate for grout pour height and width of grout space. Conform to ACI 530.1, Table 5 for grout space requirements.

2.05 GROUT MIXING

- A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and course grout.
- B. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- C. Do not use anti-freeze compounds to lower the freezing point of grout.
- D. Grout shall have a slump of 8 to 10 inches at time of placement.
- E. Use grout withing 2-1/2 hours of initial mixing.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install mortar and grout as specified by the Brick Institute of America.

3.02 FIELD QUALITY CONTROL

- A. Masonry Mortar Testing
 - 1. Conduct strength tests in accordance with the following:
 - a. Spread mortar on the masonry units 1/2 inch to 5/8 inch thick, and allow to stand for one minute.
 - b. Remove mortar and place in a 2 inch by 4 inch cylinder in two layers, compressing the mortar into the cylinder using a flat end stick or fingers. Lightly tap mold on opposite sides level off and immediately cover molds and keep them damp until taken to the laboratory.
 - c. After 48 hours set, have the laboratory remove molds and place them in the fog room until tested in damp condition.
 - 2. Execute one mortar test specimen for each 5,000 square feet of masonry wall constructed and a minimum of one mortar test specimen for each day that masonry construction is performed. Test specimens at 28 days.

3. Strength of mortar will be considered satisfactory if each mortar test equals or exceeds 1500 psi (this corresponds with Type S, 2000 psi mortar mix as specified in Contract Drawings.)
4. In addition to required information noted previously in this Section, record the following information on mortar compression reports:
 - a. Mix design or mix designation.
 - b. Test sample number.
 - c. Specific wall areas covered by test.
 - d. Description of units used to form sample.
 - e. Tested compressive strength.

B. Masonry Grout Testing

1. Conduct strength tests in accordance with ASTM C1019.
 - a. Take two strength samples for each 5000 square feet of masonry wall surface for each type of grout placed each day.
 - b. Create test samples by forming with wood surface on bottom and concrete block on sides, The samples shall be 3 inches square and 8 inches high.
 - c. Initial cure during first 48 hours. Protect samples from loss of moisture by covering with wet cloth and keeping moist. Protect from freezing and variations in temperature. Record maximum and minimum temperatures by using a max/min thermometer.
 - d. Remove masonry units that form samples after 48 hours and transport grout samples to laboratory. Keep samples protected from vibration, freezing, and moisture loss during transportation.
 - e. Test samples at 28 days. Compressive strength shall be the average, of the two samples and shall be adequate if it equals f'm as defined on Contract Drawings but not less than 2000 psi.
2. Conduct slump test at time compressive test samples are taken in accordance with ASTM C143.
3. In addition to required information noted previously in this Section record the following information on grout compression reports.
 - a. Mix design or mix designation. Test sample number.
 - b. Test sample number.
 - c. Specific wall areas covered by test.
 - d. Description of sample dimensions, amount out of plumb in percent.
 - e. Description of units used to form sample.
 - f. Curing history with max/min temperature, age when transported to lab, and age when tested.
 - g. Tested compressive strength.
 - h. Description of failure.

END OF SECTION

SECTION 048100
BRICK UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clay Facing Brick.
- B. Mortar and Grout.
- C. Reinforcement and Anchorage.
- D. Flashings.
- E. Accessories.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar.
- C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.03 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.

1.04 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 4 feet long by 4 feet 8 inches high, which includes mortar and accessories, wall openings, and flashings.
- B. Locate where directed.
- C. Mock-up may not remain as part of the Work.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.01 BRICK UNITS

- A. Manufacturers:
 - 1. Acme Brick
5130 S. 110th E. Ave.
Tulsa, OK 74146
- B. Facing Brick:
 - 1. Field Brick: Acme, Tulsa Plant, Crimson, Velour Texture, Modular (TUP003)
 - 2. Accent Brick: Acme, Tulsa Plant, Allentown, Velour Texture, Modular (TUP008)

2.02 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I; color as required to produce approved color sample.
 - 1. Hydrated Lime: ASTM C 207, Type S.
 - 2. Mortar Aggregate: ASTM C 144.
 - 3. Grout Aggregate: ASTM C 404.
- B. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B-2.
 - 1. Anchor plates: Not less than 0.0747 inch thick, designed for fastening to backup through sheathing by two fasteners.
 - 2. Wire ties: triangular shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 2 inches.

2.04 FLASHINGS

- A. Plastic Flashings: Nervastral HD as manufactured by Nervastral, Inc., or approved equal; thickness as indicated on drawings.
- B. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 coating, 24 gage total thickness.

2.05 ACCESSORIES

- A. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; 3 inch wide by maximum lengths available.
- B. Cavity Vents: Molded polyvinyl chloride grilles; insect resistant.
 - 1. Manufacturers:
 - a. Dur-O-Wal, Inc.
 - b. Hohmann & Barnard, Inc.
 - c. Mortar Net Solutions.
 - d. Substitutions: See Section 016000 - Product Requirements.
- C. Cavity Wall Mortar Screen: WallDefender by Mortar Net Solutions or equivalent. Trapezoidal Shape, 90% open weave mesh, dual levels, installed per manufacturer's instructions.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C 270, using the Proportion Specification.

1. Masonry below grade and in contact with earth: Type S.
 2. Exterior, non-loadbearing masonry: Type N.
- B. Grout: ASTM C 476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- C. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units:
1. Bond: Running.
 2. Coursing: Three units and three mortar joints to equal 8 inches.
 3. Mortar Joints: Concave.

3.02 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar as work progresses.
- E. Interlock intersections and external corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.03 WEEPS

- A. Install weeps in cavity walls at 24 inches on center horizontally above through-wall flashing and at bottom of walls.

3.04 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches.
- D. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry

veneer at maximum 16 inches on center vertically, and horizontally at each stud, but not to exceed (24 inches on center horizontally.). Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.05 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
 - 2. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Extend flashings to within 1/4 inch of exterior face of masonry.
- C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.
- D. Plastic Flashings to be installed per manufacturer's directions.

3.06 LINTELS

- A. Install loose steel lintels over openings unless indicated otherwise on drawings.
- B. Maintain minimum 8 inch bearing on each side of opening.
- C. Notch brick as indicated on drawings to conceal edge of lintels.

3.07 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
- C. Size control joint in accordance with Section 079000 for sealant performance.
- D. Form expansion joint as detailed.

3.08 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.09 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.10 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

END OF SECTION

SECTION 054000

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior non-load-bearing wall framing.
 - 2. Roof rafter framing.
 - 3. Soffit framing.
 - 4. Any other cold-formed framing system noted on Structural Contract Drawings.
- B. Related Requirements:
 - 1. Section 048100 – Brick Unit Masonry
 - 2. Section 053100 – Metal Roof Deck
 - 3. Section 055000 – Metal Fabrications
 - 4. Section 092116 – Gypsum Board Assemblies

1.3 SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory indicated on the Contract Drawings, provide the following:
 - 1. Section Properties: Submit section properties, material strengths and ASTM specification compliance verification for each size member, strap or brace of each gage used.
 - 2. Connections: Submit manufacturer's data for each type of manufactured connector, screw, or fastener verifying conformance with the Contract Drawings.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
 - 1. Submit three bond sets of shop drawings and calculations for review by the Structural Engineer-of-Record. The Structural Engineer-of-Record will mark three sets with red and will return one set to the contractor through the Architect. The contractor shall make the number of photocopies required of the approved shop drawings for distribution to other parties, and the contractor shall be responsible for transmitting the original red-marked set to the fabricator for corrections.
 - 2. Only complete shop drawing submittals will be reviewed. Shop drawings not in compliance with the Submittal portion of this document will be rejected. Time required by structural engineer to review shop drawing submittals a second or third time will be billed to the Contractor at engineer's hourly rates.
 - 3. For cold-formed steel framing indicated to comply with design loads, include complete structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation and licensed in the state where the

project is located. Design calculations will be reviewed by the Engineer-of-Record.

- C. Qualification Data: For testing agency.
- D. Welding certificates.
- E. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
 - 1. Steel sheet.
 - 2. Expansion anchors.
 - 3. Powder-actuated anchors.
 - 4. Mechanical fasteners.
 - 5. Adhesive anchors.
 - 6. Vertical deflection clips.
 - 7. Horizontal drift deflection clips
 - 8. Miscellaneous structural clips and accessories.
- F. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer licensed in the state where the project is located.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed steel framing that are similar to those indicated on this Project in material, design and extent.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 for testing indicated.
- D. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- E. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
- F. Fire-Test-Response Characteristics: Where indicated, provide cold-formed steel framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
- G. Comply with current AISI Specifications and Standards.
- H. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.
- B. During construction, adequately distribute all loads applied to framing members so as not to exceed the carrying capacity of any one member.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AllSteel & Gypsum Products, Inc.
 - 2. California Expanded Metal Products Company.
 - 3. ClarkDietrich Building Systems, Inc.
 - 4. Consolidated Fabricators Corp.; Building Products Division.
 - 5. Craco Mfg., Inc.
 - 6. Custom Stud Inc.
 - 7. Design Shapes in Steel.
 - 8. Formetal Co. Inc. (The).
 - 9. MarinoWARE.
 - 10. Nuconsteel; a Nucor Company.
 - 11. Olmar Supply, Inc.
 - 12. Quail Run Building Materials, Inc.
 - 13. SCAFCO Corporation.
 - 14. Southeastern Stud & Components, Inc.
 - 15. State Building Products, Inc.
 - 16. Steel Construction Systems.
 - 17. Steel Network, Inc. (The).
 - 18. Steel Structural Systems.
 - 19. Steeler, Inc.
 - 20. Super Stud Building Products, Inc.
 - 21. Telling Industries, LLC.
 - 22. United Metal Products, Inc.
 - 23. United Steel Manufacturing.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated on Contract Drawings.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing – Horizontal deflections:
 - a) Masonry Veneer: $l/600$ of the wall height.
 - b) Brittle Finishes: $l/360$ of the wall height.
 - c) Flexible Finishes: $l/240$ of the wall height.
 - b. Roof Rafter Framing: Vertical deflection of $1/360$ for live loads and $l/240$ for total loads of the span.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Roof Framing: Downward movement of 3/4 inch and upward movement of 1/2 inch, unless noted otherwise on Contract Documents.
 - b. Floor Framing: Downward movement of 3/4 inch, unless noted otherwise on Contract Documents.
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Comply with current AISI Specifications and Standards, unless more stringent requirements are indicated.
- D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Manufacturing Standard: All cold form framing shall be equivalent to SSMA (Steel Stud Manufacturers Association) published standards and installation recommendations, which will be used as a quality standard reference in the event the Contractor furnishes materials in which the submitted manufacturer does not have a published installation manual.
- B. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 1. Grade: ST33H or ST50H as indicated or as required by structural performance
 2. Coating: G60.
- C. Steel Sheet for Vertical Deflection Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:
 1. Grade: 50, Class 1.
 2. Coating: G90.

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: The physical and structural properties listed by SSMA shall be the minimum permitted. Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 1. Minimum Base-Metal Thickness: 0.0329 inch or as indicated on Contract Drawings.
 2. Minimum Flange Width: 1-5/8 inches.
 3. Minimum Lip Length: 1/2 inch.
- B. Steel Track: The physical and structural properties listed by SSMA shall be the minimum permitted. Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch or as indicated on Contract Drawings, but shall match wall stud thickness when heavier than 0.0329 inch.
 2. Minimum Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard bypass and head clips as noted on Contract Drawings, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AllSteel & Gypsum Products, Inc.
 - b. ClarkDietrich Building Systems, Inc.
 - c. MarinoWARE.
 - d. SCAFCO Corporation.
 - e. Steel Network, Inc. (The).
 - f. Steeler, Inc.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track as noted on the Contract Drawings; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch or as indicated on Contract Drawings.
 2. Minimum Flange Width: 3/4 inch plus the design gap.
 3. Row of bridging to be located 12 inches from top of studs.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0428 inch or as indicated on Contract Drawings.
 - b. Minimum Flange Width: 3/4 inch plus the design gap.
 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: 0.0329 inch or as indicated on Contract Drawings.
 - b. Minimum Flange Width: Equal to sum of outer deflection track flange width plus 1 inch.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.5 ROOF-RAFTER FRAMING

- A. Steel Rafters: The physical and structural properties listed by SSMA shall be the minimum permitted. Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch or as indicated on Contract Drawings.
 2. Minimum Flange Width: 1-5/8 inches.
 3. Minimum Lip Width: 1/2 inch.
- B. Built-Up Members: The physical and structural properties listed by SSMA shall be the minimum permitted. Built-up members of manufacturer's C-shaped steel section, with

stiffened flanges, nested into a U-shaped steel section joist track, with unstiffened flanges; unpunched; of web depths as indicated on the Contract Drawings; and as follows.

1. Minimum Base-Metal Thickness: 0.0428 inches, or as indicated on Contract Drawings.
2. Minimum Flange Width: 1-5/8 inches.
3. Minimum Lip Width: 1/2 inch.

2.6 SOFFIT FRAMING

- A. Exterior Soffit Frame: The physical and structural properties listed by SSMA shall be the minimum permitted. Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0329 inch or as indicated on Contract Drawings.
 2. Minimum Flange Width: 1-5/8 inches.
 3. Minimum Lip Width: 1/2 inch.

2.7 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers and knee braces.
 9. Joist hangers and end closures.
 10. Hole reinforcing plates.
 11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.
- B. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
1. Configuration: Straight.
 2. Nuts: ASTM A 563 heavy-hex carbon steel.
 3. Plate Washers: ASTM A 36 carbon steel.
 4. Washers: ASTM F 436, Type 1, hardened carbon steel.
 5. Finish: Plain, except where indicated to be galvanized.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

- D. Powder-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.10 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
 - 5. Do not begin fabrication of work prior to receiving approval of shop drawings and calculations. Fabricate per manufacturer's current printed instructions.
 - 6. Shop Fabrication: Fabricate items in shop to greatest extent possible so as to minimize field assembly of units at project site. Clearly mark units for assembly and coordinated installation.

- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- J. All structural joists and studs shall have a minimum of 10 inches of unpunched steel at bearing or support points.
- K. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 1. Stud Spacing: As indicated on Contract Drawings or Shop Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 1. Connect vertical deflection clips to bypassing and infill studs and anchor to building structure.

- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Contract Drawings or Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
 - 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - a. Install solid blocking at 96-inch centers.
 - 2. Bridging:
 - a. Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - b. Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - c. Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

- A. Testing: Contractor will retain a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor, owner and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 055000

METAL FABRICATIONS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Includes ferrous metal items, galvanized and prime painted scheduled at end of this Section.

1.02 REFERENCES

- A. ASTM – American Society for Testing and Materials
- B. AWS D1.1 – Structural Welding Code

1.03 SUBMITTALS

- A. See section 013000 – Administrative Requirements, for submittal procedures.
- B. Product Data: Provide field dimensions, profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners and accessories.
- C. Shop Drawings: Include erection drawings, elevations and details where applicable. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.

1.04 DELIVERY AND STORAGE

Materials shall be delivered to the site in undamaged condition, stored off ground in fully covered, well-ventilated areas, and protected from extreme changes in temperature and humidity.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Bolts, Nuts and Washers: ASTM A307.
- D. Welding Materials: AWS D1.1; type required for materials being welded.
- E. Primer: FS TT-P-31, red or brown for shop application and field touch-up.
- F. Touch-up for Galvanized Surfaces: Organic Zinc Rich Paint; DOD-P-21035; 4 mils thick.

2.02 FABRICATION

- A. Fabricate items with joints .020" tightly fitted and secured. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.

- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
- D. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.03 FINISHES

- A. Prime paint items scheduled with one coat. Clean surfaces of rust, scale, grease and foreign matter before finishing. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- B. Fabrication practices for assemblies to be galvanized in accordance with ASTM A385.
- C. Galvanize items to "Minimum Coating Thickness Grade" in accordance with ASTM A123.

PART 3 EXECUTION

3.01 PREPARATION

- A. Obtain Architect / Engineer approval before site cutting or making adjustments not scheduled.
- B. Make provision for erection loads with temporary bracing. Keep work in alignment.
- C. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate trades.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Perform field welding in accordance with AWS D1.1.
- C. After installation, touch-up field welds, scratched or damaged surfaces with primer.

3.03 SCHEDULE

- A. The Schedule is a list of principal items only. Refer to Drawings details for items not specifically scheduled.
 - 1. Ledge and Shelf Angles and Channels and Plates: not attached to structural framing, for support of masonry: galvanized finish.
 - 2. Lintels: galvanized finish
 - 3. Guard Rails and Handrails (exterior): galvanized after fabrication.
 - 4. Bumper Posts and Bollards: prime paint.
 - 5. Fabricated Frames and Grating, Plate Covers for Manholes, Catch Basins, Sump Trenches, Pits: prime paint or galvanize finish as directed.
 - 6. Pipe Handrails, Ladders: prime paint finish.
 - 7. Steel Plates: necessary for erection of structural members, natural finish.

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 DESCRIPTION

- A. Includes, but is not limited to, wood framing and blocking, concealed fire-retardant wood backing for wall mounted items, cants, nailers sleepers, utility shelving, sleepers and plywood backing panels.

1.02 REFERENCES

- A. AFPA – American Forest and Paper Association
- B. FS TT-W-571 – Wood Preservation: Treating Practices
- C. PS 1 – Construction and Industrial Plywood.
- D. PS 20 – American Softwood Lumber Standard.

1.03 DELIVERY AND STORAGE

- A. Materials shall be delivered to the site in undamaged condition, stored off ground in fully covered, well-ventilated areas, and protected from extreme changes in temperature and humidity.
- B. Stack lumber flat with spacers beneath and between each bundle.

PART 2 PRODUCTS

2.01 GENERAL LUMBER

Comply with PS 20 and applicable grading rules of inspection in accordance with AFPA Grading Rules.

- A. Provide seasoned lumber with 19 percent moisture content at time of dressing and shipment, for sizes 2" or less in thickness.
- B. Provide lumber with 15 percent moisture content at time of dressing and shipment, for sizes 2" or less in thickness.
- C. All concealed lumber shall be fire-retardant.

2.02 PANELS

For types of concealed applications indicated below, provide wood panel products complying with PS 1 where applicable, and with "APA Performance Standard and Policies for Structural Use Panels" (Form E445) for requirements indicated.

For following types of applications where exposure durability classification or span rating is not given, provide EXPOSURE 1 and rating required to suit support spacing indicated.

- A. Plywood Backing for Electrical and Telephone Equipment: APA C-D PLUGGED INT with exterior glue, fire-retardant treated, 1/2" thick except as otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION:

- A. **ROUGH CARPENTRY**
Install rough carpentry work to comply with recommendations of American Plywood Association (APA), unless otherwise indicated. For sheathing, underlayment and other products not covered in above standards, comply with recommendations of manufacturer of product involved for use intended. Set carpentry work to required levels and lines, with members plumb and true and cut to fit.
- B. **ATTACHMENTS**
Securely attach carpentry work to substrates and supporting members using fasteners of size that will not penetrate members where opposite side will be exposed to view or receive finish materials. Install fasteners without splitting wood; fasten panel products to allow for expansion at joints unless otherwise indicated.

3.02 PROTECTION:

- A. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 061643

EXTERIOR GYPSUM SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Fiberglass-mat faced, moisture and mold resistant gypsum sheathing.
- B. Related Sections:
 - 1. Section 054000 – Cold Formed Metal Framing
 - 2. Section 061000 - Rough Carpentry
 - 3. Section 092116 - Gypsum Board Assemblies

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
 - 2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 3. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - 4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - 5. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
 - 6. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - 7. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
 - 8. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
 - 9. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
 - 10. ASTM C1396 Standard Specification for Gypsum Board
 - 11. ASTM E 136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
 - 12. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
- B. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.4 WARRANTY

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay) commencing with the date of installation of the product in such structure.
- B. Manufacturer's Warranty:
 - 1. Five years against manufacturing defects from the date of purchase of the product for

- installation
- 2. 12 years against manufacturing defects when used as a substrate in architecturally specified EIFS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Georgia-Pacific Gypsum LLC:
 - 1. Fiberglass-Mat Faced Gypsum Sheathing: DensGlass Sheathing.
 - 2. Fiberglass-Mat Faced Gypsum Sheathing, Type X for Fire Rated Designs: DensGlass Fireguard Sheathing.
- B. Other manufacturers meeting or exceeding the product requirements specified herein.

2.2 MATERIALS

- A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:
 - 1. Thickness: 1/2 inch.
 - 2. Width: 4 feet.
 - 3. Length: [8 feet] [9 feet] [10 feet].
 - 4. Weight: 1.9 lb/sq. ft.
 - 5. Edges: Square.
 - 6. Surfacing: Fiberglass mat on face, back, and long edges.
 - 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
 - 8. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
 - 9. Humidified Deflection (ASTM C1177): Not more than 2/8 inch.
 - 10. Permeance (ASTM E96): Not less than 23 perms.
 - 11. R-Value (ASTM C518): 0.56.
 - 12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
 - 13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
 - 14. Acceptable Products:
 - a. 1/2 inch DensGlass Sheathing, Georgia-Pacific Gypsum LLC.
- B. Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:
 - 1. Thickness: 5/8 inch.
 - 2. Width: 4 feet.
 - 3. Length: [8 feet] [9 feet] [10 feet].
 - 4. Weight: 2.5 lb/sq. ft.
 - 5. Edges: Square.
 - 6. Surfacing: Fiberglass mat on face, back, and long edges.
 - 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.
 - 8. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.
 - 9. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
 - 10. Permeance (ASTM E96): Not less than 17 perms.
 - 11. R-Value (ASTM C518): 0.67.
 - 12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
 - 13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
 - 14. Acceptable Products:
 - a. 5/8 inch DensGlass Fireguard Sheathing, Georgia-Pacific Gypsum LLC.

2.3 ACCESSORIES

- A. Screws: ASTM C1002, corrosion resistant treated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

3.2 INSTALLATION

- A. General: In accordance with GA-253, ASTM C1280 and the manufacturer's recommendations.
 - 1. Manufacturer's Recommendations:
 - a. Current "Product Catalog", Georgia-Pacific Gypsum.

3.3 PROTECTION

- A. Protect gypsum board installations from damage and deterioration until date of Substantial Completion.

END OF SECTION

SECTION 062000

FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid surfacing window sills & countertops
- B. Wood Moldings
- C. Hardware and attachment accessories.

1.02 RELATED SECTIONS

- A. Section 061000 – Rough Carpentry
- B. Section 099000 – Paints and Coatings

1.03 REFERENCES

- A. AWI/AWMAC (QSI) – Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2003

1.04 SUBMITTALS

- A. See Section 013000 – administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- C. Samples:
 - 1. Solid Surface Material: Two 3" x 3" min. of each color and finish specified. One sample 6-inch length showing the edge detail.
 - 2. Wood Moldings: two 18-inch long samples of each shape as specified in the wood type.

1.05 QUALITY ASSURANCE

- A. Protect work in accordance with AWI Architectural Woodwork quality Standards illustrated Custom Grade.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Protect work from moisture damage

1.07 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.01 SOLID SURFACING MATERIAL

- A. Polyester/acrylic type with integral coloring

1. Surface finish: Satin
2. Color: As indicated on the drawings.
3. Thickness 1/2" and edging as indicated on drawing. If not on drawing, provide options for approval.

2.02 ADHESIVE

- A. Adhesive: Type recommended by AWI to suit application.

2.03 FABRICATION

- A. Shop assembled work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work

3.02 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.

3.03 SCHEDULE

- A. Interior:
 1. Window Sills: solid surfacing.
 2. Transaction Counter: solid surfacing
 3. Color Selection as identified on Construction Drawings

END OF SECTION

SECTION 064000

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes special fabricated cabinet units, countertops, cabinet hardware, prefinished surfaces, and preparation for installing utilities.
- B. Related Sections:
 - 1. Section 061000 – Rough Carpentry.
 - 2. Section 062000 – Finish Carpentry.
 - 3. Mechanical and Electrical: Rough-in and connection.

1.02 REFERENCES

- A. ANSI A135.4 – Basic Hardboard.
- B. ANSI A208.1 – Mat Formed Wood Particleboard.
- C. AWI (Architectural Woodwork Institute) – Quality Standards.
- D. BHMA A156.9 – Cabinet Hardware.
- E. FS MMM-A-130 – Adhesive, Contact.
- F. NEMA (National Electric Manufacturers Association) LD3 – High Pressure Decorative Laminates.
- G. PS 1 – Construction and Industrial Plywood.
- H. PS 20 – American Softwood Lumber Standard.
- I. WIC (Woodwork Institute of California) – Manual of Millwork.
- J. APA (American Plywood Association).

1.03 SUBMITTALS FOR REVIEW

- A. Section 013000 – Administrative Requirements: Procedures for submittals.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories and edging.
- D. Samples: Submit two: 12 x 12 inch size samples, illustrating each cabinet finish; 12 inch long size samples, illustrating each edging strip.
- E. Samples: Submit two samples of drawer pulls, hinges and closures, illustrating hardware finish.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Premium Quality.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Delivery: Materials shall be delivered to the site by the casework fabricator in undamaged dry condition.
- B. Protection: Protect units by covering completed work with 4-mil polyethylene film protective enclosure, applied in a manner which will allow easy removal and without damage to woodwork or adjoining work. Architectural woodwork contractor shall remove cover immediately before date of substantial completion.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Laminate Materials:
 - 1. High Pressure Laminate (HPL): AWI 0.045 inch (1.1 mm) General Purpose quality; color, pattern and surface texture as scheduled.
 - 2. Melamine: General Purpose quality; color, pattern and surface texture as scheduled.
 - 3. Manufacturers:
 - a. Formica.
 - b. Wilsonart.
- B. Wood MDF board: PS 1; AWI standard, of grade to suit application; thickness as noted below by application.
- C. Hardboard: Pressed wood fiber with resin binder, standard grade, 1/4 inch (6 mm) thick, smooth on one side, located as noted below by application.
- D. Hardwood Plywood: PS 51; graded in accordance with AWI core materials of lumber, type of glue recommended for application; face veneer and cuts as noted below by application.
- E. Backs:
 - 1. Exposed finished backs shall be 3/4 inch thick with HPL on inside surface.
 - 2. Unexposed backs shall be 1/4 inch thick MDF board core with melamine laminate on inside surface for upper and lower cabinets. Use 3/4 inch thick on full height cabinets.
- F. Ends: Finished ends shall be 3/4 inch thick with melamine laminate on inside surface. Exposed edges to be banded with PVC.
- G. Partitions: Partitions shall be 3/4 inch thick with melamine laminate on inside surface.
- H. Bottoms and Bases:
 - 1. Bottoms shall be 3/4 inch thick MDF board core. Interior surfaced with melamine laminate and exposed surfaced with HPL on the top side.
 - 2. Base, storage and shelving units shall have a separate framed and reinforced base attached to the bottom of the cabinets forming a 4 inch high base that shall be recessed 2 inches in the front (unless noted otherwise on the drawings).
- I. Shelves:
 - 1. All shelves shall be **1 inch thick** MDF board core.
 - 2. Interior shelves shall be surfaced with white melamine laminate surface on two sides. All sides to be banded with white melamine laminate.
 - 3. Exposed shelves shall be surfaced with HPL on two sides with PVC edge banding.
 - 4. All adjustable shelves to be on metal shelf pegs inserted into shop drilled holes at 2 inches on center vertically.
- J. Countertops:
 - 1. HPL covered countertops shall be 1 inch thick laminated exterior grade fir plywood with plastic laminate surface on one side. Backsplashes as indicated on drawings, laminate to match countertop w/ 3mm PVC banding on tops and ends to match plastic laminate. Include end curb where top abuts end wall.
 - 2. Face edge of countertops shall be banded with 3mm PVC (hot mill glued) to match plastic laminate tops. Colors to match plastic laminate color.
- K. Drawers:
 - 1. Drawer fronts shall be 3/4 inch thick with HPL exterior surface and white melamine interior surface.
 - 2. Exposed edges to be banded with 3mm PVC (hot mill glued), color to match plastic laminate.
 - 3. Drawer boxes shall be plywood.
- L. Doors:
 - 1. Doors shall be 3/4 inch thick with HPL exterior surface and white melamine interior surface.
 - 2. Exposed edges shall be banded with 3mm PVC (hot mill glued).

- M. Hardware:
 - 1. Adjustable shelf hardware shall be as specified above.
 - 2. Pulls: Drawer and Door pulls shall be 4 inch "U" shaped, wire loop type pull with brushed nickel satin finish.
 - 3. Hinges: Hinges shall be Blum concealed type, 125 degree opening. Provide four (4) hinges on full-height doors.
 - 4. Drawer slides: Drawer slides shall be side-mount Blum type, full extension, 100 lb.
- N. Accessories:
 - 1. Adhesive: Type recommended by laminate manufacturer to suite application.
 - 2. Counter tops, Ends, and Partition Edging: Semi-rigid PVC Vinyl Edge Trim; 3mm thickness; extruded convex shaped; smooth finish; of width to match component thickness/height; color to match adjacent surface.
 - 3. Door and Drawer Edging: PVC Vinyl Edge; 3mm inch thick; smooth finish; of width to match component thickness; color to match adjacent surface.
 - 4. Fasteners: Size and type to suite application.
 - 5. Wireways: Provide 3 inch diameter plastic wireways at 48" o.c. at worksurfaces; color shall be black (minimum 4).
- P. Finish Wood: Shall be as identified on plans.

2.02 FABRICATION

- A. Shop assemble casework in one unit easily handled and to permit passage through building openings.
- B. Fit shelves, doors and exposed edges to be banded with PVC trim.
- C. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
- E. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- F. Glue and fasten backsplash with screws to countertop at a minimum of 12 inches on center.
- G. Millwork contractor to provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.
- H. Millwork shall be custom fabricated as identified on drawings. Manufacturer's standard millwork may only be substituted if it matches the sizes, configurations and styles indicated on drawings. Any substitutions shall be approved by Architect prior to bidding. If not approved prior to bidding, contractor shall not be allowed to substitute during fabrication.

2.03 FINISH FOR MILLWORK

- A. General: The entire finish of millwork is work of this section.
- B. Shop Finishing: To the greatest extent possible, finish millwork at shop or factory. Defer only final touch-up, cleaning and polishing for time after delivery and installation.
- C. Preparations for Finishing: Comply with AWI Quality Standards for sanding, filling countersunk fasteners, back priming and similar preparations for finishing of architectural woodwork as applicable to each unit of work.
- D. Transparent Finish:
 - 1. AWI Finish System #3.
 - 2. Grade: Premium.
 - 3. Open Grain Woods: Filled finish.
- E. Exterior surfaces of finish wood on millwork shall have the following finish system.
 - 1. A first sealer coat shall be applied, thoroughly dried, sanded and dusted.
 - 2. A second sealer coat shall be applied and thoroughly dried.
 - 3. A double coat of chemical resistant synthetic varnish shall then be applied and thoroughly dried, providing a semi-gloss finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Coordinate unit models, quantities and delivery dates with Architect prior to start of work.

3.02 INSTALLATION

- A. Installation shall be performed by personnel trained in the installation of architectural woodwork.
- B. Set and secure casework in place rigid, plumb and level.
- C. Use purpose designed fixture attachments at concealed locations for wall mounted components.
- D. Use threaded steel concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Use purpose designed color matching sealant at all countertop and backsplash joints at laminate clad countertops.
- G. Install a clear silicon sealant at joint between wall and top of backsplash at laminate clad countertops.

- 3.03** Provide and install wire management grommets in worksurfaces where indicated on drawings. Where grommet are not shown in worksurfaces on drawings, provide grommets at 48" o.c, verify exact locations with Architect.

3.04 ADJUSTING

- A. Adjust work before delivery. Test work to be delivered for rigidity and ability to support loads.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.05 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings and fixtures.
- B. Protect millwork to ensure that work will be without damage or deterioration at the time of delivery and acceptance.

END OF SECTION

SECTION 072100

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Thermal, air and water resistive barrier wall system for cold-formed metal exterior wall assemblies:
 - 1. Exterior wall steel stud cavity batt insulation.
 - 2. Exterior wall insulating sheathing.
 - 3. Taped joint seal on insulating sheathing.
 - 4. Foundation Insulation
- B. Related Sections:
 - 1. Section 054000 – Cold Formed Metal Framing
 - 2. Section 092116 - Gypsum Board Assemblies

1.2 REFERENCES

- A. Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:
 - 1. American Society for Testing of Materials (ASTM):
 - a. ASTM C 272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
 - b. ASTM C 518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - c. ASTM C 578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation.
 - d. ASTM C 665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - e. ASTM D 1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - f. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - g. ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials.
 - h. ASTM E 119: Standard Test Methods for Fire Tests of Building Constructions and Materials.
 - i. ASTM E 331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference.
 - j. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.
 - 2. National Fire Protection Association (NFPA):
 - a. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
 - 3. International Code Council Evaluation Service (ICC-ES):
 - a. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.
 - b. AC 148: Acceptance Criteria for Flexible Flashing Materials.
 - 4. American Architectural Manufacturers Association (AAMA):
 - a. AAMA 711: Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

1.3 SYSTEM DESCRIPTION

- A. Provide and install cold formed steel stud exterior wall framing system, with water resistive barrier layer over the exterior gypsum, with fiberglass batt insulation in the stud cavity with a vapor retarding facer on the fiberglass, that effectively controls thermal, air and water

performance and provides continuous insulation and continuity of the building envelope. The system shall include the following:

1. Steel stud framing independently braced to resist vertical and transverse structural loading.
 2. Fiberglass batt insulation in the steel stud framing cavity.
 3. Joint sealing tape over the insulating joints and penetrations.
- B. All joints, penetrations and gaps of the insulating and air barrier wall system shall be made water and air tight.
- C. Code Compliance: Exterior wall system and component materials shall comply with the following requirements:
1. The complete exterior wall assembly shall comply with the passing criteria defined in NFPA 285 for exterior wall limited fire spread performance.
 2. Wall and floor joints shall be fire stopped as required in International Building Code, at fire-rated construction.

1.4 SUBMITTALS

- A. Product Data: Submit data on product characteristics, performance criteria, and limitations, including installation instructions.
- B. Sustainable Design: Submit manufacturer's sustainable design certifications as indicated.
- C. Warranty: Submit documentation for limited product warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original packaging.
- B. Store and protect products in accordance with manufacturer's instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources. Do not install insulation that has been damaged or wet.
1. In the event the batt or blanket insulation becomes wet, remove it from jobsite.
 - a. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

PART 2 - PRODUCTS

2.1 FIBERGLASS BATT INSULATION

- A. Stud Cavity Batts: Fiberglass batt insulation (faced at exterior walls, unfaced at interior walls), complying with ASTM C665 and meeting the following criteria:
1. ASTM C 665 type I (batt without facing), or II Class A (batt with nonreflective facing, flame spread 25 or less), or III Class A (batt with reflective facing, flame spread 25 or less).
 2. Full width batt for use with steel studs spaced 16" on center.
 3. Thermal Resistance: Measured in accordance with ASTM C 518, R-value 19
 4. Factory-applied facing:
 - a. FSK (foil-scrim-kraft, Type III Class A, Category 1, facer is a vapor retarder with 0.02 water vapor permeance)
 - b. Surface burning characteristics, ASTM E 84, flame spread 25 or less.
 5. Water Vapor Permeance: Permeance of vapor retarding facings measured in accordance with ASTM E 96.

6. Indoor Air Quality: Verified to be formaldehyde free by independent third party such as GreenGuard Environmental Institute, Indoor Air Quality and/or GreenGuard Children and Schools Certified
 7. Recycle Content: Minimum 50%, certified by independent third party such as Scientific Certification Systems
 8. Sustainable Product Certification: Verified to comply with EcoLogo Certification Criteria Document 016 for Thermal Insulation Materials (CCD-016) for environmentally preferable products
 9. Renewable Materials: Verified to contain renewable ingredients to meet or exceed the biobased content criteria for the USDA Certified Biobased Product Label
- B. Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to:
1. CertainTeed Corporation.
 2. Guardian Building Products.
 3. Johns Manville.
 4. Owens Corning.
- C. Acceptable Products: Subject to compliance with product criteria, the products that may be incorporated into the work include but are not limited to:
1. EcoTouch™ Thermal Batt, unfaced;
 - a. ASTM C 665 Type I; thickness [3-1/2" R-11, 3-1/2" R-13, 6-1/4" R-19]; full width for steel stud framing 16" or 24" on center; 48" or 96" long]
 2. EcoTouch™ Flame Spread 25, FSK faced;
 - a. ASTM C 665 Type III, Class A, reflective FSK faced, flame spread 25, 0.02 perm; thickness [3-1/2" R-11, 3-1/2" R-13, 6-1/4" R-19, 9-1/2" R-30]; full width for steel stud framing 16" or 24" on center; 48" or 96" long]

2.2 INSULATION FASTENERS

- A. Attach insulation as recommended by the insulation manufacturer for the different types of insulation and back-up to which it is to be applied.
- B. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that steel wall studs, opening framing, bridging and structural bracing and other framing support members and anchorage have been installed in accordance with good construction practice and are compliant with this specification.
- B. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within walls have been tested and inspected.
- C. Report unacceptable conditions in writing. Do not proceed with work until unsatisfactory conditions have been corrected.
- D. Installation of products specified in this section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.

3.2 INSTALLATION OF FIBERGLASS BATT STEEL STUD CAVITY INSULATION

- A. Install fiberglass batt insulation in accordance with manufacturer's recommendations and not before the exterior sheathing has been installed on one side of the stud cavity and sealed to be water resistant.

- B. Protect insulation from damage due to weather and physical abuse until protected by permanent construction.
- C. Fit batt insulation tightly into exterior wall steel stud cavity spaces and framing voids to create a continuous insulation layer without gaps. Trim to fill spaces and voids neatly. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation.
- D. Within exterior wall framing, install insulation between pipes, mechanical services, electrical boxes, and backside of sheathing. Cut or split insulation material as required to fit around wiring and plumbing.
- E. Install factory applied facing with vapor retarder membrane facing warm side of building spaces. Facing flanges (tabs) may be left unfolded for friction fit installation, or they may be unfolded and lapped over or between framing members.
- F. Maintain vapor retarder integrity by tightly abutting adjacent insulation. Repair punctures or tears in vapor retarder facing by taping with a vapor retarding tape. Follow tape manufacturer's application recommendations.
- G. Fiberglass batt support in steel stud cavities:
 - 1. Unfaced and faced batt: Tightly friction fit full width 16", batt insulation to fill the interior of the cavities between steel studs, and to completely fill the voids inside the steel stud flanges.
 - 2. Factory faced batt insulation: Support by taping or adhering the facing flanges to the face of the steel stud. Gypsum board wall finish is applied after the facing is secured. No additional support is required.
 - 3. When Unfaced batt insulation, completely filled cavity depth, both sides of the stud cavity closed: Friction fit is adequate if the insulation completely fills the depth of the stud cavity, and the cavity is enclosed on both sides. No additional support is required
 - 4. When Unfaced batt insulation, completely fills cavity depth, and one side of the stud cavity open: Friction fit, supplement with straps or wires, described below, installed starting 4' above the floor and every 2' on center above 4'.
 - 5. When Unfaced batt insulation, does not completely fill depth of stud cavity: Friction fit, supplement with straps or wires, described below, installed starting 4' above the floor and every 2' on center above 4'.
 - 6. Supplemental wire or strap supporting devices: Multiple types of support devices may be used. Wires can be inserted through the batts extending from stud to stud. The wires may be installed continuously through the punch outs of the steel stud framing. Or, heavy gauge wire may be cut slightly larger than each stud space and wedged into place between studs. When the insulation is less than the depth of the stud cavity, the wires should be positioned to hold the batt against the sheathing (gypsum or foam plastic) on the opposite side of the cavity. Another option is the use of punched metal straps attached to the face of the framing. The punched pronged tabs are bent 90 degrees pointing into the stud cavity and are pushed into the insulation after installation. The punched prongs impale the insulation batt and hold it in place.

END OF SECTION

SECTION 072500
WEATHER BARRIERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Weather barrier membrane
- B. Seam Tape
- C. Flashing
- D. Fasteners

1.02 REFERENCES

- A. ASTM International
 - 1. ASTM C 920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C 1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D 882; Test Method for Tensile Properties of Thin Plastic Sheet
 - 4. ASTM D 1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E 84; Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E 96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E 1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
 - 9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- B. AATCC – American Association of Textile Chemists & Colorists
 - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
 - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
 - 2. Test Method T-460; Air Resistance of Paper (Gurley Hill Method)

1.03 SUBMITTALS

- A. Refer to Section 013000
- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
- D. Quality Assurance Submittals

1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

E. Closeout Submittals

1. Refer to Section 017800.
2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.04 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

B. Mock-up

1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - a. Mock-up size: 10 feet by 10 feet.
 - b. Mock-up Substrate: Match wall assembly construction, including window opening.
 - c. Mock-up may not remain as part of the work.
2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

C. Pre-installation Meeting

1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, installer, Owner's Representative, and weather barrier manufacturer's designated representative.
2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.05 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 016000.

B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

- C. Store weather barrier materials as recommended by weather barrier manufacturer.

1.06 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.07 WARRANTY

- A. Special Warranty
 - 1. Weather barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
 - 2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); <http://www.construction.tyvek.com>
- B. Other manufacturers meeting or exceeding these specifications.

2.02 MATERIALS

- A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont Tyvek CommercialWrap D and related assembly components.
- B. Performance Characteristics:
 - 1. Air Penetration: 0.001 cfm/ft² at 75 Pa when tested in accordance with ASTM E2178. Type 1 when tested in accordance with ASTM E 1677. ≤0.04 cfm/ft @ 75 Pa when tested in accordance with ASTM E2357.
 - 2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E 96, Method B.
 - 3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.
 - 4. Basis Weight: 2.4 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 - 5. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.
 - 6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D 822 , Method A.
 - 7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 15, Smoke Developed: 25.

2.03 ACCESSORIES

- A. Seam Tape: 3" DuPont Tyvek Tape as distributed by DuPont.
- B. Fasteners:
 - 1. DuPont Tyvek Wrap Cap Screws,: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap fasteners.
- C. Sealants
 - 1. Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
 - 2. Products:
 - a. DuPont Commercial Sealant.
 - b. Sealants recommended by the weather barrier manufacturer.
- D. Adhesives:
 - 1. Provide adhesive recommended by weather barrier manufacturer.
- E. Primers:
 - 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
- F. Flashing
 - 1. DuPont™ FlexWrap™: Flexible membrane flashing materials for window openings and penetrations.
 - 2. DuPont™ FlexWrap™ NF: Flexible membrane flashing materials for window openings and penetrations.
 - 3. DuPont™ StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
 - 4. DuPont™ StraightFlash™ VF: Dual-sided flashing membrane materials for brick mold and non-flanged windows and doors.
 - 5. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
 - 6. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION - WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap weather barrier
 - 1. Exterior corners: minimum 12 inches.
 - 2. Seams: minimum 6 inches.
- H. Weather Barrier Attachment:
 - 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.05 FLASHING

- A. Cut 9-inch wide DuPont™ FlexWrap a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont FlexWrap edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

- C. Fan DuPont FlexWrap at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
- D. Apply 9-inch wide strips of DuPont StraightFlash at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install DuPont FlexWrap at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont StraightFlash over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.06 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Apply sealant bead at each termination.

3.07 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

3.08 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE

- A. Seal weather barrier to bottom of shelf angle with sealing membrane.

- B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.09 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners.

3.10 FIELD QUALITY CONTROL

- A. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.11 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION

SECTION 074100
METAL WALL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prefinished prefabricated nonstructural wall panels providing cladding protection of a weather barrier substrate.
- B. Associated flashings, fasteners, clips, sealants and accessories.

1.2 RELATED SECTIONS

- A. Section 054000 – Cold Formed Metal Framing.
- B. Section 061000 - Rough Carpentry.
- C. Section 076200 - Sheet Metal Flashing and Trim.
- D. Section 079000 - Joint Protection.

1.3 REFERENCES

- A. AWS Structural Welding Code D1.1 - Structural Welding Code, Steel.
- B. AWS Structural Welding Code D1.3 - Structural Welding Code, Sheet Steel.
- C. American Iron and Steel Institute (AISI) - Specification for the Design of Cold-Formed Steel Structural Members.
- D. American Society for Testing and Materials (ASTM) A446 - Steel sheet, zinc coated (galvanized) by the hot-dip process, structural (physical) quality.
- E. American Society for Testing and Materials (ASTM) A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- F. American Society for Testing and Materials (ASTM) A792 - Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- G. American Society for Testing and Materials (ASTM) B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- H. American Society for Testing and Materials (ASTM) D523 - Standard Test Method for Specular Gloss.
- I. American Society for Testing and Materials (ASTM) D659 - Standard Guide for Testing Industrial Water-Reducible Coatings.
- J. American Society for Testing and Materials (ASTM) D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- K. American Society for Testing and Materials (ASTM) D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

- L. American Society for Testing and Materials ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- M. American Society for Testing and Materials (ASTM) E283 - Standard Test Method for Rate of Air Leakage Through Exterior Curtain Walls, and Doors.
- N. American Society for Testing and Materials (ASTM) E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- O. American Society for Testing and Materials (ASTM) E1592 - Standard Test Method for the Structural Performance of Sheet Metal Roofing and Siding Systems by Uniform Static Air Pressure Difference.
- P. American Architectural Manufacturer's Association (AAMA) 605.2 - Voluntary Specification for High Performance Organic Coatings.
- Q. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- R. Underwriters Laboratories (UL) - Building Materials Directory.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Manufacturer's data sheets on each product to be used, including:
 - 1. Data substantiating materials comply with requirements.
 - 2. Detailed specification of construction and fabrication.
 - 3. Manufacturer's installation instructions.
 - 4. Certified test reports indicating compliance with performance requirements specified herein and as follows:
 - a. Certification by the manufacturer that the roofing assembly is listed by UL for the wind uplift rating specified with relevant construction number indicated.
 - 5. Clip fastener pull-out tests.
 - 6. Concentrated load test data certifying compliance with specified performance requirements.
 - 7. Preparation instructions and recommendations.
 - 8. Storage and handling requirements and recommendations.
 - 9. Installation methods.
- C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.
 - 1. Indicate material profile, jointing pattern, jointing details, fastening methods, and installation details.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 12 by 24 inches square representing actual product, color, profiles and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Manufacturer shall have a minimum of 10 years experience supplying metal roofing/siding to the region where the work is to be done.

- B. Installer Qualifications:
 - 1. Acceptable to, licensed or certified by manufacturer.
 - 2. Not less than 5 years experience with systems.
 - 3. Successfully completed not less than 5 comparable scale projects using this system.
- C. Regulatory Requirements:
 - 1. Comply with local Building Code requirements if more restrictive than those specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect against damage and discoloration.
- B. Handle panels with non-marring slings.
- C. Do not bend panels.
- D. Store panels above ground, with one end elevated for drainage.
- E. Protect panels against standing water and condensation between adjacent surfaces.
- F. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.
- G. Remove any strippable film coating prior to installation and do not allow it to remain on the panels in extreme cold, heat or in direct sunlight.
- H. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Manufacturer/installer shall stand behind installed system for the periods described herein, starting from Date of Substantial Completion against all the conditions indicated below. When notified in writing from Owner, Manufacturer/installer shall, promptly and without inconvenience and cost to Owner, correct said deficiencies.
 - 1. Standard Material Warranty:
 - a. 20 years from date of Substantial Completion on coil coated material.
 - b. Finish coating shall not peel, blister, chip, crack or check in finish, and shall not chalk in excess of 7 numerical ratings when measured in accordance with ASTM D659.
 - c. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822.
 - 2. Standard 20-Year Warranties: Warrant wall panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage following Project Substantial Completion date for the period stated below:
 - a. Concealed fastener warranty, 2 years.
 - b. Weathertight Wall Panel Side Joint Only 20-Year Prorated Warranty: Side joint only warranties cover the weathertight integrity of the wall panel side joint only.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Metal Sales Manufacturing Corp., Peterson Aluminum Corp., AEP-Span, Berridge Manufacturing Co., MBCI
- B. Other manufacturers meeting these specifications.

2.2 PRODUCTS

- A. Exterior Wall Panels: Equal to Pac-Clad R-36 Wall Panel, 24 gauge with 36" panel coverage and 1 1/4" panel depth. Panels shall be full height. Panel end splices shall not be acceptable. Corner trim, base trim and transition flashings shall be provided as required to complete the assembly. Closures and fasteners shall be provided as required for a weathertight installation. Fastener spacing and type shall be determined by manufacturer's standard offering.
- B. Base Metal: Prefinished Galvalume sheet, AZ50 coating made up of 55 percent aluminum, 1.6 percent silicon and the balance zinc as described in ASTM specification A792.
- C. Closures, Flashing and Trim: Shall be of same material, gauge, finish and panels.
- D. Concealed Clips: Clips as determined by manufacturer to suit specified performance requirements.
- E. Fastener Screws: as determined by manufacturer to suit specified performance requirements.

2.3 FINISH

- A. Exterior Finish:
 - 1. Wall Panels: Polyvinylidene Fluoride, full 70% Kynar 500 / Hylar 5000 consisting of a baked on .20 mil corrosion resistant primer and a baked on .8 mil finish coat with a specular gloss of 10-30% when tested in accordance with ASTM d-523-89 at 60 degrees F. Color shall be as scheduled on Construction Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
 - 1. Inspect installed work of other trades and verify that work required is complete.
 - 2. Verify that installation will be made in accordance with approved shop drawings and manufacturer's instructions.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
 - 1. Follow wall panel manufacturer's directions.
 - 2. Lap panels away from prevailing wind direction.
 - 3. Do not stretch or compress panel side-laps.
 - 4. Secure panels without warp or deflection.
 - 5. Clean and dry surfaces prior to applying sealant.
 - 6. Exposed fasteners are not allowed, except to fasten flashings, at fixed points, or as indicated on Drawings.
- B. Cutting and Fitting:
 - 1. Neat, square and true. Torch cutting is prohibited where cut is exposed to final view.
 - 2. Openings 6 inches (153 mm) and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.
 - 3. Where necessary to saw-cut panels, debur cut edges.
- C. Flashing:
 - 1. Follow manufacturer's directions and architect approved Shop Drawings.
 - 2. Install flashings to allow for thermal movement.
 - 3. Remove strippable protective film, if used, immediately preceding flashing installation.
- D. Dissimilar Metals:
 - 1. Where sheet metal is in contact with dissimilar metals, execute juncture to facilitate drainage and minimize possibility of galvanic action.
 - 2. At point of contact with dissimilar metal, coat metal with protective paint or tape which can be placed between metals.
- E. Field apply sealant to penetrations, transitions, and other locations necessary (not batten seam) for airtight, waterproof installation.

3.4 PROTECTION

- A. Protect installed products until completion of project.
 - 1. Treat, or isolate with protective material, and contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
 - 2. Protect work of other trades against damage and discoloration.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 076100

METAL STANDING SEAM ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. Prefinished, prefabricated structural standing seam roof system with continuous interlocking field formed seams.
2. Coordinate with installation of roofing substructure.
3. Provide color coordinated hip, gable, and valley flashings, ridge and peak caps, eave and shelf drips, and counter flashings.
4. Provide clips, fasteners, closures, and sealants as necessary to meet design criteria and ensure weathertight installation.

B. RELATED SECTIONS:

1. Section 074100 – Metal Wall & Soffit Panels
2. Section 076200 – Sheet Metal Flashing and Trim

1.2 SYSTEM DESCRIPTION

A. DESIGN REQUIREMENTS:

1. The panel system shall bear fully documented proof that it has been independent laboratory evaluated using the U.S. Army Corps of Engineers Guide Specification (CEGS) 07416.
2. Provide UL 90 rated roofing system that has been tested in accordance with UL 580 test procedure.
3. Provide factory preformed panel system that has been pretested and certified by manufacturer to comply with specified requirements under installed conditions.
4. Provide one-piece, single length roof panel where possible.
5. Provide continuous interlocking field formed standing seam that inherently increases load span capability, stiffness and flexural stress handling capacity.
6. Provide panel capable of spanning 7'-0" support spacing and maintain UL 90 wind uplift rating.
7. Provide continuous factory installed hot-melt butyl sealant within the confines of the female flange.

B. STRUCTURAL REQUIREMENTS:

1. Panel structural properties determined in accordance with latest edition of American Iron and Steel Institute's "Cold Formed Steel Design Manual," using "effective width" concepts.
2. Provide confirmation of positive and negative buckling moments and uplift capacity determined by full-scale tests.

C. SUBSTRATE CRITERIA:

1. UL90 Design Criteria: Engineer roofing system based on steel purlins capable of withstanding Class 90 loading as per UL protocol 580 applied at 90 degrees to surface and spaced as shown.

D. ENVIRONMENTAL REQUIREMENTS: Actual independent laboratory certified test results must be submitted.

1. Resistance to air infiltration: .022 cfm per linear foot of joint when tested in accordance with ASTM E 1680 at static test pressure differential of 12.00 psf.

2. Resistance to water infiltration: No leakage through panel joints when tested in accordance with ASTM E 1648 at static test pressure differential of 15.00 psf.

1.3 SUBMITTALS

- A. PRODUCT DATA: Submit manufacturer's specifications, standard detail drawings, and installation instructions.
- B. SHOP DRAWINGS:
 1. Submit shop drawings indicating thickness and dimensions of parts, fastenings and anchoring methods, details and locations of seams, transitions and other provisions necessary for thermal expansion and contraction.
 2. Indicate roof terminations, clearly showing flashings and change of direction caps.
 3. Clearly indicate locations of field and factory applied sealant.
 4. Show locations and types of hold-down clips and fasteners.
 5. Provide plan showing layout of entire roof.
- C. SAMPLES:
 1. Submit two samples, 12" long x full width panel, showing proposed metal gauge and seam profile.
- D. TEST REPORTS:
 1. Submit test reports prepared by (UL) Underwriters Laboratories, Inc. indicating wind uplift rating of proposed roof system.
- E. CERTIFICATION:
 1. Submit manufacturer's certification that materials and finishes meet specification requirements.
- F. APPLICATOR'S EXPERIENCE:
 1. Submit list of completed projects and name of Architects.

1.4 QUALITY ASSURANCE

- A. MANUFACTURER'S QUALIFICATIONS:
 1. Ten years minimum experience in factory fabrication of standing seam roofs.
 2. Products listed in this specification section are as manufactured by Metal Sales Manufacturing Corp.
 3. Other manufacturers complying with the specified requirements shall be acceptable.
- B. APPLICATOR QUALIFICATIONS:
 1. Three years minimum experience in application of high performance standing seam roofs.
 2. Minimum of five satisfactory projects on similar types of roofs.
- C. REGULATORY REQUIREMENTS:
 1. Comply with requirements of applicable building codes and other agencies having jurisdiction for wind uplift rating of standing seam roofs.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Protect products and accessories from damage and discoloration during transit and at project site. Store sheets and components in dry storage area to prevent condensation.
- B. Do not overload roof structure with stored materials. Do not permit material storage or traffic on completed roof surfaces.

1.6 WARRANTY

- A. Furnish manufacturer's standard 20-year warranty stating architectural fluorocarbon finish will be:
 - 1. Free of fading or color change in excess of 5 NBS units as measured per ASTM D 2244-68;
 - 2. Will not chalk in excess of numerical rating of 7 when measured in accordance with standard procedures specified in ASTM D 659-74;
 - 3. Will not peel, crack, chip, or delaminate.
- B. Furnish written warranty signed by applicator for two-year period from date of substantial completion of the building covering repairs required to maintain roof and flashings in watertight conditions.
- C. Special Watertightness Warranty: Manufacturer's no dollar limit form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain watertight, including leaks, within 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Metal Sales Manufacturing Corp., Peterson Aluminum Corp., AEP-Span, Berridge Manufacturing Co., MBCI
- B. SUBSTITUTIONS:
 - 1. Substitutions must fully comply with specified requirements.

2.2 MATERIALS

- A. PANELS:
 - 1. Prefinished sheet, ASTM AZ50 made of 55% aluminum, 1.6% silicon and the balance zinc as described in ASTM specification A792.
 - 2. Fabricate panels with sufficient thickness to meet specified UL 90 wind uplift requirements.
 - 3. Factory or field fabricated panel with integral continuous overlapping seams suitable for continuous locking or crimping by mechanical means during installation.
 - 4. Panel Width: 16" or 18".
 - 5. Minimum Seam Size: 2"
 - 6. Provide high grade, hot-melt elastomeric sealant, within the confines of female seam flange, on bottom edge of female seam flange, designed to seal against adjacent male panel leg.
 - 7. Panels shall be equal to PAC-Clad, Tite-Loc, (Berridge 16in. Double Lock Zee Lock panel is approved).
- B. CLIP/FASTENER ASSEMBLIES:
 - 1. Typical clip:
 - UL 90 requirements:
 - a. Fasteners: Manufacturer's standard #12 - 14 x 1 1/4" long self-drilling, self-tapping hex head drive screws for metal; noncorrosive base material.
 - b. UL Rated Clip: Sliding 22 gauge galvanized steel hook in combination with a double fastened 16 gauge galvanized steel base, both at Fy (MIN) = 33 ksi. Clip hook shall have a shop installed hot-melt butyl sealant for continuity of seal at clip locations.
 - 2. Typical Low Clip Requirements:

- a. Fasteners: as per manufacturer's recommendation.
 - b. Sliding 26 gauge at $F_y=40\text{ksi}$ (MIN) galvanized steel hook in combination with a double fastener 18 gauge at $F_y = 50 \text{ ksi}$ (MIN) galvanized steel base. Clip hook shall have a shop installed hot-melt butyl sealant for continuity of seal at clip locations.
- 3. Standard Fasteners: Same as UL 90 fasteners specified above. All fasteners shall be concealed.
- C. ACCESSORIES:
 - 1. Provide manufacturer's standard accessories and other items essential to completeness of standing seam roof installation.
 - 2. Gutters and downspouts will be fabricated to the same gauge and specification as panel.
 - 3. Expanded metal grate walkway system secured to metal panel vertical seams where shown on Construction Drawings.
- D. FIELD SEALANT:
 - 1. Color coordinated primerless silicone or high grade, nondrying butyl as recommended by panel manufacturer.
 - 2. Do not use sealant containing asphalt.

2.3 FABRICATION

- A. PANELS:
 - 1. Provide factory formed panel widths.
 - 2. Provide panels in full length from ridge to eave and eave to eave where applicable.
 - 3. Where single length panels are not practical, provide mated swaged panels for positive joint end laps, shingled to accommodate water run-off (fabricated with overlap in direction of water flow). Exposed fasteners shall not be acceptable.
 - 4. Roof panels shall have flush horizontal and vertical surfaces to facilitate sealing at terminations. Panel configurations which create voids and require supplemental closure devices shall not be considered acceptable.
- B. SEAMS:
 - 1. Panel seams shall interlock entire length of seam.
 - 2. Design standing seam to lock up and resist joint disengagement during design wind uplift conditions as calculated according to local building codes.
 - 3. Provide factory sealant within confines on trailing edge of female seam leg to aid in resistance of leaks and provide panel-to-panel seal while allowing expansion and contraction movement, and the seams shall be continuously locked or crimped together by mechanical means during installation.
- C. CLIPS:
 - 1. Provide UL listed clip designed to allow panels to thermally expand and contract and provide ± 1 inch of thermal movement. Clip shall incorporate a self-centering feature to allow 1" of movement in both directions along panel length.
 - 2. Clip shall be designed to meet positive and negative pressures as calculated per local building code.
- D. Engineer panels to use concealed anchors that permit expansion and contraction. Exposed fasteners shall not be permitted.

2.4 FINISH

- A. FLUOROCARBON COATING:
 - 1. Full strength 70% Kynar 500® coating baked on for 15 minutes at 450 degrees F to dry-film thickness of 1.0 mil.
 - 2. 15% reflective gloss (ASTM D 523).

3. 0.3 mil baked on epoxy primer.
4. Color:
 - a. Color be as schedule on the Construction Drawings.
 - b. Trims and Flashings: To match roof panels.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's instructions for assembly, installation, and erection in order to achieve weathertight installation. Install in accordance with approved shop drawings.
- B. Standing Seam System:
 1. Install panels in accordance with manufacturer's instructions and recommendations.
 2. Anchor securely in place using clips and fasteners spaced in accordance with manufacturer's recommendations for design wind load criteria.
- C. Dissimilar Metals:
 1. Where sheet metal is in contact with dissimilar metals, execute juncture to facilitate drainage and minimize possibility of galvanic action.
 2. At point of contact with dissimilar metal, coat metal with protective paint or tape which can be placed between metals.
- D. Field apply sealant to penetrations, transitions, and other locations necessary (not standing seam) for airtight, waterproof installation.

3.2 CLEANING

- A. Clean exposed surfaces of work promptly after completion of installation.

3.3 PROTECTION

- A. Protect work as required to ensure roofing will be without damage at time of final completion.

END OF SECTION

SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section describes complete systems using proven details to exclude water from the building at copings, base flashings, parapet wall liners and other locations commonly closed by sheet metal.

1.2 REFERENCES

- A. FM: FM Global
 - 1. FM Data Sheet 1-49: Perimeter Flashing
- B. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association, Inc.
 - 1. SMACNA Architectural Sheet Metal Manual

1.3 SYSTEM DESCRIPTION

- A. Allow for field adjustments for proper anchoring or joining to other items.
- B. The requirements shown by the details are intended to establish basic dimensions, profiles and sightlines. Within these limitations, the Contractor shall be responsible for the design of the sheet metal flashing and trim assemblies and may make whatever modifications of and additions to the details as may be required to prevent water and air penetration. Maintain the visual design concept as shown, including member sizes, profiles and alignment of components.
- C. Conform to criteria described in FM data sheets 1-49.

1.4 SUBMITTALS

- A. Submit the following.
 - 1. Product Data: Submit metal manufacturer's specifications, installation instructions and general recommendations for flashing and trim applications, with complete list of materials proposed for use.
 - 2. Shop Drawings:
 - a. Show the manner of forming, jointing and securing the metal to form flashings and trim. Show waterproof connections to adjoining work and at obstructions and penetrations. Identify adjoining materials.
 - b. Clearly identify design modifications recommended under System Description article above.

1.5 PROJECT CONDITIONS

- A. Scheduling: Promptly cover exposed edges of completed roofing.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTIES

Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

- 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- 2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
 - 1. Exposed Coil-Coated Finishes:
 - a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color: Colors shall match existing metal roof panels. Provide custom color as required to match panels.
 - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
 - 2. Surface: Smooth, flat and mill phosphatized for field painting at exposed locations and with manufacturer's standard clear acrylic coating on both sides at locations not exposed to view.
 - 3. Exposed Coil-Coated Finish:
 - a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

4. Color: Color to match Metal Wall Panels.
5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.2 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
 3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- C. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

- C. Solder:
 - 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane, polysulfide, or silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

- G. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- I. Do not use graphite pencils to mark metal surfaces.

2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Gutters at standing seam metal roofs to be installed by pre-engineered metal building manufacturer are not to be included here. Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
 - 1. Gutter Style: SMACNA designation D.
 - 2. Expansion Joints: Butt type with cover plate.
 - 3. Accessories: Continuous removable leaf screen with sheet metal frame and hardware cloth screen.
 - 4. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
 - a. Galvanized Steel: 0.022 inch thick.
- B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Hanger Style: continuous cleat and hanger to SMACNA Standards. With metal straps at 36 inches on center max.
 - 2. Fabricate from the following materials:
 - a. Galvanized Steel: 0.022 inch thick.
- C. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:
 - 1. Galvanized Steel: 0.028 inch thick.
- D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated complete with outlet tubes, exterior flange trim, and built-in overflows. Fabricate from the following materials:
 - 1. Galvanized Steel: 0.028 inch thick.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof-Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch long, but not exceeding 10-foot long, sections. Furnish with 6-inch wide, joint cover plates.
 - 1. Joint Style: Butt, with 6-inch wide, exposed cover plates.
 - 2. Fabricate from the following materials:
 - a. Galvanized Steel: 0.028 inch thick.
- B. Copings: Fabricate in minimum 96-inch long, but not exceeding 10-foot long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support

edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners and weld (no exceptions) and seal watertight.

1. Coping Profile: SMACNA figure designation 3-4A.
 2. Joint Style: Butt, with 12-inch wide, concealed backup plate and 6-inch wide, exposed cover plates.
 3. Fabricate from the following materials:
 - a. Galvanized Steel: 0.040 inch thick.
- C. Roof and Roof to Wall Transition Expansion-Joint Cover: Fabricate from the following materials:
1. Galvanized Steel: 0.034 inch thick.
- D. Base Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch thick.
- E. Counterflashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- F. Flashing Receivers: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- G. Roof-Penetration Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch thick.
- H. Roof-Drain Flashing: Fabricate from the following materials:
1. Copper: 12 oz./sq. ft.

2.7 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- B. Valley Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch thick.
- C. Drip Edges: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- E. Counterflashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- F. Flashing Receivers: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- G. Roof-Penetration Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch long, but not exceeding 12-foot long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch high, end dams where flashing is discontinuous. Fabricate from the following materials:
 - 1. Copper: 16 oz./sq. ft.
- B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch high, end dams. Fabricate from the following materials:
 - 1. Galvanized Steel: 0.022 inch thick.
- C. Wall Expansion-Joint Cover: Fabricate from the following materials:
 - 1. Galvanized Steel: 0.028 inch thick.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:
 - 1. Galvanized Steel: 0.028 inch thick.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that substrates are smooth and clean to extent needed for sheet metal work.
- B. Verify that reglets, nailers, cants, and blocking, to receive sheet metal are installed and free of concrete and soil.
- C. Start sheet metal work only after conditions are satisfactory.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings.
- B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding

rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 5. Install sealant tape where indicated.
 6. Torch cutting of sheet metal flashing and trim is not permitted.
 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws and metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Section 07900 - Joint Sealers.
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel sheet.
 2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets and straps spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - 1. Fasten gutter spacers to front and back of gutter.
 - 2. Loosely lock straps to front gutter bead and anchor to roof deck.
 - 3. Anchor and loosely lock back edge of gutter to continuous cleat.
 - 4. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
 - 5. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.
- C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
 - 1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
 - 2. Connect downspouts to underground drainage system indicated.
- D. Splash Pans: Install where downspouts discharge on low-slope roofs Set in asphalt roofing cement compatible with roofing membrane.
- E. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
 - 1. Anchor scupper closure trim flange to exterior wall and solder or seal with elastomeric sealant to scupper.
 - 2. If conductor head is indicated in the Drawings, solder or seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.
- F. Conductor Heads: Anchor securely to wall with elevation of conductor head rim 1 inch below scupper discharge.
- G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

- C. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.
 - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
 - 2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of interlocking folded seam or blind rivets and sealant.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 4 Section "Unit Masonry Assemblies."
- C. Reglets: Installation of reglets is specified in Division 4 Section "Unit Masonry Assemblies."

3.7 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Curved Roof Flashing: Flashing at curved roof fascias shall be fabricated and installed in minimum lengths of 10'-0".

3.8 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 077253

SNOW GUARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Standing seam clamp-on snow fence.

1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for standing seam clamp-on snow fences.
 - 1. Engineering Calculations: For clamp-in snow fence system anchoring and roof system stamped and sealed by an Engineer licensed in the State of Oklahoma.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of standing seam clamp-on snow fences.
 - 1. Include details of standing seam clamp-on snow fences.
 - 2. Include calculation of number and location of standing seam clamp-on snow fences based on ground snow load, roof slope, roof type, components, spacings, and sheathing type.
- C. Samples: Clamp and 12-inch long fence.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of standing seam clamp-on snow fence for tests performed by manufacturer and reviewed by a qualified testing agency.

1.5 WARRANTY

- A. Special Warranty on Standing Seam Clamp-On Snow Fences: Manufacturer's standard form in which manufacturer agrees to replace and ship snow guard components that fail to meet engineered design loads within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Performance Requirements: Provide standing seam clamp-on snow fences, and deck-mounted snow fences that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Structural Performance:
 - 1. Snow Loads: As stipulated by the International Building Code, 2018 Edition.

2.2 FENCE-TYPE SNOW GUARDS

- A. Seam-Mounted, Rail-Type Snow Guards:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide TRA SNOW AND SUN, INC.; C21Z Clamp On Snow Guard or a comparable product.
 - 2. Description: Units fabricated from metal with one rail options.
 - 3. Color: Powder coat; Color shall match metal roof panels.

2.3 FASTENERS

- A. Use stainless steel fasteners and anchors recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances of standing seam clamp-on snow fence attachment, and other conditions affecting performance of the Work.
 - 1. Verify compatibility with and suitability of substrates including compatibility with existing finishes or primers.
 - 2. Verify that roofing materials, framing, decking, and fastenings are capable of resisting design forces in accordance with authorities having jurisdiction.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare substrates for securing standing seam clamp-on snow fence; remove loose and foreign matter that could interfere with installation or performance.

- B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

- A. Install standing seam clamp-on snow fence according to manufacturer's written instructions. Space brackets horizontally and rows as recommended by manufacturer.
- B. Attachment for Standing-Seam Metal Roofing:
 - 1. Do not use fasteners that will penetrate metal roofing, or fastening methods that void metal roofing finish warranty.
 - 2. Seam-Mounted, Rail-Type Snow Guards: Zinc-plated-steel clamps attached to vertical ribs of standing-seam metal roof panels.

END OF SECTION

SECTION 079000

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Caulks and sealants.
- B. Caulks and sealants application schedule.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 808.3 - Specification for Exterior Perimeter Sealing Compound.
- B. ASTM International:
 - 1. ASTM C834 - Standard Specification for Latex Sealants.
 - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 3. ASTM C1311 - Standard Specification for Solvent Release Sealants.
- C. Underwriters Laboratory (UL):
 - 1. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings:
 - 1. Show details of each system including material layers and thicknesses, flashing, terminations, and penetrations with each rooftop support system to be installed.
 - 2. All supports shall be pre-assembled and shipped for turnkey installation. Indicate all steps and preparation required by others.
- D. Verification Samples: Provide two representative samples for each product to be installed.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products.
- B. Installer Qualifications: Minimum 2 years experience installing similar products.
- C. Product Requirements: Provide products to meet the following:
 - 1. VOC requirements of the state and local building authorities.
 - 2. GreenSeal GS-36 Specifications - Standard for Adhesives For Commercial Use.
 - 3. National Science Foundation (NSF) 51 - Food Equipment Materials.

- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
 - 4. Accepted mock-ups may be included in the finished work and shall set the standard of workmanship and acceptance for remaining work.

1.5 PRE-INSTALLATION MEETINGS

- A. Convene at the project site a minimum two weeks prior to starting work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Handle materials to avoid damage.
- C. Store materials in a clean, dry, interior location in accordance with the manufacturer's instructions. Maintain temperature range required by the manufacturer. Keep containers sealed until ready for use. Do not use sealants past the expiration date.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products to wet surfaces or under environmental conditions outside manufacturer's recommended limits.

1.8 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

- A. Warranty: Provide manufacturer's standard limited warranty for the following:
 - 1. Elastomeric Acrylic Sealant: 60 years.
 - 2. Siliconized Acrylic Caulk: 50 years.
 - 3. Acrylic Latex Caulk: 40 years.
 - 4. Clear Thermoplastic Sealant: 40 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
Top Gun Brand
400 Bertha Lamme Dr.
Cranberry Township, PA 16066
Tel: 800-834-0015
- B. Requests for substitutions will be considered in accordance with provisions of

Section 016000 - Product Requirements.

2.2 JOINT SEALANTS

A. Acrylic Sealants:

1. Siliconized Acrylic Sealant: Provide TOP GUN 200 to meet the following:
 - a. Product Type: Siliconized acrylic.
 - b. Class: ASTM C834, Type OP, Grade 0'C.
 - c. VOC (actual): 1 percent.
 - d. Solids by Weight: 80 percent minimum.
 - e. Hardness: Shore A, 25.
 - f. Flash Point: > 200 degrees F (93 degrees C).
 - g. Color: As selected by Architect to match adjacent surfaces
2. Acrylic Polymer Sealant: Provide TOP GUN 200xi to meet the following:
 - a. Product Type: Acrylic Polymer.
 - b. Class: ASTM C834, Grade -18'C.
 - c. VOC (actual): 1 percent.
 - d. Solids by Weight: 72.5 percent minimum.
 - e. Flash Point: > 200 degrees F (93 degrees C).
 - f. Color: 1411 Bright White.
3. Elastomeric Siliconized Acrylic Sealant: Provide TOP GUN 210x to meet the following:
 - a. Product Type: High-Acrylate, Vinyl acrylic copolymer Siliconized latex.
 - b. Class: ASTM C834, Type OP, Grade -18'C.
 - c. VOC (actual): 1.2 percent.
 - d. Solids by Weight: 82 percent minimum.
 - e. Flash Point: > 200 degrees F (93 degrees C).
 - f. Color: 1412 White.
4. Modified Acrylic Sealant: Provide TOP GUN 250 to meet the following:
 - a. Product Type: Proprietary modified acrylic.
 - b. Class: ASTM C834, Type OP, Grade -18'C.
 - c. VOC (actual): 1 percent.
 - d. Solids by Weight: 83 percent minimum.
 - e. Flash Point: > 200 degrees F (93 degrees C).
 - f. Color: 1415 White.
5. Elastomeric Siliconized Acrylic Sealant: Provide TOP GUN 300 to meet the following:
 - a. Product Type: Siliconized acrylic.
 - 1) Class: Class: ASTM C834 and ASTM C920, Type S, Grade NS, Class 12-1/2, Use NT, M, G, A, and O.
 - b. VOC (actual): 1 percent.
 - c. Solids by Weight: 82 percent minimum.
 - d. Hardness: Not reported.
 - e. Flash Point: > 200 degrees F (93 degrees C).
 - f. Product Type: Proprietary Urethane/ Modified acrylic blend (Siliconized).
 - g. Class: ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, G, A and O.
 - h. VOC (actual): <1.5 % (30 g/L less water.
 - i. Solids by Weight: 67 percent minimum.
 - j. Flash Point: > 200 degrees F (93 degrees C).
 - k. Color: As selected by Architect to match adjacent surfaces Silicone Sealants:
6. Silicone All Purpose Sealant: Provide TOP GUN 350 to meet the following:
 - a. Product Type: Silicone rubber.

- b. Class: ASTM C920, Type S, Grade NS, Class 25, Use NT, G, and A.
 - c. Food Safety: When cured and washed, meets FDA No. 21 CFR 177.2600.2.
 - d. VOC (actual): 2.9 percent.
 - e. Solids by Weight: 97 percent minimum.
 - f. Flash Point: > 200 degrees F (93 degrees C).
 - g. Color: 1419 Clear.
- B. Thermoplastic Sealants:
 - 1. Thermoplastic Sealant: Provide Top Gun 750 to meet the following:
 - a. Product Type: Thermoplastic elastomer.
 - b. Meets requirements of ASTM C 1311.
 - c. Hardness: 40 (Shore A).
 - d. Flash Point: 82°F (28°C).
 - e. Solids by Weight: 60%.
 - f. VOC (actual): 40%.
 - g. Elongation: 1400%.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction. Produce uniform appearance on exposed surfaces. Remove excess sealants immediately.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 SEALANT APPLICATIONS SCHEDULE

- A. Application: Masonry Veneer:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 300, TOP GUN 400, TOP GUN 350, TOP GUN 750
- B. Application: Rough Carpentry:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 300, TOP GUN 250

- C. Application: Miscellaneous Rough Carpentry:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 300, TOP GUN 250
- D. Application: Sheathing Roof and Wall:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 300, TOP GUN 250, TOP GUN 140
- E. Application: Gypsum Sheathing:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 140
- F. Application: Sheathing, Moisture Resistant:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 140
- G. Application: Cementitious Sheathing:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 140 (listed as "bonding" category)
- H. Application: Wood Trim:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 300, TOP GUN 400, TOP GUN 250, TOP GUN 350
- I. Application: Gypsum Board:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 140
- J. Application: Solid Surface Countertops:
 - 1) Sealant: TOP GUN Kitchen and Bath, TOP GUN 300, TOP GUN 350, TOP GUN 400
- K. Application: Joint Sealants:
 - 1) Sealant: TOP GUN 300, TOP GUN 400
- L. Application: Acoustical Joint Sealants:
 - 1) Sealant: TOP GUN 200, TOP GUN 200xi, TOP GUN 300, TOP GUN 400

END OF SECTION

SECTION 081113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The work under this section shall include the furnishing of all items shown on the drawings and as specified including, but not limited to, the following.
 - 1. Steel Doors
 - 2. Steel Door Frames

1.2 REFERENCES

- A. Steel Doors and Frames in this section must meet all standards as established by the following listing.
 - 1. Door and Hardware Preparation ANSI 115.
 - 2. Life Safety Codes NFPA-101 (Latest edition).
 - 3. Fire Doors and Windows NFPA-80 (Latest edition).
 - 4. Steel Door Institute ANSI/SDI-100 (Latest edition)
 - 5. UL10C and UBC 7 – 2 Positive Pressure fire testing.

1.3 SUBMITTAL

- A. Coordinate approved shop drawings with all other trades and manufacturers whose products are used in conjunction with the Steel Doors and Frames under section 08100.
- B. Finish hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Each floor of the building is to be detailed separately.
- D. The steel door and frame supplier will furnish to the architect (6) complete copies of the proposed steel door and frames schedule and/or shop drawings. **Using the same reference number for details and openings as those on the contract drawings.** After receipt of the approved door schedule the steel door and frame supplier will make any corrections and submit to the architect (6) sets of corrected schedules.
- E. Upon request of the architect or for any substitution to this specification, (4) copies of the steel door & frame manufacturers catalog cut sheets are to be submitted to the architect before any material is placed on the job site.

1.4 QUALITY ASSURANCE

- A. Provide Steel Doors and Frames complying with the Steel Door Institute recommended specifications for Standard Steel Doors and Frames ANSI/SDI 100 (Latest edition).

1.5 DELIVERY, STORAGE & HANDLING

- A. Doors and frames must be properly marked with door opening mark number to correspond with the schedule.
- B. Deliver all steel doors in cartons and palletized to provide protection during transit and job storage.
- C. Inspect doors and frames upon delivery for damage. Minor damage is to be repaired, provided the repair is equal to new work and acceptable to the architect.

- D. Store doors and frames at the job site under cover. Place units on wood sills on the floor in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters, which could create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a ¼ inch space between stacked doors to promote air circulation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provided their products meet the requirements of the specifications.
 - 1. Ceco Door Products
 - 2. Curries Company
 - 3. Other SDI or NAAMM members that conform to the specific requirements of this specification.

2.2 HARDWARE LOCATIONS & GENERAL REINFORCEMENTS

- A. Locate hardware on doors and frames in accordance with the manufacturer's standard location.
- B. When steel frames are used with wood doors, the hardware preparation in the door is governed by the location on the frame. If the doors are factory mortised, the door supplier is responsible for coordinating hardware locations.
- C. Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.
- D. Doors shall be mortised, reinforced and function holes provided at the factory in accordance with the hardware schedule and templates provided by the hardware supplier. Through bolt holes, attachment holes, or drilling and tapping for surface hardware, shall be done by others in the field.

2.3 STEEL DOORS

- A. Material - Exterior and as indicated on the schedule
 - 1. Sheets are to be made of commercial quality hot dipped zinc coated steel that complies with ASTM A924 A60.
 - 2. Vertical edges will join the face sheets by a continuous weld extending the full height of the door. Welds are to be ground, filled to make them invisible and provide a smooth flush surface.
 - 3. Hinge reinforcement to be not less than 7 gauge (3/16") plate 1-1/4" X 9". Approved equal is a 12 gauge continuous channel with formed holes drilled and tapped. The manufacture is to provide test information with submittal that this type reinforcement is equal to a 3/16" or 7 gauge plate reinforcement.
 - 4. Reinforce tops and bottoms of all doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel shall be flush with the top of the face sheets of the door. Plastic fillers are NOT acceptable.
 - 5. Door Cores
 - a. Insulated doors are to be completely filled with a rigid polyurethane core chemically bonded to all interior surfaces with a minimum insulation value of R10.
 - b. Insulated doors to have 20 gauge vertical steel stiffeners spanning the full thickness of the interior space between door faces. Stiffeners are spaced not more than 6" on centers, and attached by spot welds spaced not more

than 5" on centers. Spaces between stiffeners are to be filled with fiberglass insulation (Min. density 0.8#/cubic ft.)

6. Door face sheets shall be 16 gage.

B. Materials - Other doors as indicated on the schedule.

1. Face sheets are to be made of commercial quality cold rolled steel that complies with ASTM A366 or A620.
2. Vertical edges to have a hairline edge seam.
3. Hinge reinforcement shall be not less than 7 gauge (3/16") plate 1-1/4" X 9". Approved as equal is a 12 gauge continuous channel with formed holes drilled and tapped. The manufacture is to provide test information with submittal that this type reinforcement is equal to a 3/16" or 7 gauge plate reinforcement.
4. Reinforce tops and bottoms of all doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to have a steel closure channel screwed in place so that the web of the channel is flush with the top of the face sheets of the door. Plastic filler is NOT acceptable.
5. Door Cores
 - a. Doors are to be fully filled with a one piece resin-impregnated honeycomb bonded to both faces.
 - b. Or doors are to be fully filled with a one piece polystyrene core, securely bonded to both faces.
6. Door face sheets shall be 16 gage.

2.4 STEEL FRAMES

A. Materials - Exterior

1. To be hot dipped zinc coated steel that complies with ASTM designations A924 A60.
2. Weld the face seam and the full web of the frame corner or intersection. Grind and dress the weld area smooth. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.
3. All exterior door frames shall be 14 gage.

B. Materials - Interior

1. Cold rolled steel that complies to ASTM A366 or A620.
2. Weld the face miter seam. Grind and dress the weld smooth. Finish with a matching prime paint.
3. All interior door frames shall be 14 gage.

C. Fabrication

1. Provide steel frames for doors, transoms, sidelights, borrowed lites, and other openings to the size and design as shown on the architectural drawings.
2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects.
3. Jamb depths, trim, profile and backbends to be as scheduled and shown on approved shop drawings.
4. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field.
5. Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.
6. Frames shall be mortised, reinforced, drilled and tapped at the factory for template mortised hardware only, in accordance with approved hardware schedule and template provided by the hardware contractor. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping to be done in the field by others.

7. Hinge reinforcements to be 7 gauge steel.
8. All frames shall be fully welded. **Knock-down type frames shall not be acceptable.**

D. Anchors

1. Floor anchors to be provided at each jamb.
2. Anchors for masonry walls to be of the wire type.
3. Anchors for stud partitions to be steel of a suitable design, not less than 18 gauge thickness,
4. Dust boxes/mortar guards to be no less than 26 gauge.
5. All frames that are to be welded are to have a steel spreader during shipping and handling. Spreader bars are for bracing only and are not be used to size the frame opening.
6. Loose glazing stops are to be of 16 gauge galvanized steel, butted at corner joints and secured to the frame with countersunk cadmium or zinc-plated screws.
7. Except on weather-stripped frames, punch the stop for 3 silencers on single door and 2 on double door frames.

2.5 LABELED DOORS & FRAMES

- A. Construct and install doors and frames to comply with current issue of National Fire Protection Association (NFPA) Standard Number 80, as herein specified.
- B. Doors and/or frames for labeled openings shall bear either a stamped or applied label from a nationally recognized testing agency.
- C. All doors and frames shall have been tested in accordance with UL10C and UBC 7-2 Positive Pressure.

2.6 PRIME FINISH

- A. Doors and frames are to be cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer. The finish to meet the requirements for acceptance stated in ANSI A224.1 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces." The prime finish is not intended to be the final layer of protection from the elements. Field painting using a good grade of paint to be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

PART 3 EXECUTION

3.1 INSPECTION

- A. It is the responsibility of the General Contractor to assure that scratches or disfigurements caused in shipping or handling are properly cleaned and touched up with a rust inhibitive primer.

3.2 INSTALLATION

- A. Frames
 1. Prior to installation, all frames must be checked for rack, twist and out of square conditions.
 2. Place frames prior to enclosing walls and ceilings. Set frames accurately in position, plumbed and braced securely until permanent anchors are set. Remove shipping

- bar spreader and insert a wood spreader cut to the opening width, notched to clear the stops.
- 3. Fill frames in masonry walls with mortar.
- 4. When temperature conditions necessitate an additive to be used in the plaster or mortar to prevent freezing, the contractor installing the frames shall coat the inside of the frames, in the field, with a corrosion inhibiting bituminous material.
- 5. SDI-105, "Recommended Erection Instructions for Steel Frames" and SDI-110 "Standard Steel Doors and Frames for Modular Masonry Construction" shall indicate the proper installation procedures.
- B. Doors
 - 1. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.
 - 2. Proper door clearance must be maintained in accordance with SDI-110.
 - 3. Where necessary, only metal hinge shims are acceptable to maintain clearances.
 - 4. "Installation Guide for Doors and Hardware" published by DHI is recommended for further details.
- C. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.

3.3 ADJUST & CLEAN

- A. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper condition.
- B. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply to touch-up or compatible air-drying primer.

END OF SECTION

SECTION 081416
FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid core veneer-faced doors.
 - 2. High Pressure Decorative Laminate faced doors.
 - 3. Fire-resistant composite core doors.
 - 4. Factory finishing.
 - 5. Sizing by manufacturer.

1.3 SUBMITTALS

- A. Doors shall be numbered to correspond to numbering system used on Construction Drawings.
- B. Product Data: For each type of door, include details of core and edge construction and trim for openings.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
 - 2. Provide construction samples of doors, approximately 5 by 5 inches, with door faces and vertical edges representing actual construction to be used.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. A qualified manufacturer that is a member in good standing of the Window and Door Manufacturers Association.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body when FSC Certified wood is specified

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package factory-finished doors individually in manufacturer's standard plastic bags, stretch wrap, or cardboard cartons.
- C. Mark each door on top rail with opening number used on Shop Drawings. Include manufacturer's order number and date of manufacture.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Marshfield DoorSystems, Inc. flush wood doors or a comparable product by one of the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Eggers Industries.
 - 3. Marshfield DoorSystems

- B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A-11, "Architectural Wood Flush Doors."
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain added urea formaldehyde.
- C. WDMA I.S.1-A Performance Grade:
 - 1. Extra Heavy Duty
- D. Fire-Rated Wood Doors: Doors shall be 1 3/4" thick, complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Cores: Provide core specified or fire-resistant composite core as needed to provide fire-protection rating indicated.
 - 2. Blocking: Provide composite blocking approved for use in doors of fire-protection ratings indicated as needed to maintain WDMA performance level and eliminate through-bolting hardware.
 - 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals.
- E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- F. Wood-Based Particleboard-Core Doors:
 - 1. Provide wood-based particleboard core doors 1 3/4" thick, with a minimum density per ANSI A208.1, Grade LD-2 as required to meet WDMA Performance Duty level specified without added blocking.
- G. Face Veneer: Face veneer shall be custom grade or better, white maple.
- H. Pre-Finish door color shall be Saffron 60-02.

2.3 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

- C. Provide minimum 1/2" thick edge strips to match face veneer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs. Any deficiencies must be corrected prior to door installation.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: Refer to Finish Hardware Schedule
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
 - 2. Install smoke- and draft-control doors according to NFPA 105.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Do not trim factory finished doors for width.

3.3 ADJUSTING

- A. Operation: Correct any deficiency that prohibits the door from swinging or operating freely. Do not remove hinge screws after initial insertion. Shims used for alignment purposes must be inserted between hinge and frame. Do not insert shims between hinge and door.
- B. To prevent stile failure, insure that door closers are properly adjusted and do not limit the door opening swing. Limit door opening swing only with a properly located stop.
- C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 083113
ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire resistive rated and non-rated access door and frame units.
- B. Wall and ceiling locations.

1.2 REFERENCES

- A. ASTM E119-05a - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. NFPA 251-2006 - Standard Methods of Tests of Fire Resistance of Building Construction and Material.
- C. NFPA 252-2003 - Standard Methods of Fire Tests of Door Assemblies.
- D. NFPA 288-2001 - Standard Method of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance Rated Floor Systems.
- E. UL - Fire Resistance Directory.
- F. UL 10B-1997 - Standard for Fire Tests of Door Assemblies.

1.3 SUBMITTALS FOR REVIEW

- A. Section 013000 - Administrative Requirements
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of all access door units.

1.4 SUBMITTALS AT PROJECT CLOSEOUT

- A. Record actual locations and sizes of all access units.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with UL Design requirements.
- B. Provide fire rated products with labels.
- C. Provide all products specified in this Section from one manufacturer.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for fire rated access doors.

1.7 PROJECT CONDITIONS

- A. Coordinate the work with other work requiring access doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Maxam Metal Products Limited.
- B. Other manufacturers meeting the requirements of these specifications.

2.2 MATERIALS

- A. Galvanized Steel: Bonderized, with electrostatically applied rust inhibitor, off-white prime finish.
- B. Gasketing: Urethane composition maximum compression set two percent (2%) at 73 degrees F.
- C. Insulation: Fiberglass, R-4.2 per inch.

2.3 ACCESS UNITS - WALLS

- A. Non-Fire Rated Door and Frame Unit:
 - 1. Exterior Flange Doors:
 - a. Standard Doors: Galvanized steel
- B. Fire Rated Door and Frame Unit: Galvanized steel.
 - 1. Exterior Flange Doors:
 - a. Uninsulated, fire rating meeting the requirements of the wall assembly the access door is installed in.

2.4 ACCESS UNITS - CEILINGS

- A. Non-Fire Rated Door and Frame Unit:
 - 1. Exterior Flange Doors:
 - a. Standard Doors: Galvanized steel

2.5 FABRICATION

- A. Panel: Galvanized steel, 18 gauge
- B. Frame: Galvanized steel, minimum 18 gauge
- C. Hinge: Continuous hinge, allows door panel to open 175 degrees.
- D. Flanges:
 - 1. Exterior: 3/4 inch wide at perimeter.
 - 2. Gypsum: Gypsum bead, galvanized steel.
- E. Latching/Locking Devices:
 - 1. Cam Latch: 3/16 inch allen key operator.

- 2. Handle: Non-locking, two position.
- F. Weld, fill, and grind joints to ensure flush and square unit.

2.6 FINISHES

- A. Base Metal Protection: Galvanized, hot dipped finish. Prime coat units with alkyd primer.
- B. Finish: Field Painted to match walls.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings for door and frame are correctly sized and located.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Position unit to provide convenient access to concealed work requiring access.

END OF SECTION

SECTION 083600

SECTIONAL OVERHEAD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulated Sectional Overhead Doors.

1.2 RELATED SECTIONS

- A. 055000 – Metal Fabrications: Steel frame and supports.
- B. 099000 – Paints and Coatings: Field Painting.
- C. Electrical, Wiring, & Conduit, Electrical service to door operator.

1.3 REFERENCES

- A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Wiring Connections: Requirements for electrical characteristics.
 - 1. 115 volts, single phase, 60 Hz.
- B. Single-Source Responsibility: Provide doors, tracks, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components. The Electric Motor & Operators shall be from a source acceptable to the manufacturer of the doors.

1.5 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Operation and Maintenance Data.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated weathertight location.

1.8 PROJECT CONDITIONS

- A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.9 WARRANTY

- A. Warranty: Manufacturer's limited door and operators System warranty for 10 years against rust through, delamination of polystyrene foam from steel face and all other components for 1 year and covered under General Conditions of Contract.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garaga, Mid-America Series SSI-25, 1001 West Hartford Ave., Ponca City, OK 74601. Web Site: www.garaga.com, Tel.: 1-800-364-3367, Fax.: 1-580-765-6661.
- B. Additional Acceptable Manufacturers: Overhead Door Corp. 426 Series, CHI Overhead Door, Clopay Commercial 3200 Series are approved manufactures meeting or exceeding these specifications.
- C. Other manufacturers meeting or exceeding these specifications.

2.2 INSULATED SECTIONAL OVERHEAD DOORS

- A. Insulated Steel Sectional Overhead Doors: SSI-25 Mid-America Series Insulated Steel Doors by Garaga Inc. Units shall have the following characteristics:
 - 1. Door Assembly: Rigid steel construction; fully insulated with continuous steel backing on the inside face. Fabricated with steel end stiles and tongue and groove sections.
 - a. Panel Thickness: 2 inches (51 mm).
 - b. Exterior Surface: Ribbed.
 - c. Exterior Steel: 24/25 gauge, hot-dipped galvanized with smooth texture.
 - d. Interior Steel: 26/27 gauge, hot-dipped galvanized
 - e. Springs:
 - 1) 100,000 cycles.
 - f. Insulation: Polystyrene.
 - g. Thermal Values:
 - 1) Polystyrene - R-value of 7.00 min.

- h. Glazing of Door Sections: Full View width sections of doors shall be glazed where indicated on Construction Drawings; 1/2" Thermopane tempered glass.
- 2. Finish and Color: Two coat baked-on polyester. Color: White
- 3. Windload Design: Standard nominal 90mph, or 20 psf. minimum.
- 4. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
- 5. Lock:
 - a. Verify Motor & chain system holds doors closed securely, or provide interior mounted slide locks.
- 6. Weatherstripping:
 - a. Flexible bulb-type strip at bottom section.
 - b. Flexible Jamb seals.
 - c. Flexible Header seal.
- 7. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
- 8. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
 - a. Entrapment Protection: Required for momentary contact, includes radio control operation.
 - 1) Pneumatic sensing edge up to 18 feet (5.5 m) wide. Constant contact only complying with UL 325/2010.
 - 2) Electric sensing edge monitored to meet UL 325/2010.
 - 3) Photoelectric sensors monitored to meet UL 325/2010.
 - b. Operator Controls:
 - 1) Push-button operated control stations with open, close, and stop buttons.
 - 2) Flush mounting.
 - 3) Interior location.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until openings have been properly prepared.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- C. Verify electric power is available and of correct characteristics.

3.2 PREPARATION

- A. Clean adjacent surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.

- B. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- C. Anchor assembly to wall construction and building framing without distortion or stress.
- D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- E. Fit and align door assembly including hardware.
- F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.4 CLEANING AND ADJUSTING

- A. Adjust door assembly to smooth operation and in full contact with weatherstripping.
- B. Clean doors, frames, glass according to manufacturer's instructions.
- C. Remove temporary labels and visible markings. Do not remove care and maintenance labels required to maintain warranty.

3.5 PROTECTION

- A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- B. Protect installed products until completion of project.
- C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

SECTION 084113
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
 - 1. Types of Kawneer Aluminum Storefront Systems include:
 - a. Trifab VG 451 Framing System – 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension; Non-Thermal; Center Glazed; Punched Opening Fabrication.
- B. Related Sections:
 - 1. Section 079000 - Joint Sealants
 - 2. Section 088000 – Glass & Glazing

1.3 DEFINITIONS

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 PERFORMANCE REQUIREMENTS

- A. Storefront System Performance Requirements:
 - 1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures based on the International Building Code; 2015 Edition.
 - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.24 psf (300 Pa).
 - 3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
 - 4. Uniform Load: A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum-framed storefront system indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

- D. Samples for Verification: For aluminum-framed storefront system and components required.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.
- F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
 - 1. Joinery.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- G. Other Action Submittals:
 - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements". Do not modify size and dimensional requirements.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Pre-installation Conference: Conduct conference at Project.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.8 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
 - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product:

1. Kawneer Company Inc.
 2. Trifab VG 451T (Thermal) Framing System
 3. System Dimensions: 2" x 4-1/2" (50.8 mm x 114.3 mm)
 4. Glass: Center
 5. Oldcastle Building Envelope, Series 3000 Thermal Multiplane Storefront is an approved manufacturer & product.
- B. Subject to compliance with requirements, provide a comparable product by the following:
1. Manufacturer: EFCO, Tubelite, Inc., Manko
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements
1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
 - a. Manko 2450 window system and 150 wide stile doors shall be approved substitution.
 2. Post-Contract (Construction Period) Substitutions: Not Allowed.
 3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
 4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years. (Company Name)
 5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
 6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.2 MATERIALS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 STOREFRONT FRAMING SYSTEM

- A. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposed shall be stainless steel.
- C. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action
- D. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- E. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Section 088000 – Glass & Glazing.
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
 - 1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
 - a. Color: Black
 - 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
 - a. Color: Matching structural sealant.

2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Door Hardware:
 - 1. Continuous Hinge.
 - 2. Exit Device: Surface Mount, Provided as part of Section 087150
 - 3. Interior Latch Handle: Provided as part of Section 087150
 - 4. Access Control: Provided as part of Section 087150
- B. Door Styles: Wide Stile without Crossrail
- C. Major portions of door members shall be 0.125" in thickness (nominal)
- D. Provide adjustable glass jacks to help center the glass in the door opening.
- E. Provide 1" insulated glazing.

2.6 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants".

- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.7 FABRICATION

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fit joints; make joints flush, hairline and weatherproof.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
 - 1. Kawnear Permanodic™ AA-M10C21A44 / AA-M45C22A44, Architectural Class I Dark Bronze Anodic Coating (Color #40).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.
 - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
 - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.
- B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

- A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 - 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
 - a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.
 - b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).
- B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 ADJUSTING, CLEANING AND PROTECTION

- A. Clean aluminum surfaces immediately after installing aluminum-framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

SECTION 085619

DEAL TRAY & SPEAK-THRU GRILL

1.1 SUMMARY

- A. Section Includes:
 - 1. Deal Tray unit.
 - 2. Speak-Thru Grill.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
 - 1. ASTM A27/A27M - Standard Specification for Steel Castings, Carbon, for General Application.
 - 2. ASTM A 36/A 36M. - Standard Specification for Carbon Structural Steel.
 - 3. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
 - 4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - 7. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 8. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - 9. ASTM B221/B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 10. ASTM C1036 - Standard Specification for Flat Glass.
 - 11. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
 - 12. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 13. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
 - 14. ASTM E699 - Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.
 - 15. ASTM F588 - Standard Test Methods for Resistance of Window Assemblies to Forced Entry Excluding Glazing.
 - 16. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- C. Consumer Products Safety Commission:
 - 1. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing.
- D. National Association of Architectural Metal Manufacturers.
 - 1. NAAMM No. 3 Finish: Ground unidirectional uniform finish obtained with 80 - 100 grit abrasive.

- E. Underwriters Laboratory:
 - 1. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.
 - 2. UL 752 - Ballistic Standards:
 - a. Level I MPSA 9mm.
 - 3. UL 1995 - Heating and Cooling Equipment.

1.3 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead loads and live loads caused by pressure and negative wind loads acting normal to plane of window as calculated in accordance with applicable code.

1.4 SUBMITTALS

- A. Section 013000 – Administrative Requirements: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate configuration, sizes, rough-in, mounting, construction and glazing details as well as installation clearances and finishes.
- C. Product Data:
 - 1. Submit manufacturer's product data for specified Products indicating materials, operation characteristics, and finishes.
- D. Manufacturer's Installation Instructions:
 - 1. Submit installation instructions with requirements to accommodate specific site conditions.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 10 years documented experience.
 - 1. Participates in a Quality Assurance validation Program.
- B. Installer: Company specializing in installation of window systems specified with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Ordering: To avoid construction delays comply with ordering instructions and lead time requirements as set by window system manufacturer.
- C. Pack units and accessories in manufacturer's standard shipping containers and protective packaging. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.
- D. Store units and accessories on raised blocks to prevent moisture damage protected from exposure to weather and vandalism.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication and record on shop drawings.

1.8 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with adjacent materials specified in other Sections and as indicated on Drawings and approved shop drawings.
- C. Coordinate installation of anchorages for security windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in [concrete] [or] [masonry]. Deliver such items to Project site in time for installation.

1.9 WARRANTY

- A. Furnish manufacturer's standard warranty document, executed by an authorized officer in which manufacturer agrees to repair or replace windows, drawers and air curtains that fail in materials or workmanship within specified warranty period. This warranty is in addition to, and not a limitation of other rights Owner has under the contract.
 - 1. Warranty Period:
 - a. One year parts and labor from date of installation.
 - 2. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - b. Structural failures including deflections.
 - c. Failure of welds.
 - d. Faulty operation of sliding hardware.
 - e. Faulty operation of transaction drawer.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B221/B221M. Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength and not less than 0.125 inch (3.2 mm) thick at any location for main frame and sash members.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Metallic-Coated Steel Sheet:
 - 1. ASTM A653/A653M, CS (Commercial Steel), Type B; with G90 (Z275) zinc (galvanized) coating designation.
 - 2. AMS5511, steel, corrosion-resistant, sheet, strip, and plate, 19Cr - 9.5Ni (304L), solution heat treated.
 - 3. AMS5513, steel, corrosion-resistant, sheet, strip, and plate 19cr 9.2Ni (SAE 30304) solution heat treated.
- D. Stainless Steel Sheet, Strip, Plate, and Flat Bars:
 - 1. ASTM A666, austenitic stainless steel, Type 304, stretcher-leveled standard of flatness.
 - 2. ASME SA-240/SA-240M, chromium and chromium-nickel stainless steel plate, sheet, and strip for general applications.
- E. Concealed Bolts: ASTM A307, Grade A unless otherwise indicated.

- F. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- G. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.76-mm) thickness per coat.
- H. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.
- I. Gaskets: For gaskets required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Gaskets shall remain permanently elastic, nonshrinking, and nonmigrating.

2.2 DEAL TRAYS AND SHELVES

- A. Manufacturers - Deal Trays:
 - 1. CR Laurence
 - a. Model DD1616:
 - 1) Transfer Area: 12 inches (w) x 2 7/8 inches (d) x 13 inches (l).
 - 2) Finish: Stainless Steel with number 4 finish.

2.3 TALK THROUGH

- A. Manufacturers - Talk Through:
 - 1. Quikserv Corp.
 - a. Model: 6 inch Round Heavy Stainless Steel Level 3 Speak-Thru.
 - 2. Substitutions: In accordance with Contract Documents.

2.4 FABRICATION

- A. Fabricate to dimensions indicated on Drawings.
- B. Fabricate accessories to provide a complete system for assembly of components and anchorage of window and accessories.
- C. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.
 - 1. Fabricate framing with manufacturer's standard, internal opaque armoring in thicknesses required for security windows to comply with ballistics-resistance performance indicated.
- D. Prepare components with reinforcement required for hardware.
- E. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- F. Factory-cut openings in glazing for speaking apertures.
- G. Preglazed Fabrication: Preglaze window units at factory, where required for applications indicated.

2.5 SHOP FINISHING

- A. Aluminum Finishes:
 - 1. Clear Anodized Aluminum Surfaces: AA-M10C22A31 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class II 0.7 mils (0.018 mm) clear anodized coating.
 - a. Conform to AAMA 611
- B. Concealed Steel Items: Galvanized in accordance with ASTM A123 to thickness Grade 85, 2.0 oz/sq ft (610 gm/sq m).
- C. Apply bituminous paint to concealed metal surfaces in contact with cementitious or dissimilar materials.
- D. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- E. Extent of Finish:
 - 1. Apply factory coating to all surfaces exposed at completed assemblies.
 - 2. Apply finish to surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify construction is ready to receive Products specified in this section.
- C. Verify rough openings are correct size and in correct location.
- D. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.
- E. For glazing materials whose orientation is critical for performance, verify installation orientation.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Furnish frames and anchors to other sections as required for installation in surrounding partition and casework construction.

3.3 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Align Products plumb, level and square.
- C. Rigidly secure Products to adjacent supporting construction.

- D. Glaze windows in accordance with manufacturer's instructions.
- E. Seal perimeter joints in accordance with Section.
- F. Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.4 ADJUSTING

- A. Section 017300 - Execution Requirements: Requirements for adjusting.
- B. Remove and replace defective work, including security windows that are warped, bowed, or otherwise unacceptable.

3.5 CLEANING AND PROTECTION

- A. Section 017300 - Execution Requirements: Requirements for cleaning.
- B. Remove protective material from factory finished surfaces.
- C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.
- E. Clean metal and glass surfaces to polished condition.
- F. Provide temporary protection to ensure that security windows are without damage at time of Substantial Completion.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The General Conditions of the Contract, including Supplementary Conditions and Division 1, General Requirements, apply to work of this Section.
- B. Hardware for hollow metal doors.
- C. Hardware for fire-rated doors.
- D. Lock cylinders for doors for which hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping, seals and door gaskets.

1.02 REFERENCES

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.
- B. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.
- C. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 1997.
- D. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention and adjustment.
- D. Project Record Documents: Record actual locations of installed cylinders and their master key code.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- F. Keys: Coordinate with existing system and deliver with identifying tags to Owner's designated representative ONLY by security shipment direct from hardware supplier.
- G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Single-Source: All door hardware is to be furnished by the same vendor.
- B. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.05 PRE-INSTALLATION MEETING

- A. Convene one week prior to commencing work of this section. The Architect and the Owner's Representative is to be notified of date, time, and location of said meeting at least one (1) week ahead of the meeting and be given the opportunity to attend same.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.07 COORDINATION

- A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.
- B. Furnish templates for door and frame preparation.
- C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

1.09 MAINTENANCE PRODUCTS

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Refer to Finish Hardware Schedule

2.02 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

- A. Provide products that comply with the following:
 - 1. Applicable provisions of Federal, State, and local codes.
 - 2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 - 3. Applicable provisions of NFPA 101, Life Safety Code.
 - 4. Fire-Rated Doors: NFPA 80.
 - 5. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
 - 6. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

- B. Finishes: All finishes shall be dark bronze to match aluminum storefront framing and doors.

2.03 KEYING

- A. Door Locks: Grand master keyed.
 - 1. Refer to keying hierarchy.
- B. Keying shall be done by manufacturer prior to shipping to job site.
- C. ALL KEYS SHALL HAVE THE ROOM NUMBER and MASTER DESIGNATION STAMPED INTO THE KEY.
- D. Provide temporary construction master keyed cores (CT6R) for all exterior doors and lock-up rooms as required.
- E. Provide temporary cores (CT6D) for all other locks.
- F. Provide twenty (20) construction keys.
- G. Provide permanent 8000 Series cores.
- H. Provide complete bitting schedule.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

- A. All door hardware is to be installed by the Vendor.
- B. Install wood blocking backup for all wall stops and electro-magnetic hold-opens.
- C. All closers to be "through bolted" to the doors, whatever the closer element may be. If the arm attaches to the door, it is to be "through bolted." If the body of the closer attaches to the door, it is to be "through-bolted."
- D. Install hardware in accordance with manufacturer's instructions and applicable codes.
- E. Use templates provided by hardware item manufacturer.
- F. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- G. Mounting heights for hardware from finished floor to center line of hardware item: As listed in Schedule, unless otherwise noted:

3.03 FIELD QUALITY CONTROL

- A. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's

instructions and as specified.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 017000.
- B. Adjust hardware for smooth operation.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished Work.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 087150

FINISH HARDWARE SCHEDULE

Keying Instructions

Contractor Shall Key All Locks To A Restricted Keyway System.
Provide Temporary Construction Master Keyed Cores For All Exterior Doors, And Lock-Up Rooms As Required.
Provide Disposable Plastic Temporary Cores For All Other Locks.
Provide Twenty (20) Construction Keys.
Master Keying shall be coordinated with Owner.

Finishes Note: All Hardware in Exterior Doors shall be Dark Bronze

SET #01

Doors: 101A, 121, 133A, 134A, 137F, 139

1	Continuous Hinge	CFM 83 HD1 SER 12	US11	PE
1	Rim Exit Device	21 56 8806 F ETL	10BE	SA
1	Threshold	171A (.5 x 5 x 36)	US11	PE
1	Weatherstrip	303AV (1-36, 2-84)	US11	PE
1	Sweep	315CN (36)	US11	PE
1	Closer (thru-bolt)	351-CPS	10BE	SA
Wiring Harness & Power Supply				
Access Control Key Pad				
Refer to Section 087155 for Door Controls Hardware Information				

SET #02

Doors: 101B

1	Continuous Hinge	CFM 83 HD1 SER 12	US26D	PE
1	Rim Exit Device	21 56 8804 F ETL	US26D	SA
1	Closer (thru-bolt)	351-CPS	US26D	SA
Wiring Harness & Power Supply				
Access Control Key Pad				
Refer to Section 087155 for Door Controls Hardware Information				

SET #03

Doors: 112, 113, 119, 120, 138

3	Hinges	TA2714 4.5" x 4.5"	US26D	MC
1	Privacy Latchset	SG-28-10U65LL	US26D	SA
1	Closer (thru-bolt)	1431-O	EN 689	SA
1	Wall Bumper	409	US32D	RO
3	Silencers	SR64		IV
1	Double Coat Hook	796 (1.25 projection)	US26D	RO

SET #04

Doors: 108, 109

3	Hinges	TA2714 4.5" x 4.5"	US26D	MC
1	Closer (thru-bolt)	1431-O	EN 689	SA
1	Wall Bumper	409	US32D	RO
3	Silencers	SR64		IV
1	Push Plate	73A	US32D	RO
1	Pull Bar	112	US32D	RO

SET #05

Doors: 103, 105, 106, 110, 114, 117, 122B, 135, 140

3	Hinges	TA2714 4.5" x 4.5"	US26D	MC
1	Passage Latchset	SG-28-10U15LL	US26D	SA
1	Wall Bumper	409	US32D	RO
3	Silencers	SR64		IV

SET #06

Doors: 115, 131

6	Hinges	TA2714 4.5" x 4.5"	US26D	MC 2
2	Overhead Stop	1548 S	US26D	SA
2	Silencers	SR64		IV
1	Lockset (security)	21-28-10G38 LL	US26D	SA
1	Automatic Flush Bolt	2942	US26D	RO

SET #07

Doors: 130

6	Hinges	TA2714 4.5" x 4.5"	US26D	MC 2
2	Overhead Stop	1548 S	US26D	SA
2	Silencers	SR64		IV
1	Passage Latchset	SG-28-10U15LL	US26D	SA
1	Automatic Flush Bolt	2942	US26D	RO

SET #08

Doors: 116, 122A, 123, 125, 126, 127, 128, 129, 132, 136

3	Hinges	TA2714 4.5" x 4.5"	US26D	MC
1	Lockset (security)	21-28-10G38 LL	US26D	SA
1	Overhead Stop	1548 S	US26D	SA
3	Silencers	SR64		IV

SET #09

Doors: 107A, 107B, 124, 133B, 134B

3	Hinges	TA2714 4.5" x 4.5"	US26D	MC
1	Rim Exit Device	21 56 8806 F ETL	US26D	SA
1	Closer (thru-bolt)	1431-CPS	EN 689	SA
1	Kick Down Stop	461L	US26D	RO

SET #10

Doors: 137A, 137B, 137C, 137D, 137E

All Hardware by Overhead Door Supplier

Manufacturer List

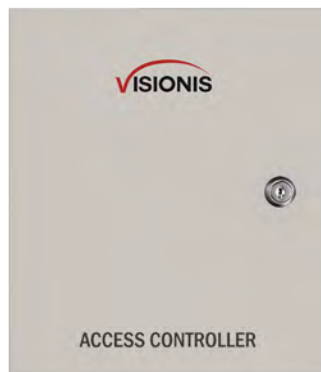
<u>Code</u>	<u>Name</u>
IV	Ives
PE	Pemko
RO	Rockwood
MC	McKinney
SA	Sargent (No Substitution)
RX	Rixon

END OF SECTION

SECTION 087155

DOOR CONTROLS HARDWARE

See Attached Door Controls Cut-Sheets



The VS-AXESS-4ETL is a series of powerful and stable access controller, using the logical architecture design. The uplink and downlink adopt TCP/IP and wiegand communicate respectively. Its signal processed with special encryption and can be run offline. Anti-tampering function is also supported.

Features

- 32-bit high-speed processor
- TCP/IP network communication, with self-adaptive network interface. The communication data is encrypted to ensure information security
- Supports Wiegand interface for accessing card reader. Wiegand interface supports W26/ W34 and is seamlessly compatible with third-party card reader
- Massive storage with 10,000 users and 50,000 card swiping records
- Supports first card function, super card and super password function, online upgrade function and online remote control of the doors
- Supports various card types such as normal/ disabled/blacklist/patrol/visitor/duress/ super card, etc.
- Supports tamper-proof alarm for card reader, unsecured door alarm, forced entry door alarm, alarm for door opening timeout, duress alarm, and alarm for invalid card swiping attempts alarm, case in alarm and restore, insufficient storage alarm for offline event, network break alarm
- The recognition and storage of card number with maximum 20 digits
- Supports online and offline operating mode;
- Supports time synchronization via NTP, manual or automatic method
- Watchdog for device running status detection
- Data can be permanently saved when the access controller is powered off
- Client supports attendance function
- High/low temperature resistant design -20°C to +65°C (-4°F~+149°F)



Disclaimer: VISIONIS reserve the right to go ahead with any modifications of models or features or price without forewarning. All the information and specifications stated in this document are current at the time of publication. Attention: We are not responsible for the improper installation of this kit. If you are not handy with electrical equipment you should contact a professional electrician. You will also need to check with your local Fire authority to see if you need anything else to comply with local Fire Codes. We are not responsible for any damage or fees that can occur.



sales@visionistech.com



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Model No.	VS-AXESS-4ETL
Working Voltage	DC 12V
Power consumption	≤3.5W (without load)
Processor	32-bit
Uplink Communication Interface	TCP/IP Network Interface and RS-485 Interface
Downlink Communication Interface	Wiegand interface
Storage	Storage for 10.000 users information and 50.000 card swiping records
LED Indicator	Power Supply Status, Communication Status, Abnormal Status
Built-in Clock	Yes
Accessible Card Reader	4 Card Readers (Wiegand Interface) Connectable
Input Interface	Door Magnetic×4, Door Switch×4, Case Input×4
Output Interface	Door Switch Relay×4, Alarm Relay×4
Working Temperature	-20°C to +65°C (-4°F~+149°F)
Working Humidity	10% to 90% (Non-Condensing)
Dimensions (L×W×H)	285(L) x 237(W) x 69(H)mm – 11.22(L) x 9.33(W) x 2.71(H)in.



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The device is a metal access control keypad and proximity card reader which supports EM, MF and HID card types, it's one of the most advanced standalone access control.

It adopts unique design with metal material and durable backlight metal keyboard, builds-in USA Atmel microprocessor, with strong anti-interference ability, high security and reliability, powerful function and convenient operation. It's widely used in high-end buildings, residential communities and other public places.

Features

- Ultra-low power consumption: Standby current is less than 30mA.
- Input & Output: Wiegand26.
- Searching Time: Less than 0.1s after reading card.
- Backlight Keypad: Easy to operate at night.
- Doorbell interface: Support external wired doorbell.
- Access ways: Card, code, card+code.
- Independent codes: Use codes without related card.
- Change Codes: Users can change codes by themselves.
- Anti-tamper alarm: Alarm is activated after tear down illegally.
- Delete Users by card NO.: Delete card NO. by keypad to eliminate security risk completely.
- Waterproof Rate: IP68, indoor or outdoor use.

Model No.	VIS-3000
Input Voltage	DC 12V
Idle Current	≤25mA
Card Reading Distance	2 - 3 cm (0.78 - 1.18 in.)
Card Frequency	125KHz for EM and HID // 13.56MHz for Mifare
Card Transmission Format	Wiegand26
Keypad Transmission Format	4bit, 8bit and Virtual card number
Operating Temperature	-45°C ~ 55° C (-49°F ~ 131°F)
Operating Humidity	0%~95%
Product Size	118Lx81Wx21H (mm) - 4.64Lx3.18Wx0.82H (in.)
Protection Level	IP68 - No ingress of dust; complete protection against contact (dust tight), and waterproof



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The VIS-EL104-FSESA is an electric strike lock designed for wood, metal and PVC doors. This is a perfect solution for a simple or advanced access control systems. The operating principle of an electric strike lock is that it turns into a magnetic force. The strike has an impressive 350kg/770lbs of magnetic force. This electric strike has two working modes: One mode is the door remains locked when the power is off and the second mode is the door remains unlocked when the power is off.

Features

- Holding Strength: 350kg (770 pounds).
- Function: Fail Safe (with power it's lock)
Fail Secure (with power is unlock)

Model No.	VIS-EL104-FSESA
Lock Size	124.6Lx32.3H (mm) - 4.90Lx1.27H (in.)
Holding Strength	350kg (770 pounds)
Voltage	12VDC
Current	12VDC - 280mA // 24VDC - 140mA
Feature	Fail Safe and Fail Secure Adjustable
Suitable For	Wooden Door, Metal Door, PVC Door
Cycles Tested	300.000
Operating Temperature	-15°C / +40°C (5°F / 104°F)
Product + Packaging Weight	0.50kg (1.10 pounds)



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Model No.	VIS-APROXCARD/26
Type	EM proximity card
Frequency	125KHz passive type
Dimension	54(W) x 85(L) x 1.8(T) mm - 2.12(W) x 3.34(L) x 0.07(T) in.



Model No.	VIS-AKEYTAG
Type	EM proximity tag
Frequency	125kHz passive key tag
Dimension	30.4(W) x 45.3(L) x 8.7(T) mm - 1.19(W) x 1.78(L) x 0.34(T) in.



SECTION 088000

GLASS & GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. High performance glass

1.2 RELATED SECTIONS

- A. Section 081113 – Hollow Metal Doors and Frames
- B. Section 081416 – Flush Wood Doors
- C. Section 084113 – Aluminum-Framed Entrances and Storefronts

1.3 REFERENCES

- A. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- B. ASCE 7 - "Minimum Design Loads for Buildings and Other Structures".
- C. ASTM International (ASTM):
 - 1. ASTM C 162 - Standard Terminology of Glass and Glass Products.
 - 2. ASTM C 1036 - Standard Specification for Flat Glass.
 - 3. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
 - 4. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
 - 5. ASTM E 2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
 - 6. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

1.4 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in inches.
- C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or other specified gas.
- D. Sealed Insulating Glass Unit Surface Designations:
 - 1. Surface 1 - Exterior surface of the outer glass lite.
 - 2. Surface 2 - Interspace surface of the outer glass lite.
 - 3. Surface 3 - Interspace surface of the inner glass lite.
 - 4. Surface 4 - Interior surface of the inner glass lite.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Provide glass capable of withstanding thermal movement and wind and impact loads (where applicable) as specified in paragraph B following.

- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Design Wind Loads: Determine design wind loads applicable to the Project according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
 - 1) Design loads shall be in accordance with IBC, 2018 edition.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
 - 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
 - a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. per h per degree F.
 - b. Solar Heat Gain Coefficient: NFRC 200.
 - c. Solar Optical Properties: NFRC 300.

1.6 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: For each glass product and glazing material indicated.
- C. Verification Samples: For the following products, in the form of 12 inch (305 mm) square samples for insulating glass units.
- D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- F. Qualification Data: For installers.
- G. Product Test Reports: For each type of glazing.
- H. Warranties: Special warranties specified in this Section.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National

Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

- B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.
- C. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
 - 1. Insulating Glass Certification Council.
 - 2. Associated Laboratories, Inc.
- F. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.
 - 3. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf. Or less in area, provide glazing products that comply with Category I or II materials.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.9 WARRANTY

- A. Manufacturer's Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the glass fabricator in which the coated glass manufacturer agrees to replace coated glass units that deteriorates during normal use within the specified warranty period. Deterioration of the coated glass is defined as peeling and/or cracking, or discoloration that is not attributed to glass breakage, seal failure, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.

1. Warranty Period: Ten years from date of Substantial Completion.
- B. Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form in which the insulating glass unit manufacturer agrees to replace insulating-glass units that deteriorate during normal use within the specified warranty period. Deterioration of insulating glass units is defined as an obstruction of vision by dust, moisture, or a film on the interior surfaces of the glass caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.
 1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:

PPG Industries, Inc., Glass Group
Glass Business and Discovery Center 400 Guys Run Rd.
Pittsburgh, PA 15024
Tel: 800-377-5267
www.ppgideascapescapes.com
- B. Other manufacturers meeting or exceeding these specifications.

2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
 3. For uncoated glass, comply with requirements for Condition A.
 4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
 5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated or required.
- C. Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during initial manufacture, and complying with other requirements specified.
- D. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of

- individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated or required.
 3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
 4. Sealing System: Dual seal, with primary and secondary sealants of polyisobutylene and silicone.
 5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
 - a. Spacer Material: Aluminum with finish to match window system framing color.
 - b. Desiccant: Molecular sieve or silica gel, or blend of both.
 - c. Corner Construction: Manufacturer's standard corner construction.

2.3 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.4 GLASS MATERIALS

- A. Glass materials shall be as scheduled on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units in accordance with approved Shop Drawings, plumb, level, square and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding surfaces.
- B. Provide glazing compounds and accessories as required.
- C. Contractor's beginning of work shall signify acceptance of substrate. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PROTECTION AND CLEANING

- A. Mark panes with removable tape after installation.
- B. Prior to final acceptance, clean as recommended by manufacturer. Do not use materials or methods which may damage finish or surrounding construction.

END OF SECTION

SECTION 092116

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum board and accessories.
- B. Non-structural metal studs for wall assemblies.

1.2 RELATED SECTIONS

- A. Section 054000 - Cold-Formed Metal Framing.
- B. Section 061000 - Rough Carpentry.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - 3. ASTM B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
 - 4. ASTM C 475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 5. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - 6. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members.
 - 7. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 8. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 9. ASTM C 834 - Standard Specification for Latex Sealants.
 - 10. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board.
 - 11. ASTM C 844 - Standard Specification for Application of Gypsum Base to receive Gypsum Veneer Plaster.
 - 12. ASTM C 847 - Standard Specification for Metal Lath.
 - 13. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications.
 - 14. ASTM C 1002 - Standard Specification for Steel Self Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - 15. ASTM C 1047 - Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - 16. ASTM C 1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster (Plaster and Stucco Accessories).
 - 17. ASTM C 1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

18. ASTM C 1178 - Standard Specification for Glass Mat Water Resistant Gypsum Backing Panel.
 19. ASTM C 1278 - Standard Specification for Fiber Reinforced Gypsum Panel.
 20. ASTM C 1396 - Standard Specification for Gypsum Board.
 21. ASTM C 1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
 22. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 23. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 24. ASTM E 413 - Classification for Rating Sound Insulation.
- B. AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - C. AISI - Standard for Cold-Formed Steel Framing General Provisions.
 - D. Gypsum Association (GA):
 1. GA-214 - Recommended Levels of Gypsum Board Finish.
 2. GA-216 - Application and Finishing of Gypsum Panel Products.
 3. GA-238 - Guidelines for the Prevention of Mold Growth on Gypsum Board; Gypsum Association.
 - E. Underwriters Laboratory (UL) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Submit manufacturer's certification of product compliance with codes and standards along with product literature and data sheets for specified products. Electronic submittals generated via ClarkDietrich website and submitted electronically are acceptable.
- C. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- B. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- C. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-structural steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by, and displaying a classification label, from an independent testing agency acceptable to authority having jurisdiction. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.
 1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements indicated on the Drawings.
 2. Rated assemblies to be substantiated from applicable testing using the proposed products, by Contractor.

- D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect and store products in manufacturer's unopened packaging until ready for installation per requirements of AISI's "Code of Standard Practice".
- B. Deliver and store gypsum board in accordance with GA-238.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended ASTM C 840 and by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 METAL FRAMING MANUFACTURERS

- A. Acceptable Manufacturer, Metal Framing:
 - 1. ClarkDietrich Building Systems
4200 Cedar Blvd.
Baytown, TX 77520
Tel: (281) 383-1617.
- B. Acceptable Manufacturers, Gypsum Board
 - 1. G-P Gypsum Corp.
 - 2. National Gypsum Co.
 - 3. United States Gypsum Co.
- C. Substitutions: Other manufacturers that meet or exceed these specifications
- D. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 METAL FRAMING COMPONENTS

- A. Recycled Content of Steel Products: Post-consumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- B. Framing Members, General: Comply with ASTM C 645 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with ASTM C 645; roll-formed from hot-dipped galvanized steel, complying with ASTM A 653/A653M G40 (Z120) or having a coating that provides equivalent corrosion resistance. A40 galvanized products are not acceptable.
 - a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.
- C. Steel Studs and Runners: ASTM C 645.
 - 1. Non-Structural Studs: Cold-formed galvanized steel C-studs as per ASTM C

- 645 for conditions indicated below:
 - a. Flange Size: 1-1/4 inch (32 mm).
 - b. Web Depth: As specified on Drawings.
 - 2. Non-Structural Track: Cold-formed galvanized steel runner tracks, in conformance with ASTM C 645 for conditions indicated below:
 - a. Flange Size: 1-1/4 inch (32 mm).
 - b. Web Depth: Track web to match stud web size.
 - c. Minimum Material Thickness: Track thickness to match wall stud thickness or as per design.
- D. Slotted Deflection Track: cold-formed galvanized steel in conformance with AISI's Specifications for Design of Cold-Formed Steel Members.
 - 1. Designation and size as indicated on the drawings.
- E. Control Joint Backer: Metal profile which supports intumescent materials located inside and spanning gap between opposing drywall edge at control joint locations.
- F. Furring Channel: Cold-formed galvanized steel in conformance with AISI's North American Specifications for Design of Cold-Formed Steel Structural Members; furring channel:
 - 1. Designation and size as indicated on the drawings.
- G. U Channel: Cold-formed galvanized steel:
 - 1. Designation and size as indicated on the drawings.
- H. H Studs and C-Runner: Cold-formed galvanized steel, approved for the use intended:
 - 1. Designation and size as indicated on the drawings.
- I. CT Shaftwall Studs and J-Tabbed Track: Cold-formed galvanized steel, approved for the use intended based on a current Evaluation Report
 - 1. Designation and size as indicated on the drawings.
- J. Metal Trims: Cold-formed galvanized steel.
 - 1. Type and Size as indicated on the drawings.
- K. Drywall Corner Bead: Cold-formed galvanized steel sheet.
 - 1. Type: 103 Deluxe.
 - 2. Flange Length: 1-1/4 inches (32 mm).
- L. Flat Straps: Sheet for blocking and bracing in length and width indicated.
 - 1. Galvanized Sheet Steel:
 - a. Minimum Base-Steel Thickness: As indicated on Drawings.
- M. Channel Bridging and Bracing:
 - a. Depth: As indicated on Drawings.
- N. Radius Framing: Steel sheet runner for non-load-bearing curves, bends, variable radii and arches using expandable ribbon technology.
 - 1. Size: As indicated on Drawings.
- O. Framing Component Accessories: Provide the following accessories as required for a complete system.
 - 1. Clip Angle.
 - 2. Angles.
 - 3. Backing Strip.
- P. Fasteners: Self-drilling, self-tapping screws; steel, complying with ASTM C 1513;

galvanized coating, plated or oil-phosphate coated complying with ASTM B 633 as needed for required corrosion resistance.

- Q. Touch-Up Paint: Complying with ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings. Zinc rich, containing 95-percent metallic zinc.
- R. Non-Hardening, Flexible Sealant: Latex acrylic.
- S. Framing: Framing components may be preassembled into panels prior to erecting.
 - 1. Fabricate panels square, with components attached in a manner so as to prevent racking or distortion.
 - 2. Cut all framing components squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Hold members positively in place until properly fastened.
 - 3. Fasteners: Fasten components using self-tapping screws or welding.

2.3 GYPSUM BOARD AND ACCESSORIES

- A. Gypsum Wallboard: ASTM C 1396, of types, edge configuration and thickness indicated below; in maximum lengths available to minimize end-to-end butt joints.
 - 1. Type: Regular, unless otherwise indicated. Type X for fire-resistant rated assemblies and where indicated. Sag-resistant type for ceiling surfaces.
 - 2. Edges: Tapered.
 - 3. Thickness: 5/8 inch (16 mm), unless otherwise indicated.
- B. Gypsum Backing Board for Multi-Layer Applications: ASTM C 1396 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C 1396, of type, edge configuration and thickness indicated below, in maximum lengths available to minimize end-to-end joints.
 - 1. Type: Regular, unless otherwise indicated. Type X for fire-resistant rated assemblies and where indicated. Sag-resistant type for ceiling surfaces.
 - 2. Edges: Square, non-tapered, or V-tongue and groove.
 - 3. Thickness: 5/8 inch (16 mm), unless otherwise indicated.
- C. Abuse-Resistant Gypsum Wallboard: ASTM C 1278 and ASTM C 1396, of types, edge configuration and thickness indicated below without paper facing and with fiber mesh reinforced backing; in maximum lengths available to minimize end-to-end butt joints.
 - 1. Type: Regular, unless otherwise indicated.
 - 2. Thickness: 5/8 inch (16 mm), unless otherwise indicated.
 - 3. Manufacturer: USG "Fiberock VHI Abuse-Resistant Gypsum Fiber Interior Panels".
- D. Mold and Mildew Resistant Gypsum Board: ASTM C 1396, of type and thickness indicated below to resist mold and mildew; in maximum lengths available to minimize end-to-end butt joints. Board shall score minimum 10 when tested per ASTM D 3273.
 - 1. Type and Thickness: Regular, 1/2 inch (12 mm) thick, unless otherwise indicated. Type X, 5/8 inch thick, for fire-resistant rated assemblies and where indicated.
 - 2. Manufacturer: G-P Gypsum Corporation "DensArmor Plus" / "DensArmor Plus Fireguard" or LaFarge "Drywall with Mold Defense".
- E. Mold and Mildew Resistant Backing Board: ASTM C 1177/ASTM C 1396, of type and thickness indicated below with glass mat facing embedded on both sides to resist mold and mildew; in maximum lengths available to minimize end-to-end butt

- joints.
1. Type and Thickness: Regular, 1/2 inch (12 mm) thick, unless otherwise indicated. Type X, 5/8 inch thick, for fire-resistant rated assemblies and where indicated.
 2. Manufacturer: G-P Gypsum Corporation "DensArmor Plus".
- F. Water-Resistant Backing Board: ASTM C 1396, with tapered edges and of type and thickness indicated below; in maximum lengths available to minimize end-to-end butt joints.
1. Types: Regular, unless otherwise indicated. Type X for fire-resistant rated assemblies and where indicated.
 2. Thickness: 5/8 inch (16 mm), unless otherwise indicated.
- G. Water-Resistant Backing Board: ASTM C 1178, of type and thickness indicated below with glass mat facing on both sides and acrylic coating on one side; in maximum lengths available to minimize end-to-end butt joints.
1. Type and Thickness: Regular, 5/8-inch thick, unless otherwise indicated. Type X, 5/8 inch (16 mm) thick, for fire-resistant rated assemblies and where indicated.
 2. Manufacturer: G-P Gypsum Corporation "Dens-Shield Tile Guard".
- H. Gypsum Shaftliner Board, Type X: ASTM C 1396 manufacturer's proprietary fire-resistive liner panels with paper faces.
- I. Gypsum Shaftliner Board, Moisture- and Mold-Resistant Type X: ASTM C 1396, manufacturer's proprietary fire-resistive liner panels with moisture- and mold-resistant core and surfaces.
- J. Exterior Soffit Board: ASTM C 1396, with manufacturer's standard edges, of type and thickness indicated.
1. Types: Regular unless otherwise indicated. Type X for fire-resistant rated assemblies and where indicated.
 2. Thickness: 5/8 inch (16 mm), unless otherwise indicated.
- K. Trim Accessories: Provide manufacturer's standard plastic or metal trim accessories for gypsum board work, per ASTM C 1047. Provide with either knurled or perforated expanded flanges for nailing or stapling, and beaded for concealment of flanges, in joint compound. Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads, and one-piece control joint beads.
- L. Interior Trim Accessories: Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads, and one-piece control joint beads complying with the following requirements:
1. Materials: Formed metal complying with one the following requirements:
 - a. Sheet Steel zinc coated by the hot-dip process.
- M. Exterior Surface Trim and Accessories: Cornerbead, edge trim, control joints formed from sheet steel zinc coated by the hot dip process per ASTM C 1047, or plastic conforming to ASTM C 1047 Section 4.3 plastic for accessories shall be manufactured from rigid PVC or ABS Plastic not less than 0.028 inch (0.7112 mm) and Section 4.3.1 PVC specification D 3678 Class II or III, in shapes indicated below by reference to ASTM C1047.
1. Cornerbead on outside corners, unless otherwise indicated.
 2. Edge trim complying with shape LC-bead.
 3. One piece control joint formed with V-shaped slot and removable strip covering slot opening.

- N. Soffit Vents: Prefabricated extruded aluminum, with clear anodized finish or vinyl soffit vent.
 - 1. Manufacturer: Vinyl Corp "No. CSJ50-200V".
- O. Laminating Adhesive: Special adhesive or joint compound specifically recommended for laminating gypsum boards.
- P. Spot Grout: ASTM C 475, setting-type joint compound for type recommended for spot grouting hollow metal door frames.
- Q. Gypsum Board Screws: ASTM C 1513. Fastening gypsum board to steel members less than 0.033 inch thick. Fastening gypsum board to gypsum board.
- R. Steel Drill Screws: ASTM C 1513, for fastening gypsum board to steel members.
- S. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing), unfaced mineral fiber blanket insulation in thicknesses shown. Fibers manufactured from glass, slag wool, or rock wool.

2.4 JOINT TREATMENT AND ACCESSORIES

- A. Joint Treatment Materials: ASTM C 475; type recommended by manufacturer of sheet products and joint treatment materials for application indicated, unless indicated otherwise.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper reinforcing tape.
 - 2. Exterior Gypsum Board: Paper reinforcing tape.
 - 3. Mold and Mildew Resistant Backer Board: Glass mesh tape.
- C. Setting Type Joint Compound: Factory prepackaged, job mixed chemical-hardening powder products for bedding and filling, formulated for uses indicated.
 - 1. For taping and filling only.
 - 2. For prefilling gypsum board joints.
 - 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile.
 - 4. For filling joints and treating fasteners of mold and mildew resistant backing board behind base for ceramic tile.
 - 5. For filling joints and treating fasteners of gypsum base for veneer plaster.
 - 6. For topping compound, use sandable formulation.
- D. Drying-Type Joint Compounds: Factory prepackaged vinyl-based products complying with the following requirements for formulation and intended use.
 - 1. Ready-Mix Formulation: Factory-mixed product.
 - 2. All-purpose compound formulated for use as both taping and topping compound; use for finish (third) coat only.
- E. Exterior Joint Compound: Special chemical-hardening-type for exterior application.
- F. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard non-sag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to installation, inspect previous work of all other trades. Verify that all work is complete and accurate to the point where this installation may properly proceed in strict accordance with framing shop drawings.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 METAL FRAMING INSTALLATION

- A. Install cold-formed framing in accordance with requirements of ASTM C 754.
- B. Framing Installation:
 - 1. Erect framing and panels plumb, level and square in strict accordance with approved drawings.
 - 2. Handle and lift prefabricated panels in a manner to not cause distortion in any member.
 - 3. Anchor runner track securely to the supporting structure. Install concrete anchors only after full compressive strength has been achieved.
 - 4. Butt all track joints. Securely anchor abutting pieces of track to a common structural element, or splice them together.
 - 5. Align and plumb studs, and securely attach to the flanges or webs of both upper and lower tracks.
 - 6. Attach wall stud bridging when required in a manner to prevent stud rotation. Space bridging rows according to manufacturer's recommendations.
 - 7. Provide temporary bracing until erection is completed.
 - 8. Where indicated in the drawings, provide for structural vertical movement using means in accordance with manufacturer's recommendations.
 - 9. Blocking: Install blocking for support of anything and everything mounted to the walls. All wood blocking shall be fire-retardant.
- C. Shaftwall Framing Installation:
 - 1. Lay out as shown in construction drawings. Secure J-Tabbed Track at perimeter framing and plumb to ceiling, floor and sides. Attach with suitable fasteners, spaced not more than 24 inches (610 mm) o.c. Apply a bead of non-hardening, flexible sealant to the perimeter.
 - 2. Preplan the stud layout 24 inches (610 mm) o.c. and adjust the spacing at either end so the end studs will not fall closer than 12 inches (305 mm) from the end.
 - 3. Erect the first 1-inch (25.4 mm) shaft wall liner panel, cut 3/4 inch (19 mm) less than the total height of the framed section. Plumb the panel against the web of the J-Tabbed Track and bend out tabs in J-Tabbed Track to secure panels in place. If tabs are not used, screw the liner panel to the J-Tabbed Track.
 - 4. Insert CT Shaftwall Stud, cut 3/4 inch (19 mm) less than the overall height, into the top and bottom J-Tabbed Tracks and fit tightly over the previously installed 1 inch (25.4 mm) panel. Allow equal clearance between top and bottom J-Tabbed Track.
 - 5. Install the next 1-inch (25.4 mm) shaft wall liner panel inside the J-Tabbed Tracks and within the tabs of the CT Shaftwall stud.
 - 6. Progressively install succeeding studs and panels as described above until the wall section is enclosed. The final panel section may be secured with tabs from the J-Tabbed Track at 12 inches (305 mm) o.c.
 - 7. Where wall heights exceed the standard or available length of shaft wall liner

panels, the gypsum panels may be cut and stacked with joints occurring within the top or bottom third points of the wall. Joints of adjacent panels should be alternately staggered to prevent a continuous horizontal joint. Any butt joints must be factory edge to factory edge with pieces pushed tightly together. Gypsum panels must engage a minimum of 2 tabs of the CT Shaftwall Stud.

8. CT Shaftwall Studs cannot be spliced. They must be installed full height, one piece. J-Tabbed Track when not attached of the structure shall not be spliced.
9. Do not attach J-Tabbed Track to the CT Shaftwall Studs.
10. For doors, ducts or other large penetrations or openings, install J-Tabbed Track as perimeter framing. Use 20 gauge, 0.0329 inches (0.83 mm) track with a 3 inches (76 mm) back leg for elevator doors and block cavity with 12 inches (305 mm) wide gypsum filler strips for doors exceeding 7-foot (2 m) height.

3.3 GYPSUM BOARD INSTALLATION

A. Gypsum Board:

1. Gypsum Board Application and Finishing Standards: Comply with ASTM C 840 and GA-216.
2. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches (610 mm) in alternate courses of board.
3. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints a minimum of 24 inches (610 mm).
4. Install wall and partition boards vertically unless otherwise noted.
5. Install exposed gypsum board with face side out. Do not install imperfect, damaged, or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) open space between boards.
6. Locate either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges, and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
7. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
8. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cut-outs.
9. Form control joints and expansion joints at locations indicated on Drawings, and as recommended by Gypsum Association, with space between edges of boards prepared to receive trim accessories.
10. Cover both faces of steel stud partition framing with gypsum board in concealed spaces except in chase walls that are properly braced internally.
11. Fit gypsum board around ducts, pipes, and conduits.
12. Where partitions intersect open concrete coffer, cut gypsum board to fit profile of coffer and allow 1/4 to 1/2 inch (6 mm to 13 mm) wide joint for sealant.
13. Isolate perimeter of non-load bearing drywall partitions at structural abutments. Provide 1/4 to 1/2 inch (6 mm to 13 mm) space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant. See also 07910.
14. Where sound-rated drywall construction is indicated on Drawings, seal construction at perimeters, control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's

recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.

15. Space fasteners in gypsum boards per referenced gypsum board application and finishing standard and manufacturer's recommendations.

B. Accessories:

1. Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
2. Install metal corner beads at external corners.
3. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, except where plastic trim is indicated on Drawings. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
4. Install gypsum board reveals where indicated on Drawings.
5. Install control joints at locations indicated on Drawings, or if not indicated, at no more than 30 feet apart on walls and ceilings over 50 feet long. At exterior soffits, not more than 30 feet apart in both directions.

C. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch (1.5 mm) in 10 feet (3048 mm) in any direction.

D. Joint Treatment: Comply with ASTM C 840, GA 214 and GA 216.

1. Level 1: Plenums, service corridors; above ceilings
2. Level 2: Areas of water resistant gypsum backing board under tile; exposed areas where appearance is not critical.
3. Level 3: Areas to receive heavy or medium textured coatings; heavy-grade wall coverings.
4. Level 4: Areas to receive flat sheen paint finish; light textured coatings; lightweight wall coverings.
5. Level 5: Areas to receive gloss, semi-gloss sheen paints; critical lighting conditions.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 093010

PORCELAIN / CERAMIC / QUARRY TILE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Tile
- B. Reference Standards:
 - 1. ANSI A108.5 – Porcelain Tile installed in Dry-Set Portland Portland_Cement Mortar or Latex P. C. Mortar.
 - 2. TCA 137.1 – Recommended Standard Specifications for Porcelain Tile.
 - 3. Tile Council of America (TCA) – Handbook for Porcelain Tile Installation.

1.02 REFERENCES

- A. Tile Council of North America (TCNA): TCA Handbook for Ceramic Tile Installation, 2007.
- B. ASTM International (ASTM):
 - 1. ASTM C 50 - Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products.
 - 2. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
 - 3. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
 - 4. ASTM C 241 - Standard Test Method For Abrasion Resistance of Stone Subjected to Foot Traffic.
 - 5. ASTM C 1028 - Standard Test method for Determining the Static Coefficient of Friction or Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull meter Method.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01300 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Selection Samples: Samples of actual tiles selected.
- E. Manufacturer's Certificate:
 - 1. Certify that products meet or exceed specified requirements.
 - 2. For each shipment, type and composition of tile provide a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1.

- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.04 ENVIRONMENTAL CONDITIONS

- A. Do not install adhesives in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during tiling and for a minimum of 7 days after completion.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum two years experience.
- B. Single Source Responsibility: Obtain each type and color of tile from a single source. Obtain each type and color of mortar, adhesive and grout from the same source.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging until ready for installation.
- B. Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
- C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.

1.07 WARRANTY

- A. Manufacturer shall warrant tile free from manufacturing defects and that the installation shall remain serviceable for a period of five years from the date of Substantial Completion. Warranty shall cover the functionality of the product and installation. Product must be installed as recommended by the manufacturer. Manufacturer's representative shall verify installation is in accordance with manufacturer's instructions.
- B. Warranty shall be a full system warranty.

PART 2 PRODUCTS

2.01 TILE MANUFACTURERS

- A. Manufacturer:
Crossville Studios

2.02 GROUT MANUFACTURERS

- A. Manufacturers:
Tec
HB Fuller Construction Products, Inc
1105 S. Frontenac Rd
Aurora, IL
Tel: 800-552-6225

2.03 MATERIALS & SCHEDULE

- A. Porcelain Wall & Floor Tile:
 - 1. Crossville Studios, Gotham, Clock Tower AV323 (cross-sheen), 12x24
 - 2. Tec, InColor Advanced Performance Grout
- B. Ceramic Wall Tile:
 - 1. Crossville Studios, Color-By-Numbers, Sixth Sense WT06, 4x8
 - 2. Tec, InColor Advanced Performance Grout
- C. Trim Pieces:
 - 1. Schluter, Dilex-AHK with inside and outside corners, anodized aluminum
 - 2. Schluter, Rondec with end caps, inside and outside corners, anodized aluminum
 - 3. Schluter, Reno-U to be used as a transition between tile flooring and lower elevation floor coverings or finished concrete.
 - 4. Schluter, ECK-E
 - 5. Schluter, RENO-RAMP-K, ADA compliant transition between tile flooring and lower elevation floor coverings or finished concrete
 - 6. Refer to drawings for additional trim piece requirements.
- G. Water: Clean, fresh and free of deleterious substances.

2.04 MIXING

- A. Mix and proportion cementitious materials for site made leveling coats, bond coats, and grout as recommended by the TCA Handbook for Porcelain Tile Installation.
- B. Mix and proportion pre-mix setting bed, bond coat, and grout materials in accordance with manufacturers' recommendations.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine surfaces to receive tile. Ensure surfaces are level, with maximum surface variation of 1/4-inch in 10-feet, clean and well cured. Do not commence until surface conditions are within tolerances required for proper installation.
- B. Prior to installing floor tile ensure surfaces slope to drains. Where ceramic tile meets thicker material apply leveling coat to make finished surfaces match, extend transition 4-feet.

3.02 INSTALLATION – WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCA Handbook Method W244, using membrane at toilet rooms.
- B. Over gypsum wallboard on wood or metal studs install in accordance with TCA Handbook Method W243, thin-set with dry-set or latex-portland cement bond coat, unless otherwise indicated.

1. Where mortar bed is indicated, install in accordance with TCA Handbook Method W222, one coat method.
 2. Where waterproofing membrane is indicated other than at showers and bathtub walls, install in accordance with TCA Handbook Method W222, one coat method.
- C. Over interior concrete and masonry install in accordance with TCA Handbook Method W202, thin-set with dry-set or latex-portland cement bond coat.
 - D. Over metal studs without backer install in accordance with TCA Handbook Method W241, mortar bed, with membrane where indicated.
 - E. Seal grout with an appropriate sealer 48 – 72 hours after grout application.

3.03 INSTALLATION – FLOOR TILE

- A. Over cementitious backer units on studs, install in accordance with TCA Handbook.
- B. Mechanically sand and scarify concrete substrate to completely remove all paint, loosely bonding topping, loose particles and similar.
- C. Clean surface of all dust, oil, grease, paint, tar, wax, curing compound, primer, sealer and similar.
- D. Provide 2-part epoxy moisture vapor compatible with floor tile grout.
- E. Install grout in accordance with ANSI and manufacturer directions.
- F. Seal grout with an appropriate sealer 48 – 72 hours after grout application.

3.04 CLEANING

- A. Thoroughly clean tile and grout surfaces.

3.05 EXTRA MATERIALS

- A. Provide for Owner's use a minimum of 2 percent of the primary sizes and colors of tile specified, boxed and clearly labeled.

END OF SECTION

SECTION 095110

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCES

- A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 1997.
- B. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1996.
- C. ASTM E 580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint; 1996.
- D. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 6 x 6 inch in size illustrating material and finish of acoustical units.
- D. Samples: Submit two samples each, 12 inches long, of suspension system main runner in specified color.

1.04 QUALITY ASSURANCE

- A. Installer shall be a company specializing in the installation of suspended acoustical ceilings with a minimum of three years documented experience.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.06 PROJECT CONDITIONS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical units after interior wet work is dry.

1.07 EXTRA MATERIALS

- A. See Section 016000 - Product Requirements, for additional provisions.
- B. Provide 5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc or Celotex
 - a. ACS-1: 2' x 4' Armstrong #1757 Fine Fissured High-NRC with Humiguard, Angled Tegular. Color: White
 - b. ACS-2: 2' x 4' Armstrong #1716 Clean Room FL with Humiguard, Square Edge. Color: White
 - 2. Substitutions: See Section 016000 - Product Requirements.

2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc.
 - 2. Chicago Metallic Corp.
 - 3. Celotex
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
 - 1. Profile: Tee; 15/16 wide face.
 - 2. Construction: Double web, Hot dipped galvanized.
 - 3. Finish: white over galvanized substrate.
- C. Match Acoustical Tile Manufacturer with same grid manufacturer to obtain 15-year warranty. 15/16" Grid System. Color: White.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected ceiling plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Provide hanger clips during steel deck erection. Provide additional hangers and inserts

as required.

- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.
- L. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 096513

RESILIENT BASE AND FLOORING TRANSITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient base.
- B. Flooring transition.

1.02 REFERENCES

- A. ASTM F 1861 - Standard Specification for Resilient Wall Base; 1998.
- B. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 1998.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Verification Samples: Submit two samples, 12-inch long in size illustrating color and pattern for each wall base and transition product and color specified.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and stripping.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Johnsonite, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

1.05 QUALITY ASSURANCE

- A. Single-Source Responsibility for Flooring: Obtain each type, color and pattern of flooring from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the work.

1.06 PROJECT CONDITIONS

- A. Sequence wall base work to ensure that wall base is not installed until installation of ALL millwork that abuts base material is complete and approved.
- B. Install resilient products after other finishing operations, including painting, have been completed.
- C. Maintain ambient temperatures within range recommended by Johnsonite, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- D. Maintain the ambient relative humidity between 40% and 60% during installation.
- E. Until Substantial Completion, maintain ambient temperatures within range recommended by Johnsonite, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

- F. Do not install resilient wall base until they are at the same temperature as the space where they are to be installed.

1.01 EXTRA MATERIALS

- A. See Section 016000 - Product Requirements, for additional provisions.
- B. Provide: 50 lineal feet of each color of base or transition specified.

1.02 WARRANTY

- A. Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style A (straight) at carpeted floors and Style B (cove) at other flooring locations:
 - 1. Height: 4 inch.
 - 2. Thickness: 0.125 inch thick.
 - 3. Finish: Satin.
 - 4. Length: 4 foot sections.
 - 5. Color: as indicated on drawings.
 - 6. Manufacturers:
 - (a) Johnsonite.
 - (b) Substitutions: approved prior to bidding.
 - 7. Flexibility: ASTM F 137 - Will not crack, break, or show any signs of fatigue when bent around a 1/4" (6.4 mm) diameter cylinder.
- B. Flooring Transition:
 - 1. As noted on Construction Drawings

2.02 ACCESSORIES

- A. Primers & Adhesives: as recommended by wall base and transition strip manufacturer. Tape shall not be accepted.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are smooth and flat within tolerances specified in Section 033000.
- B. Verify that surfaces are dust-free, and free of substances which would impair bonding of adhesive materials surfaces.

3.02 PREPARATION

- A. Wall Base and adhesives must be site conditioned at room temperature for a minimum of 48 hours prior to, during, and after installation. Room temperature must be maintained between 65deg and 85deg F (18deg and 30degC) with HVAC system operating. A minimum temperature of 55deg F (13degC) must be maintained afterwards.
 - 1. The ambient relative humidity should be between 40% and 60%.
 - 2. All walls must be clean, smooth, flat and dry. The surface must be free of all dust, loose particles, solvents, paint, grease, oil, wax, alkali, sealing/curing compounds, old adhesive, and any other foreign material,

which could affect installation. Remove existing adhesive mechanically – do not use chemical adhesive removers or solvents.

3. Fill all depressions, cracks, and other surface irregularities with a good quality patching compound.

3.03 INSTALLATION

A. Wall Base:

1. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
2. Use preformed inside and outside corners.
3. Job-formed corners: not allowed
4. Install base on solid backing. Bond tightly to wall and floor surfaces.
5. Scribe and fit to door frames and other interruptions.
6. Fill voids along the top edge of base at masonry walls with caulk.
7. Avoid excess adhesive in corners.
8. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
9. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates. Tape shall not be allowed.
10. Do not stretch resilient base during installation.

B. Transition Strips:

1. Provide transitions where flooring termination is higher than the adjacent finished flooring and at transitions between different flooring materials where indicated on drawings.
2. When required, locate transitions under door centerline.
3. Transitions are not required at doorways where thresholds are provided.
4. Secure transitions as recommended by the manufacturer.

3.04 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean base and transition strip products in accordance with manufacturer's instructions. Ensure all oils from factory have been removed from product surfaces.

END OF SECTION

SECTION 096800

CARPET

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet flooring as shown on the drawings and schedules and as indicated by the requirements of this section.
- B. 2-Part Epoxy Moisture Vapor Barrier

1.02 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work in this section only.

1.03 RELATED SECTIONS

- A. Other Division 9 sections for floor finishes related to this section but not the work of this section.

1.04 QUALITY ASSURANCE AND REGULATORY REQUIREMENTS

- A. Qualifications of Installers: All work shall be done by installation firms specializing in commercial carpet installation. It is required, that the firm or individual shall be a member of the Floor Covering Installation Contractors Association (FCICA) and/or certified by the Certified Floorcovering Installers Association (CFI). Flooring contractor to be specialty contractor normally engaged in this type of work and shall have three (3) years minimum documented experience in commercial installation of these materials and participation in manufacturer's environmental program including responsible carpet removal, recycling, and installation.
- B. Flooring contractor will be responsible for the proper product installation, including floor preparation in all the areas indicated in the drawings to receive carpet. The carpet installation standard will be as listed in The Carpet and Rug Institute's Standard for Installation of Commercial Carpet CRI-104, the standard that establishes the minimum installation procedures.
- C. Flooring contractor to provide owner a written warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of no less than two (2) years after job completion.
- D. All warranties must be issued by the manufacturer as standard published warranties on all types of carpet within this document. Second source warranties that involve parties other than the carpet manufacturer are unacceptable. If the product fails to perform as warranted when installed according to the manufacturer's carpet installation handbook and maintained according to the manufacturer's maintenance instructions, the affected area will be repaired or replaced at the expense of the manufacturer. The carpet manufacturer will provide standard published written performance warranties for the following:
 - 1. Lifetime warranty against excessive surface wear. Excessive wear means no more than 10% loss of pile fiber weight measured before and after use as tested under ASTM D-3936.
 - 2. Lifetime static protection, meaning built-in protection below 3.0 kv as tested under AATCC-134.

3. Tuft Bind (edge ravel, yarn pulls, zippering)
4. Delamination
5. Lifetime Moisture Barrier (excluding Premier Bac)
6. Lifetime Dimensional Stability (for modular products only)

E. Carpet manufacturer to provide field service experts to assist in project start-up as required by the job. Manufacturer will notify owner, architect, general contractor, or another designated contact if any installation instructions are not followed.

F. Provide flooring material to meet the following test performance criteria as tested by a recognized independent testing laboratory. Certified test reports shall be submitted by the carpet manufacturer for each test method. Requirements listed below must be met by all products being submitted for approval:

1. Pill Test / DOC-FF-1-70 (ASTM D-2589) - Requirement: Pass
2. Flooring Radiant Panel / ASTM E-648 - Requirement: Class I (Above .45 w/cm)
3. CRI VOC Chamber Test/Indoor Air Quality test (CRI-IAQ) Green Label Plus Test.
4. Lightfastness: Rating of not less than 5 on International Grey Scale after 40 SFU's when tested in accordance with AATCC Test Method 16E.
5. Crockfastness: Minimum stain rating on International Grey Scale of not less than 5 wet or dry when tested in accordance with AATCC Test Method 165.
6. Atmospheric Fading: Burned Gas shall not be less than 5 on International Grey Scale after two cycles on each test as per AATCC Test Method 129 Ozone and AATCC Test Method 23.

1.05 SUBMITTALS

- A. Submit to architect two (2) finished samples of the exact type of carpet, including quality, pattern, color, and backing.
- B. Submit manufacturer's warranties, installation instructions, and maintenance instructions before bid date.
- C. Submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests as well as the test listed under 1.04 F.

1.06 ENVIRONMENTAL / FIELD CONDITIONS

- A. Deliver all materials to the installation site in the manufacturer's original packaging and in good condition. Packaging to contain manufacturer's name and marks, identification number, shipping and handling instructions and related information.
- B. Delivered and stored materials must be available for inspection as required by the owner, architect, general contractor, and/or the manufacturer.
- C. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this document. Sub-floor preparation shall meet all conditions as specified in manufacturer's installation instructions.
- D. Sub-floor preparation will include, as required, the removal and repair of the existing floor surface. It is required that the floor of a renovation project be inspected before the bid date.
- E. All materials, including adhesives, are to be delivered to the site of installation at a minimum of 48 hours prior to the start of installation and stored in a clean and dry room that measures above 65°F and below 95°F and measures between 10% and 65% relative humidity (RH). To maintain temperature and relative humidity, permanent heating and air conditioning systems (HVAC) must be in operation. Stack

rolls horizontally and no higher than two rolls high on a flat surface. After work is completed, the ambient room temperature should remain at 65°F and relative humidity between 10% and 65% for 48 hours. These materials and related adhesives shall be protected from the direct flow of heat from heating fixtures and appliances such as hot-air registers, radiators, or other. Site conditions shall include those specified in the carpet manufacturer' installation manual and shall also include sufficient heat, light, and power required for effective and efficient working condition.

F. Once the temperature and relative humidity in area for installation have been stabilized, loose lay the carpet within the installation area and allow it to precondition for 48 hours prior to installation. Carpet installation shall not commence until painting and finishing work is complete and ceiling and overhead work is tested, approved, and completed. Traffic shall be closed during the installation of the flooring products. Verify concrete slabs are dry per the standards for bond and moisture tests listed in the manufacturer's installation manual.

1.07 SUBSTITUTIONS

- A. All Bid submittals must conform to the specifications in this document.
- B. All test results to be in accordance with a certified independent testing laboratory.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. Shaw Contract Group
PO Drawer 2128
Dalton, GA 30722
 - 2. Any manufacturer and/or product must meet or exceed those requirements specified under all sections of this document in pattern, color, and fiber. Any substitutions must be made in accordance with Section 1 of this document.

2.02 FLOORING MATERIALS

- A. Carpet Tile (CPT-1):
 - 1. Product: Hand Drawn, Fine Point Tile (#5T113) as manufactured by Shaw Contract Group
 - 2. Color: Charcoal, #13557
 - 3. Construction: Multi-level pattern cut / loop
 - 4. Dye Method: Solution Dyed
 - 5. Fiber Type: 100% eco solution nylon
 - 6. Tifted Weight: 20 oz / sy
 - 7. Pile Density: 6,372 oz / cy
 - 8. Gauge: 1/12
 - 9. Stitches: 9.0 stitches/in
 - 10. Standard Size: 18" x 36"
 - 11. Installation Method: Monolithic
 - 12. Warranties: Lifetime Commercial Limited
- B. Entryway Carpet Tile (WCPT):
 - 1. Product: Entryway Carpet Tile, Divvy Tile 5T411 as manufactured by Shaw Contract Group
 - 2. Color: Traverse #12557
 - 3. Construction: Multi-level Pattern Cut / Loop

4. Fiber Type: Ecosolution Q100 Nylon
5. Tufted Weight: 30 oz / sy
6. Standard Size: 24" x 24"
7. Direct Glue

2.03 MOISTURE VAPOR BARRIER

- A. MoistureTek as manufactured by Shaw Contract Group shall be applied over existing concrete slab areas identified to receive carpet flooring coverings.
- B. Slab prep and product installation shall conform to manufacturer's requirements.

2.04 ADHESIVES

- A. As recommended by manufacturer.

2.05 ACCESSORIES

- A. Provide transition/reducing strips tapered to meet abutting materials as indicated in the drawings.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine and verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are dry enough and ready for flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by carpet manufacturer and adhesive materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Existing concrete slab shall be shot blast to meet manufacturer's requirements.
- B. Starting installation constitutes acceptance of sub-floor conditions.
- C. **SURFACE PREPARATION-** Dust, dirt, debris and noncompatible adhesive must be removed before the installation begins. Surfaces must be smooth and level with all holes and cracks filled with Portland cement-based patch reinforced with polymers or primed with sealer.
- D. **LATEX OR OLD ADHESIVES -** Must be mechanically scraped down to a bare residue flat with the concrete substrate or covered with a skim coat of Portland cement-based patch reinforced with polymers. Any old adhesive residue must also be covered with sealer. Note: Failure to remove or seal old latex or cut back adhesive may cause installation failure, plasticizer migration, shifting, buckling or edge curling; these conditions will not be covered under warranty.

E. CONCRETE MOISTURE TESTING and pH Testing - Substrate surfaces must be tested for moisture emission. It is the responsibility of the flooring installer to perform moisture testing prior to starting the installation. ASTM-F2170-2 relative humidity probe moisture testing or ASTM-F1869 calcium chloride testing can be performed on the concrete to determine the surface moisture emission rate. Acceptable relative humidity probe testing results are up to 75% RH. An acceptable result for calcium chloride moisture testing is up to 5 lbs per 1,000 SF per 24 hours. Alkalinity tests should also be performed per ASTM-F710. The maximum acceptable pH is 9.0.

3.03 SUBFLOORS

A. New Concrete - New concrete must be fully cured and free of moisture. New concrete requires a curing period of approximately 90 days.

3.04 INSTALLATION OF FLOORING

A. Install flooring in strict accordance with the finish drawings, manufacturer's instructions, and CRI Carpet Installation Standard. Install carpet tile in accordance with manufacturer's instructions and CRI 104.

B. ADHESIVE SYSTEM – Install adhesive in accordance with manufacturer's written instructions.

C. TILE PLACEMENT - Arrows are embossed or printed on the module backing to show pile direction. To ensure proper alignment, check spacing every ten modules. Measure ten modules; proper spacing should be within ¼ inch. Continue to check spacing every ten modules throughout the entire installation.

D. PALLET AND BUNDLE SEQUENCING - It is very important to install modules in the order they were manufactured.

E. FINISHED INSTALLATION- Roll entire job with 75-100 lb. roller after completion of installation.

3.05 INSTALLATION OF ACCESSORIES

A. Install accessories as required by drawings and per manufacturer's specifications.

3.06 CLEANING AND PROTECTION

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

C. LOOP PILE CONSTRUCTION--Carpet modules with loop pile constructions may experience yarn blossoming at the edges, which is consistent with this type of construction. Clipping or shearing the yarn edges can remedy this condition.

END OF SECTION

SECTION 097700

FIBERGLASS REINFORCED PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Durable, decorative wall panels with smooth or textured finishes; Mounting hardware, adhesives, accessories and trims.
- B. Performance Requirements: Provide durable, decorative wall panels which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.2 ENVIRONMENTAL AND SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or terrazzo work has dissipated.
 - 2. Install panels between 60 degrees F - 75 degrees F (15 - 24 degrees C) and relative humidity below 55%, ideally at the same conditions as the room's normal operating temperatures after building is occupied.
 - 3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
 - 4. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished.
- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
 - 1. Wall, ceilings, floors and openings must be level, plumb, straight, in-line and square

1.3 DELIVERY & STORAGE OF MATERIALS

- A. General: Comply with Division 01 Product Requirements Section.
- B. Lead Time: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 - 1. Store panels indoors.
 - 2. Lay panels flat. Do not stand panels on edge.
 - 3. Protect panels from moisture.

4. Do not store panels in contact with the floor or against an outside wall.
 5. Do not remove protective film from panel surface until after installation (if applicable).
 6. Maintain optimum storage conditions of 60-75 degrees F (16-24 degrees C) at 35 - 55% relative humidity. Avoid extremes in temperature and humidity.
- E. Handling: Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.4 SUBMITTALS

- A. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location and dimensions of joints and fastener attachment.
- B. Samples: Submit selection and verification samples for finishes, colors and textures. Submit (2) samples of each type of panel, trim and fastener.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Marlite
202 Harger Street
Dover, OH 44622
(330) 343-6621
- B. Nudo
1500 Taylor Avenue
Springfield, IL 62703
(800) 826-4132

2.2 PANELS

- A. Texture: Embossed
- B. Color: White (final color selection shall be made during submittal process of manufacturer's standard colors)
- C. Thickness: 0.90 inch

2.3 ACCESSORIES

- A. All trim specified shall be extruded rigid PVC.
1. Extruded PVC Trim Profiles for .090" thick panels.
 - a. M 350 Inside Corner
 - b. M 360 Outside Corner
 - c. M 365 Division
 - d. M 370 Edge
 2. Trim Finish
 - a. Extruded PVC to be color-thru.
- B. All PVC Base Molding shall be a Rigid extruded PVC with integral color.

1. Base Profiles for .090" thick panels
 - a. M 612 FRP Base Molding
 - b. M 651 Inside Corner
 - c. M 660 Outside Corner
 - d. M 620 LH End Cap
 - e. M 625 RH End Cap

PART 3 EXECUTION

3.1 EXAMINATION

- A. Open cartons and carefully inspect all panels.

3.2 PREPARATION

- A. Panels must be applied over a smooth, solid, flat, clean sub-wall such as drywall or plywood.
- B. Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions. Verify that site conditions are acceptable for installation of durable, decorative wall panels. Examine back-up surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk and joints and cracks are filled flush and smooth with the adjoining surface. Do not proceed with installation of durable, decorative wall panels until unacceptable conditions are corrected.

3.3 CONDITIONING

- A. Panels should be opened and allowed to acclimate for 48 hours prior to installation. Room temperature should be approximately 70° F.

3.4 INSTALLATION

- A. Install all panels in strict accordance with manufacturer's installation instructions.
- B. All moldings must provide for a minimum 1/8 inch expansion joint to insure proper installation.
- C. Use Manufacturer's recommended adhesive.
- D. Do not install panels of unacceptable quality. Field cutting of all wall systems should be accomplished using a circular saw with fine tooth carbide blade.
- E. Position panel so that the saw blade enters the finished HPL side first to avoid chipping or damage. Protect decorative laminate face of panel by covering work area, do not remove protective will until after installation.

3.5 SEALANT

- A. As recommended by Manufacturer

3.6 CLEANING

- A. Clean panel surfaces in compliance with manufacturer's recommendations.
 1. Use a clean, damp, nonabrasive cotton cloth and a mild liquid detergent or

- household cleaner.
- 2. Rinse with clean water using a clean, nonabrasive cotton cloth.
- 3. Dry panels with a soft, clean nonabrasive cotton cloth.
- 4. Do not use cleaners containing acid, alkali or sodium hypochlorite.

3.7 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 099000

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.

1.02 REFERENCES

- A. Painting and Decorating Contractors of America – P.D.C.A. Type 1 Manual.
- B. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.

1.03 DEFINITIONS

- A. P.D.C.A. standards and interpretations.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products.
- C. Verification samples: submit a minimum of three painted 6" x 10" (+/-) "pull down" samples, illustrating selected colors and textures for each color and system selected. Each sample to be identified on the backside with project ID and project color number. Two sets of samples will be returned to the GC, one of which must be maintained at the job site for reference.
- D. Submit sealer and stain finishes on material on which that particular finish is to be used.
- E. Manufacturer's instructions: Indicated special surface preparation procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- G. MSDS for each product to be utilized.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum three (3) years experience.

1.06 REGULATORY REQUIREMENTS

- A. Comply with safety recommendations of MSDS for each product utilized.

- B. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

1.09 EXTRA MATERIALS

- A. See Section 016000 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Paints: Pittsburgh Paint Co., or other manufacturers meeting or exceeding these specifications.
- B. Where identified on plans, specific paint color shall be provided by Sherwin Williams, no exceptions.
- C. Transparent Finishes: Pittsburgh Paint Co.
- D. Stains: Pittsburgh Paint Co.
- E. Primer Sealers: Pittsburgh Paint Co.
- F. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS:

- A. Provide best of their respective kinds, delivered to job in original unopened containers, plainly marked with manufacturer's name, name of product and color. A schedule of colors will be prepared by upon receipt of all paint samples and other items required for color selections.
 - 1. Materials: PPG, SHERWIN-WILLIAMS, GLIDDEN, BENJAMIN MOORE, and PORTER.

2.03 PAINT SYSTEMS – EXTERIOR

- A. Paint WE-OP-3A - WOOD, Opaque, 3 coats
 - 1. One coat of PPG 17-941 Seal Grip Interior/Exterior Alkyd Universal Wood Primer
 - 2. Two coats of PPG 78 Line Sun-Proof Exterior 100% Acrylics Semi-Gloss Enamel
 - 3. One coat of SW Y24W08980 Fast Drying Interior Exterior Oil-Based Primer
 - 4. Two coats of SW A08-Series A-100 Exterior Latex Gloss
- B. Paint WE-OP-3L - WOOD, Opaque, 3 coats
 - 1. One coat of PPG 6-609 Speedhide Exterior Latex Wood Primer.
 - 2. Two coats of PPG 78 Line Sun-Proof Exterior 100% Acrylics Semi-Gloss Enamel
 - 3. One coat of SW B42W08141 Exterior Latex Waterbased Wood Primer
 - 4. Two coats of SW A08-Series A-100 Exterior Latex Gloss
- C. Paint CE-OP-3L - CONCRETE/MASONRY, Opaque, 3 coats
 - 1. One coat of PPG 6-7 Speedhide Interior/Exterior Latex Block filler
 - 2. Two coats of PPG 78 Line Sun-Proof Exterior 100% Acrylics Semi-Gloss Enamel
 - 3. One coat of SW B25W25 PrepRite Block Filler
 - 4. Two coats of SW A08-Series A-100 Exterior Latex Gloss
- D. Paint GE-OP-3L - GYPSUM BOARD AND PLASTER, Opaque, 3 coats
 - 1. One coat of PPG 17-921 Seal Grip Interior/Exterior Universal Acrylic Primer
 - 2. Two coats of PPG 78 Line Sun-Proof Exterior 100% Acrylics Semi-Gloss Enamel
 - 3. One coat of SW B51W450 Multi-Purpose Exterior Latex Primer
 - 4. Two coats of SW A08-Series A-100 Exterior Latex Gloss
- E. Paint ME-OP-3A - FERROUS METALS, Unprimed, 3 coats
 - 1. One coat of PPG 6-208 Speedhide Interior/Exterior Rust Inhibitive Metal Primer
 - 2. Two coats of PPG 90-474 Pitt-Tech DTM Acrylic Satin Enamel
 - 3. One coat of SW B50NZ6 Kem Kromik Universal Alkyd Primer
 - 4. Two coats of SW B66-650 Series Pro Industrial Acrylic Semi-Gloss
- F. Paint MgE-OP-3L - GALVANIZED METALS, 3 coats
 - 1. One coat of PPG 90-712 Pitt-Tech DTM Acrylic Metal Primer
 - 2. Two coats of PPG 90-474 Pitt-Tech DTM Acrylic Satin Enamel
 - 3. One coat of SW B66-1300 Series Pro Industrial Pro-Cryl Universal Primer
 - 4. Two coats of SW B66-650 Series Pro Industrial Acrylic Semi-Gloss

- G. Paint MaE-OP-3A - ALUMINUM and COPPER, Unprimed, 3 coats
 - 1. One coat of PPG 97-687 Polyclutch Wash Primer
 - 2. Two coats of PPG 90-474 Pitt-Tech DTM Acrylic Satin Enamel
 - 3. One coat of SW P60G2 Industrial Was Primer
 - 4. Two coats of SW B66-650 Series Pro Industrial Acrylic Semi-Gloss
- H. Paint E-PAV - PAVEMENT MARKING PAINT
 - 1. Two coats of Richards 3007 Lead Free Yellow Latex Traffic Coating
 - 2. Two coats of SW B97YD2467 Pro-Park Waterborne Traffic Marking Paint

2.04 PAINT SYSTEMS - INTERIOR

- A. Paint WI-OP-3A - WOOD, Opaque, 3 coats
 - 1. One coat of PPG 17-956 Seal Grip Interior Alkyd Wood Primer/Under coater
 - 2. Two coats of PPG 6-1110 Speedhide Interior Alkyd Semi-Gloss Enamel
 - 3. One coat of SW Y24W08980 Fast Drying Interior Exterior Oil-Based Primer
 - 4. Two coats of SW B34-8250 Series ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss
- B. Paint WI-OP-3L - WOOD, Opaque, 3 coats
 - 1. One coat of PPG 6-2 Speedhide Interior Latex Wood Primer
 - 2. Two coats of PPG 6-500 Speedhide Interior Latex Semi-Gloss
 - 3. One coat of SW B28W2600 ProMar 200 Zero VOC Interior Latex Primer
 - 4. Two coats of SW B31-2600 Series ProMar 200 Zero VOC Interior Latex Semi-Gloss
- C. Paint WI-TR-V - WOOD, Transparent, Varnish, No Stain
 - 1. Three coats of PPG 43886 Clear Polyurethane Satin Varnish (Sand between each coat)
 - 2. Three coats of Minwax Performance Series Fast-Dry Varnish 91/50/9151 Series
- D. Paint WI-TR-VS - WOOD, Transparent, Varnish and Stain
 - 1. One coat of PPG 44500 Oil Wiping Stain
 - 2. Three coats of PPG 43886 Clear Polyurethane Satin Varnish (Sand between each coat)
 - 3. One coat of SW Minwax Performance Series Tintable Interior Stain 7150/7151
 - 4. Three coats of SW Minwax Performance Series Fast-Dry Varnish 91/50/9151 Series
- E. Paint CI-OP-3L - CONCRETE / MASONRY, Opaque, 3 coats
 - 1. One coat of PPG 6-7 Speedhide Interior/Exterior Latex Block filler
 - 2. Two coats of PPG 6-500 Speedhide Interior Latex Semi-Gloss
 - 3. One coat of SW B25W25 PrepRite Block Filler
 - 4. Two coats of SW B31-2600 Series ProMar 200 Zero VOC Interior Latex Semi-Gloss
- F. Paint MI-OP-3A - FERROUS METALS, Unprimed, 3 coats
 - 1. One coat of PPG 6-208 Speedhide Interior/Exterior Rust Inhibitive Alkyd Metal Primer
 - 2. Two coats of PPG 6-1110 Speedhide Interior Alkyd Semi-Gloss Enamel
 - 3. One coat of SW B50NZ6 Kem Kromik Universal Alkyd Primer
 - 4. Two coats of SW B34-8250 Series ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss
- G. Paint MI-OP-2A - FERROUS METALS, Primed, 2 coats
 - 1. Touch up if needed with PPG 6-208 Speedhide Interior/Exterior Rust Inhibitive Alkyd Metal Primer

2. Two coats of PPG 6-1110 Speedhide Interior Alkyd Semi-Gloss Enamel
 3. Touch up if needed with SW B50NZ6 Kem Kromik Universal Alkyd Primer
 4. Two coats of SW B34-8250 Series ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss
- H. Paint Mgl-OP-3A - GALVANIZED METALS, 3 coats
1. One coat of PPG 6-209 Speedhide White Galvanized Metal Primer
 2. Two coats of PPG 6-1110 Speedhide Interior Alkyd Semi-Gloss Enamel
 3. One coat of SW B66-1300 Series Pro Industrial Pro-Cryl Universal Primer
 4. Two coats of SW B34-8250 Series ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss
- I. Paint Mai-OP-3A - ALUMINUM, Unprimed, 3 coats
1. One coat of PPG 97-687 Polyclutch Wash Primer
 2. Two coats of PPG 6-1110 Speedhide Interior Alkyd Semi-Gloss Enamel
 3. One coat of SW P60G2 Industrial Was Primer
 4. Two coats of SW B34-8250 Series ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss
- J. Paint GI-OP-3L - GYPSUM BOARD AND PLASTER, 3 coats
1. One coat of PPG 6-2 Speedhide Interior Latex Primer.
 2. Halls and other rooms: Three coats of PPG 6-500 Speedhide Interior Latex Semi-gloss
 3. Classrooms: Two coats of PPG 6-411 Speedhide Interior Latex Eggshell
 4. One coat of SW B28W2600 ProMar 200 Zero VOC Interior Latex Primer
 5. Halls and other rooms: Three coats of SW B31W4651 ProMar 400 Zero VOC Interior Latex Semi-Gloss
 6. Classrooms: Two coats of SW B20W4651 ProMar 400 Zero VOC Interior Latex Eg-Shel
- K. Paint GI-OP-2E - GYPSUM BOARD AND PLASTER, Water Born Epoxy (Toilets, Kitchen, Drinking Fountains)
1. One coat of PPG 17-921 Seal-Grip Interior/Exterior Acrylic Latex Primer/Sealer
 2. Two coats of PPG 16-510 Pitt-Glaze Precatalyzed WM Semi-Gloss Epoxy
 3. One Coat of SW B51W450 Multi-Purpose Exterior Latex Primer
 4. Two coats of SW K46-1150 Series Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss
- L. Existing Lockers – Wash with Peso. Sand to achieve a smooth surface free of all nicks and scratches by sanding to a featheredge.
1. Two coats of PPG 95-8000 Pitt-Thane Ultra Urethane Enamel
 2. Two coats of SW B65-600 Series Acrolon 218 Polyurethane Gloss

2.05 SURFACES NOT TO BE PAINTED

- A. Surfaces permanently concealed from view, unless noted to receive finish
- B. Materials or equipment with a complete factory applied finish, except as provided for elsewhere
- C. Finish hardware unless specifically noted otherwise
- D. Non-ferrous metals unless specifically noted otherwise

- E. Plumbing fixtures
- F. Toilet Room Accessories
- G. Lighting Fixtures
- H. Any areas noted as "Unfinished" on Finish Schedule or drawings

2.06 ACCESSORY MATERIALS

- A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- B. Patching Material: Latex filler
- C. Fastener Head Cover Material: Latex filler

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Notify Architect of any incompatibilities of specified finish on substrates, including existing finishes.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D 4442.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D 4442.

3.02 PREPARATION

- A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

- E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- F. Gypsum Board Surfaces to be Painted: Clean thoroughly all wallboard surfaces to be painted. Sand smooth all rough surfaces. Fill minor defects with filler compound. Spot prime defects after repair.
- G. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- I. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- J. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- K. Interior Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- L. Interior Wood Items to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- M. Exterior Wood to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- N. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied. Prime concealed surfaces.
- O. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- P. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.

- B. Apply finishes at manufacturer's recommended spreading rate to provide total dry film of not less than 5 mils.
- C. Apply material without reduction except as specifically required by label direction; reduction shall be the minimum permitted.
- D. Provide uniform color and finish, the number of coats specified being a minimum. Provide any additional coats to produce work satisfactory to architect.
- E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- F. Apply each coat to uniform appearance.
- G. Sand wood surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Fire hose cabinets, air registers and grilles, flanges around ceiling fixtures, exposed electrical panel boards, primed hardware, etc., shall be painted to match adjacent surfaces unless factory finished such as aluminum registers and grilles.
- K. Where paint finish is specified on CMU, take special care to assure that every pore or irregularity of CMU texture is solidly and uniformly filled with block filler, adding extra coats to coarse textured units as necessary to provide a finish acceptable to architect. Apply textured coating to uniform finish.
- L. Where Epoxy finish is specified on CMU, take special care to assure that every pore or irregularity of CMU texture is solidly and uniformly filled with block filler, adding extra coats to coarse textured units as necessary to provide an easily washable finish acceptable to architect and local Health Department.
- M. Apply material without reduction except as specifically required by label direction; reduction shall be the minimum permitted.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop-primed equipment, unless indicated otherwise.
- B. Paint rooftop equipment furnished with or without factory finish only as indicated on the drawings.
- C. Paint piping, equipment, conduits, vents, etc., on roof as indicated on the drawings. Identification labels will be provided by Mechanical Contractor.
- D. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 CLEANING

- A. Collect waste material that may constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. On completion of work, carefully clean all glass, hardware, factory finished surfaces, etc. and remove all misplaced paint and stain spots or spills and leave in a condition acceptable to architect.

END OF SECTION

SECTION 101100

VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Porcelain enamel magnetic markerboards.
- B. Tackboards and tack strips.
- C. Visual display board accessories.

1.02 REFERENCES

- A. The General Conditions of the Contract, including Supplementary Conditions and Division 1 General Requirements apply to the Work of this Section as fully as if written completely herein.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 1996.
- C. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 1996.
- D. GREENGUARD Environmental Institute: GREENGUARD Children and Schools Indoor Air Quality Certified

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data for products specified. Include Material Safety Data Sheets, when applicable.
- C. Shop Drawings: Provide shop drawings for each type of visual display board specified.
- D. Selection Samples: For items without a specified color, submit set of color chips displaying manufacturer's full range of colors and finishes.
- E. Verification Samples: Submit samples not less than 6 inches square and framed on two adjacent sides, to illustrate materials, finish, color, and texture of each type of visual display board required.
- F. Maintenance Data: Provide data on cleaning requirements, stain removal, and recommended maintenance precautions.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instructions for handling and storage of units.

1.05 FIELD CONDITIONS

- A. Field measure prior to preparation of shop drawings and fabrication, to ensure proper fit.
- B. Do not begin installation of visual display boards until environmental conditions approximate normal occupied conditions.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Submit manufacturer's "Life of the Building" warranty, stating that under normal usage and maintenance, and when installed in accordance with manufacturer's instructions and recommendations, porcelain enamel steel markerboards are guaranteed for the life of the building.
 - 1. Warranty shall cover replacement of defective boards but not the cost of removal or reinstallation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers include:
 - 1. Claridge Products and Equipment, Inc.; Harrison, Arkansas 72602-0910. ASD.
Tel: (870) 743-2200. Fax: (870) 743 1908. Email:
claridge@claridgeproducts.com. Website: www.claridgeproducts.com
 - 2. Nelson Adams Division of A. Lawer Corporation / Greensteel
 - 3. Alliance Manufacturing
 - 4. ASI, American Specialties, Inc.
- B. Substitutions: See Section 016000 - Product Requirements.

2.02 MARKERBOARD MATERIALS

- A. Steel Face Sheets: 0.0239 inch (24 gage) commercial quality steel, fired with porcelain enamel, using the DuPont process.
 - 1. Face sheets with high-fired brittle ground and finish coats are not acceptable.
 - 2. Fire porcelain enamel finish at approximately 1000 degrees F, or lowest possible temperature there under to reduce steel and porcelain stresses and achieve superior enamel bond and hardness.
- B. Core Material: 7/16 inch Duracore; no added urea-formaldehyde resins
- C. Backing Material: 0.002 inch aluminum foil.
- D. Metal Trim and Accessories: ASTM B 221 (ASTM B 221M) aluminum alloy.
- E. Laminations: Hot-type neoprene contact adhesive applied to both surfaces automatically.
 - 1. Each substrate shall have minimum 80 percent covering with 1.5-2.0 dry mils of adhesive.
 - 2. Panel components shall have uniform pressure applied mechanically over entire area.
 - 3. Laminations shall be made by manufacturer of face sheet.
- F. Adhesive: As recommended by manufacturer for project conditions.

2.03 PORCELAIN ENAMEL MAGNETIC MARKERBOARDS

- A. Markerboards: Claridge "LCS" markerboards Series 1.
 - 1. Metal Trim and Accessories: Series 1 heavy gage aluminum extrusions.
 - a. Finish: Etched and anodized satin finish.
 - b. Trim Style: 5/8-inch, mitered corners
 - c. All marker boards shall be mounted at a height shown on the drawings.
 - d. Marker trough: Full length standard continuous solid type, with ribbed section and injection molded end closures.
 - 2. Size: As indicated on drawings.
 - 3. Color: White.

2.04 TACKBOARDS AND TACK STRIPS

- A. Configuration and locations as indicated on drawings, including those integrated with marker boards, interactive boards, and in corridors.
 - 1. Metal Trim and Accessories: Series 1 heavy gage aluminum extrusions; etched and anodized satin finish.
 - 2. Size: As indicated on drawings.
 - 3. Tackboard Surfacing: Claridge Cork composed of 1/4" thick self-healing, burlap backed cork laminated on a 1/4-inch hardboard backing.
 - a. Color: Graphite #1136.

2.05 FABRICATION

- A. Laminate facing sheet and backing sheet to core material under pressure, using

manufacturer's recommended adhesive.

- B. Provide factory-assembled visual display boards, except where sizes demand partial field assembly.
- C. Assemble units in one piece without joints, wherever possible. Where required dimensions exceed maximum panel size available, provide 2 or more pieces of equal length, as indicated on approved shop drawings. Assemble to verify fit at factory, then disassemble for delivery and final assembly at project site.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are properly prepared to receive visual display boards and that all necessary backing is in place. Do not begin installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with manufacturer's installation instructions.
- B. Where visual display boards must be partly assembled at project site, use factory-supplied H-bar to maintain proper alignment.
- C. Install visual display boards level and plumb, keeping perimeter trim aligned in accordance with manufacturer's recommendations.
- D. Tack strips shall have end caps, inside corners, and outside corners as needed per layout.

3.03 ADJUSTING AND CLEANING

- A. Verify that all accessories are installed as required for each unit.
- B. Upon completion of installation, clean surfaces and trim in accordance with manufacturer's recommendations, leaving all materials ready for use.

END OF SECTION

SECTION 101419

DIMENSIONAL LETTERING SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 QUALITY ASSURANCE:

- A. Uniformity of Manufacturer: For each sign form and graphic image process indicated, furnish products of single manufacturer.

1.3 SUBMITTALS:

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Shop Drawings: Submit scaled shop drawings showing fabrication method, finish, anchoring methods, layout, and installation method.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Acceptable Manufacturer:
A.R.K. Ramos Architectural Signage Systems
Oklahoma City, Oklahoma
Tel: 800-725-7266
- B. Other manufacturers meeting or exceeding these specifications.

2.2 CAST LETTERS:

- A. Scope: The project shall include cast letters as described below, to be installed by contractor. Letter style, finish shall be Helvetica, Dark Bronze Anodized & mounted to building per construction drawings.
- B. Fabrication of Letters: Fabricate letters to comply with requirements indicated below and as indicated on drawings.
 - 1. Cast letters: Form letters by sand casting. Produce characters with smooth flat faces, sharp corners, precisely formed lines and profiles, free from pits, scale, sand holes and other defects. Cast anchoring devices into individual letters as required for anchorage.
- C. Height shall be as noted on Construction Drawings.
- E. Mounting: Tap cast metal letters for threaded stud inserts where mounted to masonry. Provide bar mounting for letters mounted to metal wall panels.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 - 1. Install signs level, plumb, and at the height indicated with sign surfaces free from distortion or other defects in appearance.
 - 2. Review letter spacing with Architect prior to installation.
- B. Cleaning and Protection: After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the owner.

END OF SECTION

SECTION 102100
TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic toilet compartments including the following:
 - 1. Floor mounted overhead-braced toilet compartments.
 - 2. Privacy screens.

1.2 RELATED SECTIONS

- A. Section 055000 - Metal Fabrications.
- B. Section 061000 - Rough Carpentry.

1.3 REFERENCES

- A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.
- E. Sustainable Design Submittals:
 - 1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
 - 2. Regional Materials: Certify distance between manufacturer and Project and between manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar

service conditions for not less than 5 years.

- B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.
- C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.
- D. Performance Requirements:
 - 1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84:
 - a. Class B flame spread/smoke developed rating.
 - 2. Material Fire Ratings:
 - a. National Fire Protection Association (NFPA) 286: Pass.
 - b. International Code Council (ICC): Class B.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Scranton Products, which is located at: 801 E. Corey St.; Scranton, PA 18505; Toll Free Tel: 800-445-5148; Fax: 855-376-6161; Email: [request info \(info@scrantonproducts.com\)](mailto:request_info@scrantonproducts.com); Web: www.scrantonproducts.com
- B. ASI, American Specialties, Inc., Accurate & Global, are approved manufacturers.
- C. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 MATERIAL

- A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.
- B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

- C. Stainless Steel Castings: ASTM A167, Type 304.
- D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

- A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.
 - 1. Style: Floor mounted overhead-braced toilet compartments.
- B. Doors, Panels, and Pilasters: 1 inch (25 mm) thick with all edges rounded to a radius. Mount doors and dividing panels based on height of specified system.
 - 1. Door and Panel Height: 55 inches (1397 mm).
 - 2. Door Design: Flush.
 - 3. Panel Edge: Shiplap.
 - 4. Pilasters: 82 inches (2083 mm) high and fastened to floor.
- C. Panel Color: Traditional Series.
 - 1. Black - Orange Peel.
- D. Pilaster Shoes: 3 inches (76 mm) high type 304, 20 gauge stainless steel. Secured to pilasters with a stainless steel tamper resistant Torx head sex bolt.
- E. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
 - 1. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.
- F. Wall Brackets:
 - 1. Aluminum Brackets: Heavy-duty aluminum 6463-T5 alloy.
 - 2. PVC Brackets: Extruded PVC plastic.
 - 3. Stainless Steel Brackets: Stainless steel type 304.
 - 4. Brackets are fastened to pilasters with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
 - 5. Bracket Type: Continuous 54 inches (1372 mm) stainless steel.
- G. Door Hardware:
 - 1. Continuous Stainless Steel Spring Loaded Hinge:
 - a. Hinges: 54 inches (1372 mm).
 - 2. Door Strike/Keeper: Heavy-duty extruded aluminum 6436-T5 alloy with a bright dip anodized finish. Secured to pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
 - a. Style: 6 inches (152 mm) aluminum.
 - 3. Stainless Steel Slide Bolt Latch and Housing: Heavy-duty stainless steel type 304. The latch and housing to have a bright finish. The slide bolt and button to have a black anodized finish.
 - 4. Provide occupancy indicator.
 - 5. Doors supplied with one coat hook/bumper and door pull made of chrome plated Zamak.
 - 6. Equip outswing handicapped doors with second door pull and door stop.

2.4 SOLID PLASTIC PRIVACY SCREENS

- A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated or scheduled.

- B. Panels, and pilasters, if required, 1 inch (25 mm) thick with edges rounded to a radius. Screens to be mounted at 14 inches (356 mm) above the finished floor. Color; Black - Orange Peel.
- C. Screen Type: Wall mounted.
 - 1. Urinal Screens: 18 inches (457 mm) wide by 42 inches (1067 mm) high.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.
- C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).
- D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 102600 CORNER GUARDS

Part 1 - General

1.01 Summary

- A. This section includes the following types of wall protection systems:
 - 1. Corner Guards
- B. Related sections: The following sections contain requirements related to this section:
 - 1. Blocking in walls for fasteners

1.02 References

- A. National codes (IBC, UBC, SBCCI, BOCA and Life Safety)
- B. American Society for Testing and Materials (ASTM)
- C. Underwriters Laboratories (UL)
- D. California 01350 specification

1.03 Submittals

- A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- B. Shop drawings showing locations, extent and installation details of corner guards. Show methods of attachment to adjoining construction.
- C. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern and end cap attachment and alignment:
 - 1. 12" (304.8mm) long sample of each model specified including end cap.
- D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.04 Quality Assurance

- A. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Not less than 5 years experience in the production of specified products and a record of successful in-service performance.
- C. Code compliance: Assemblies should conform to all applicable codes including IBC, UBC, SBCCI, BOCA, Life Safety and CA 01350.
- D. Fire performance characteristics: Provide engineered PETG wall protection system components with UL label indicating that they are identical to those tested in accordance with ASTM E84 for Class A/1 characteristics listed below:
 - 1. Flame spread: 25 or less
 - 2. Smoke developed: 450 or less
- E. Impact strength: Provide wall protection components that have been tested in accordance with the applicable provisions of ASTM F476.
- F. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.
- G. Color match: Provide wall protection components that are color matched in accordance with the following:
 - 1. Delta Ecmc of no greater than 1.0 using CIE Lab color space.
- H. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.05 Delivery, Storage and Handling

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements. A minimum room temperature of 40°F (4°C) and a maximum of 100°F (38°C) should be maintained.

- C. Material must be stored flat.

1.06 Project Conditions

- A. Materials must be acclimated in an environment of 65°-75°F (18°-24°C) for at least 24 hours prior to beginning the installation.
- B. Installation areas must be enclosed and weatherproofed before installation commences.

Part 2 - Products

2.01 Manufacturers

- A. Interior surface protection products specified herein and included on the submittal drawings shall be manufactured by Construction Specialties, Inc.; substitutions shall be in accordance with Section 016000.

2.02 Materials

- A. Engineered PETG: Extruded material should be high-impact Acrovyn 4000 with Shadowgrain texture, nominal .078" (1.98mm) thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer. Colors to be indicated in the finish schedule from one of manufacturer's available colors and patterns.
- B. Aluminum: Extruded aluminum retainers should be 6063-T6 alloy, nominal .062" (1.57mm) thickness. Minimum strength and durability properties as specified in ASTM B221.
- C. Fasteners: All fasteners to be non-corrosive and compatible with aluminum retainers. All necessary fasteners to be supplied by the manufacturer.

2.03 Corner Guards

- A. Engineered PETG Corner Guards to be CS Acrovyn: Surface mounted guards consisting of continuous retainer with snap-on Acrovyn 4000 cover. Color matched end caps to be provided for both partial and full height applications. Attachment hardware shall be appropriate for wall construction.
 - 1. Model SM-10N 90° surface mounted corner guard with 3" (76.1mm) legs, 1" (25.4mm) radius bullnose cover and aluminum retainer.

2.04 Fabrication

- A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

Part 3 - Execution

3.01 Examination

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 Preparation

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.03 Installation

- A. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware and locating all components firmly into position, level and plumb.
- B. Temperature at the time of installation must be between 65°-75°F (18°-24°C) and be maintained for at least 48 hours after the installation.
- C. Adjust installed end caps as necessary to ensure tight seams.

3.04 Cleaning

- A. General: Immediately upon completion of installation, clean material in accordance with manufacturer's recommended cleaning method.

- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.05 Protection

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

SECTION 102800

TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Accessories for toilet rooms, showers and utility rooms
- B. Grab bars

1.02 RELATED SECTIONS

- A. Section 093013 – Porcelain / Ceramic / Quarry Tile
- B. Section 102100 – Toilet Compartments

1.03 REFERENCES

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Toilet Accessories
 - 1. Bradley Corporation
 - 2. Kimberly-Clark Corporation
 - 3. Bobrick Washroom Equipment, Inc.
 - 4. Sloan Company
 - 5. San Jamar
 - 6. ASI, American Specialties, Inc.
 - 7. Substitutions: Section 016000 - Product Requirements
- B. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide two (2) keys for each accessory to Owner; master key all lockable accessories.
- C. Fasteners, Screws and Bolts: Hot dip galvanized, tamper-proof, security type.
- D. Expansion shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

2.04 TOILET ROOM ACCESSORIES

- A. Toilet Tissue Dispenser: San Jamar #R4000, 9" JBT Junior Roll Twin Tissue Dispenser; Color: TBK Black H12" x W19" x D5¼".
- B. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
 - 1. Length and configuration: As indicated on drawings
- C. Refer to drawings for other Specialties requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings.

END OF SECTION

SECTION 104300
INTERIOR SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

- A. Furnish all material, labor and engineering services necessary to fabricate and install signage.

1.3 REFERENCES

- A. Signs and their installation shall comply with applicable provisions of the latest edition of the following standards and with requirements of authorities having jurisdiction:
 - 1. ADAAG – Americans with Disabilities Act Accessibility Guidelines; US Architectural and Transportation Barriers Compliance Board.
 - 2. International Code Council/American National Standards Institute A117.1- Standard on Accessible and Usable Buildings Facilities.
 - 3. National Fire Protection Association 101 Life Safety Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: Manufacturer's data sheets on each product to be installed, including operation and maintenance data.
- C. Shop Drawings: Shop Drawings shall be complete with installation details.
 - 1. Show details that indicate sizes, lettering, graphics, and construction details of each type of sign.
 - 2. Show features of components, including but not limited to edge conditions, profiles, accessories, finishes, and textures.
 - 3. Show layout, profiles, sign mounting types, heights, anchorage methods, and attachment devices.
- D. Sample of two sign types for verification of materials, color, pattern, overall quality, and for adherence to drawings and requirements indicated.

1.5 QUALITY ASSURANCE

- A. Manufacturer specializing in manufacturing the products specified in this section with minimum five years experience. Obtain signs from one source and a single manufacturer.
- B. Installer Qualifications: Minimum two years documented experience in work of this Section.
- C. Mock-Up: Provide a mock-up for evaluation of material, workmanship.
 - 1. Construct areas designated by Architect.
 - 2. Do not proceed with remaining work until material, details and workmanship are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
 - 4. As approved by Architect, mockup may be incorporated into finished work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's recommendations for delivery, storage and handling.
- B. Materials shall be delivered to the location in unopened, labeled factory containers. Upon delivery, materials shall be inspected for damage. Deficient materials shall not be used.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Provide manufacturer's warranty against defects in materials or workmanship for minimum 5 years.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Interior signage shall equal to Innerface (1-800-445-4796), Signature System, and shall match or equal that shown on the drawings and the specification here within.
- B. Alternate manufacturers meeting these specifications are acceptable.

2.2 SIGN STANDARDS

- A. Typography
 - 1. Type style: see drawings. Copy shall be a true, clean, accurate reproduction of typeface(s) specified. Upper and lower case or all caps shall be as indicated in Sign Type drawings and Signage Schedule. Letter spacing to be normal and interline spacing shall be set by manufacturer.
 - 2. Arrows, symbols and logo art: To be provided in style, sizes, colors and spacing as shown in drawings and shall meet code requirements.
 - 3. Grade II Braille utilizing perfectly round, clear insertion beads.
 - 4. Text shall be single language; English
- B. Color and Finishes
 - 1. Colors, patterns and artwork: see drawings.
 - 2. Message Background: see drawings.
 - 3. Finishes shall meet current Federal ADA and all State and local requirements.

2.3 SIGNS

- A. Architectural Signage System
 - 1. The signage shall incorporate a decorative laminate face with applied graphics including all tactile requirements in adherence to ADA specifications.
 - 2. All signs, including work station and room ID's, overheads and flag mounts, directionals and directories shall have a matching appearance and constructed utilizing the same manufacturing process to assure a consistent look throughout.
- B. General
 - 1. All text shall be Helvetica font. Heights as indicated on drawings.
 - 2. Title 24 Braille: Braille dots shall be half hemispherical domed and protruding a minimum 0.025".
- C. Materials and Construction

1. Sign face shall be 0.035" (nominal) standard grade, high pressure surface laminate. A painted sign face shall not be acceptable.
2. The sign shall incorporate balanced construction with a core sandwiched between laminates to prevent warping. An acrylic substrate shall not be acceptable. Laminate on the sign face only shall not be acceptable.
3. Tactile lettering shall be precision machined, raised 1/32", matte PETG and subsurface colored for scratch resistance.
4. Sign and backer edge shall be treated with a hot wax seal moisture integrity.
5. Signage with replaceable inserts shall accommodate an 8-1/2" wide insert printed on standard width paper and shall not have an end cap enclosing the insert. Replacement of the insert shall not require any mechanism and shall be easily replaced.
6. Insert components shall have a .080 thickness non-glare acrylic window and shall be inlaid flush to sign face for a smooth, seamless appearance.
7. The signage shall include module options allowing for inserts, notice holders, occupancy sliders, marker, magnetic, and cork in boards. All modules shall be flush to sign face for a smooth, seamless appearance.
8. The laminates (front and back) shall be precision machined together to a 90-degree angle. Edges shall be smooth, void of chips, burrs, sharp edges and marks.
9. The signage shall utilize an acrylic sphere for Grade II Braille inserted directly into a scratch resistant, high pressure laminate sign face. Braille dots are to be pressure fit in high tolerance drilled holes.
10. Text, graphics, border and Braille shall be raised from background.
11. The signage shall utilize a pressure activated adhesive. The adhesive shall be nonhazardous and shall allow for flexing and deflection of the adhered components due to changes in temperature and moisture without bond failure.
12. All signs shall be provided with appropriate mounting hardware. Hardware shall be finished and architectural in appearance and suitable for the mounting surface.
13. Some signs may be installed on glass. A blank backer is required to be placed on the opposite side of the glass to cover tape and adhesive. The backer shall match the sign in size and shape.

D. Printed Inserts

1. The signage contractor shall provide and install all signage inserts as required on drawings.
2. Manufacturer shall provide a template containing layout, font, color, artwork and trim lines to allow Owner to produce inserts on laser or ink jet printer. The template shall be in an Acrobat or Word format (.pdf or .doc).

PART 3 EXECUTION

3.1 SITE VISITS

- A. Site visits – 3 site visits shall be required by the sign contractor.
 1. Prior to submission of bid for site assessment and evaluation.
 2. Post award for the purposes of meeting with Owners and project manager.
 3. Final walk-through and punchlist.
- B. Programming – sign contractor shall perform all wayfinding & programming. Programming shall include location plan, message schedule, and/or plots, fire/evacuation maps and insert graphics. All programming materials shall be submitted for approval.

3.2 CODE COMPLIANCE

- A. It shall be the responsibility of the successful bidder to meet any and all local, state, and federal code requirements in fabricating and installing signs.

3.3 DELIVERY, STORAGE, PROTECTION

- A. Package to prevent damage or deterioration during shipment, handling, storage and installation. Products should remain in original packaging until removal is necessary. Store products in a dry, indoor location.

3.4 EXAMINATION

- A. Installer shall examine signs for defects, damage and compliance with specifications. Installation shall not proceed until unsatisfactory conditions are corrected.
- B. Inspect conditions of substrate and other conditions which may affect installation of signage.
- C. Do not begin installation until substrates are within manufacturer's specified tolerances and have been prepared in accordance with manufacturer's instructions.
- D. If substrate preparation is the responsibility of another installer, do not proceed with installation. Notify Architect of unsatisfactory preparation immediately.
- E. Commencement of work is deemed as acceptance of installation conditions.

3.5 INSTALLATION

- A. General: Installation locations shall be in accordance with ADA specifications. Locate signs where indicated using mounting methods in compliance with manufacturer's written instructions per required method.
 - 1. The signage contractor shall coordinate installation schedules with the Contractor.
 - 2. Installation shall be performed by manufacturer's personnel trained and certified in manufacturer's methods and procedures.
 - 3. The signage contractor shall submit a CAD generated location plan noting the location of all signage and cross referenced to message schedule or plots for architect's approval.
 - 4. Install in accordance with manufacturer's printed installation instructions, and in proper relationship with adjacent work.
 - 5. Installer to conduct a pre-installation to verify copy and sign location. Each location shall be noted using a low tack vinyl reproduction of actual sign. Full scale renderings of directories and directionals shall also be provided. Any location discrepancy or message issues shall be submitted to Architect for review.
 - 6. Signs shall be level, plumb, and at heights indicated with sign surfaces free from defects.
 - 7. Upon completion of the work, signage contractor shall remove unused or discarded materials, containers and debris from site.
 - 8. Protect installed products until completion of project.

3.6 SCHEDULES

- A. Refer to Room Finish Schedules & Drawings for signage locations and designations.

3.7 STANDARDS MANUAL

- A. Manufacturer shall provide a comprehensive Standards Manual in both a paper and PDF format. The manual shall include all graphic standards, sign type descriptions, renderings showing color, pattern and finish, engineering drawings, location plans, plots, artwork, insert templates, mounting detail, and reorder information.

END OF SECTION

SECTION 104413

FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Fire extinguishers.
 - 2. Extinguisher cabinets.
 - 3. Accessories.
- B. Related Requirements:
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
 - 2. Section 013000 - Submittal Procedures: For administrative and procedural requirements for processing of submittals during the construction phase.
 - 3. Section 017800 - Closeout Procedures: For administrative and procedural requirements for completion of the Work.

1.02 REFERENCES

- A. Reference Standards:
 - 1. ASTM International (ASTM):
 - a. ASTM E814-11a, Standard Test Method for Fire Tests of Penetration Firestop Systems.
 - 2. International Code Council (ICC):
 - a. International Building Code (IBC) - 2018 Edition.
 - 3. Intertek Testing Services/Warnock-Hersey International (ITS/WHI)
 - 4. National Fire Protection Association (NFPA):
 - a. NFPA 10, Standard for Portable Fire Extinguishers: For criteria covering installations for Class A, B, C, D, and K hazards as well as the selection, inspection, maintenance, recharging, and testing of portable fire extinguishing equipment.
 - 5. Underwriters Laboratories, Inc. (UL)
 - 6. United States Code (USC):
 - a. Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2010: For restrictions relating to cabinet projections in corridors.

1.03 ACTION SUBMITTALS

- A. Submit in accordance with Section 013000:
 - 1. Product Data:
 - a. Cabinets: Materials description for fire extinguisher cabinets include roughing-in dimensions, details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, door style and materials.
 - b. Extinguishers: Materials description for fire extinguishers; include ratings and classifications.
 - c. Installation instructions for each product specified.
 - 2. Shop Drawings:
 - a. Small-scale plans showing locations of fire extinguisher cabinets and individual fire extinguishers.
 - b. Schedules showing each type of cabinet and extinguisher to ensure proper fit and function.
 - c. Indicate installation procedures and accessories required for a complete installation.

1.04 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.05 QUALITY ASSURANCE

- A. Comply with standards referenced in Article 1.02 - REFERENCES.
- B. Provide fire extinguishers, cabinets and accessories produced by a single manufacturer.
- C. Provide fire extinguishers of type approved by UL, State Fire Marshal's Office, and local regulatory agencies, if any.
- D. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle fire protection specialties and related materials using means and methods that will prevent damage, deterioration, or loss.
 - 1. Deliver components in manufacturer's original packaging, properly labeled for identification.

PART 2 - PRODUCTS

2.01 FIRE PROTECTION SPECIALTIES MANUFACTURERS

- A. Acceptable Manufacturers:

J. L. Industries, Inc., a division of Activar Construction Products Group
9702 Newton Av S
Bloomington, MN 55431
(800) 554-6077
(952) 835-6850
(952) 835-2218 (FAX)
SALES@ACTIVARCPG.COM
www.activarcpg.com
- B. Substitutions: Manufacturers seeking approval of their products shall submit for approval prior to bidding in accordance with General Requirements.

2.02 FIRE EXTINGUISHERS

- A. Multi-Purpose Chemical Type: Extinguisher unit containing a fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic.
 - 1. Construction: Heavy duty steel cylinder with metal valve and siphon tube, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin and upright squeeze grip.
 - 2. Finish: Factory powder-coated; Red.
 - 3. Effectiveness (Rating): Class A, B, and C fires.
 - 4. Model Identification and UL Rating: Cosmic 10E; 4A-80BC
 - 5. Provide ABC extinguishers at all non-Kitchen locations.
- B. Accessories:
 - 1. Mounting Brackets:
 - a. Standard Brackets: Provide manufacturer's standard steel bracket, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated.

2.03 EXTINGUISHER CABINETS

- A. Cabinet with Steel Trim and Door: Cosmopolitan Series, Model 2035

1. Cabinet Style: Recessed.
2. Components:
 - a. Tub: Cold-rolled steel.
 - 1) Finish: Factory-applied powder coat paint finish.
 - a) Standard Color: White.
 - b. Door and Trim Construction: #4 stainless-steel; flush doors with 5/8 inch (15.88 mm) door stop attached by continuous hinge and equipped with zinc-plated handle with roller catch.
 - 1) Finish: #6 satin stainless-steel
 - c. Trim Style and Depth:
 - 1) Recessed Cabinet with 3/8" flat trim
3. Fire-Rating: None
4. All fire extinguishers shall be inspected and tagged.

2.04 CABINET DOOR STYLES, GLAZING TYPES, AND ADDITIONAL OPTIONS

- A. Door Style: Style F - Full glazing; with flush pull handle.
- B. Additional Options:
 1. Cabinet Lettering:
 - a. Text: FIRE EXTINGUISHER; vertical
 - b. Color(s): Red.
 2. Door Hardware:
 - a. ADA flush pull.

2.05 SOURCE QUALITY CONTROL

- A. Ship extinguishers to the Project site fully charged, EXCEPT those which contain water as an extinguishing agent, if any.
- B. Obtain Fire Extinguishers and Fire Extinguisher Brackets from same manufacturer to ensure compatibility.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed, and blocking where surface mounted cabinets will be installed.
 1. Notify the Contractor in writing of conditions detrimental to proper and timely completion of the installation.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install cabinets in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
 1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
 2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
 3. Maintain fire ratings where cabinets are recessed into fire-rated wall systems.

- B. Cabinet Lettering:
 - 1. Location: Vertically on face of door.
 - 2. Apply lettering at the factory.

3.03 FIELD QUALITY CONTROL

- A. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

3.04 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 105300
EXTRUDED ALUMINUM CANOPIES

PART I GENERAL

1.01 DESCRIPTION OF WORK

- A. The extent of prefinished aluminum canopy work is shown on the drawings and as specified herein.
- B. Definition: Extruded Aluminum Canopies shall consist entirely of extruded aluminum sections (roll-formed not acceptable). System shall consist of heli-arc welded, decking, fascia, accessory items and hardware to provide a complete system.
- C. Water shall drain from deck into designated beams and out sides of canopies.

1.02 SUBMITTALS

- A. Shop Drawings: Submit detailed drawings, layout of canopy systems, bent locations (identify drain locations), all mechanical joint locations with complete details, connections, jointing and accessories. Include details anchorage.
- B. Product Data: Submit manufacturer's product data, specifications, component performance data and installation instructions.
- C. Calculations: Provide signed and sealed structural calculations for the proposed canopy systems, by a professional engineer registered in the State of Oklahoma.
- D. Submit samples of finish and color selections. Colors shall be as selected by Architect.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following except as otherwise indicated:
 - 1. International Building Code, 2018 Edition.
 - 2. AWS (American Welding Society) standards for structural aluminum welding.
- B. Manufacturer: Obtain aluminum canopy systems from a sole source.
- C. Installer Qualification: Firm with not less than three (3) years experience in installation of aluminum canopies of type, quantity and installation methods similar to work of this section.
- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work. However, allow for adjustments within specified tolerations wherever taking of field measurements before fabrication might delay work.
- E. Shop Assembly: Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- F. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway system (sidewalks, curbs, waterproofing, building fascias, etc.).

1.04 PERFORMANCE REQUIREMENTS

- A. System Performance: Provide aluminum covered walkway system that has been

designed, produced, fabricated and installed to withstand normal temperature changes as well as live loading, dead loading and wind loading in compliance with International Building Code, 2015 Edition requirements for geographic area in which work as located and as follows:

1. Wind Load: In accordance with the 2018 International Building Code, Exposure =C, Importance Factor = 1.15, Basic Wind Speed = 90 mph.
 2. Live Load / Snow Load: 20 psf minimum.
 3. Dead Load: Total of all permanently installed material including roofing, structural frame, accessories and all equipment that is fixed in position.
- B. Structural member sizes shown on drawings are only for indication of design intent and represent minimum acceptable sizes. Actual sizes shall be determined by manufacturer's engineer and indicated on Shop Drawings.
- C. Structure shall be capable of sustaining severe icing, hail and supporting a concentrated load such as being walked upon.

PART 2 PRODUCT

2.01 ACCEPTABLE MANUFACTURERS

- A. AVAdek Walkway Cover Systems & Canopies; 9201 Winkler, Houston, TX 77017 1-713-944-0988 (or equal).
- B. MASA Architectural Canopies
- C. Archetype Canopies
- C. Substitutions: Substitutions must fully comply with specified requirements.

2.02 MATERIALS

- A. All components shall be 6063, 6061 or 6005 alloy extruded.
- B. All components (including underneath side of deck) shall be of the finish and color as selected by Architect.
- C. Fasteners:
1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8" outside dimension, conical washer.
 2. Fascia Rivets: Size 3/16" by 1/2" grip range aluminum rivets with aluminum mandrel.
 3. Bolts: All bolts, nuts and washers to be 18-8 non-magnetic stainless steel.
 4. Tek Screws: not permitted
- D. Warranty:
1. Manufacturer shall warrant the entire system against defects in labor and materials for a period of one (1) year commencing on the date of substantial completion as established in Division One of these specifications.
 2. Intention of this warranty is the manufacturer will come onto the jobsite and do all necessary to effect corrections of any deficiencies.
 3. Evidence of defects in labor and material may include but is not limited to, one or more of the following:
 - a. Moisture leaks
 - b. Metal failure including excessive deflection
 - c. Fastener failure
 - d. Finish failure

2.03 FABRICATION

- A. Comply with indicated profiles, dimensioned requirements and structural requirements.
- B. Use sections true to details with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture, free from defects impairing strength and durability.
- C. All welding do be done by heli-arc process.
- D. Bents shall consist of shop welded one piece units. When size of bents do not permit shipment as a welded unit, concealed mechanical joints may be used.
- E. Mechanical joints shall consist of stainless steel bolts with a minimum of two (2) bolts per fastening. Bolts and nuts shall be installed in a concealed manner utilizing 1/2" thick by 1 1/2" aluminum bolt bars welded to structural members. All such mechanical joints must be detailed on shop drawings showing all locations.
- F. Roof Deck: Extruded Aluminum shapes, interlocking self-flashing sections. Shop fabricate to lengths and panels widths required for field assembly. Depth of sections to comply with structural requirements. Provide shop induced camber in deck units with spans greater than 16'- 0" to offset dead load deflections. Welded dams are to be used at non-draining ends of deck.
- G. Expansion joints, design structure for thermal expansion and contraction. Provide expansion joints as required.
- H. Exposed rivets used to fasten bottom of fascia to deck to have finish to match fascia.
- I. Flashing shall be .040 aluminum fabricated to prevent leakage between canopy systems and adjacent structures.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

Deliver, store and handle covered walkway system components as recommended by manufacturer. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

3.02 EXAMINATION

- A. Examine adjacent work for conditions that would prevent quality installation of system.
- B. Do not proceed until defects are corrected.

3.03 FIELD DIMENSIONS

- A. Contractor shall field confirm, with Architect dimensions and elevations shown on shop drawings prior to fabrication.

3.05 INSTALLATION

- A. Install roof deck sections, accessories and related flashing in accordance with manufacturer's instructions. Provide roof slope for rain drainage without ponding water. Align and anchor roof deck units to structural support frames.
- B. Assemble all components in a neat, workmanlike manner.

3.06 CLEANING AND PROTECTION

- A. Damaged Units: Replace roof deck panels and other components of the work which have been damaged or have deteriorated beyond successful minor repair.
- B. Cleaning: Remove protective coverings at time in project construction sequence which will afford greatest protection of work. Clean finished surfaces as recommended by manufacturer. Maintain in a clean condition during construction.
- C. Protection: Advise Contractor of protection and surveillance procedures, as required to ensure that work of this section will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 107500

FLAGPOLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ground-Set Flagpoles.
- B. Accessories.

1.2 REFERENCES

- A. ASTM B 241/B 241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Flagpole height: 30 feet.
 - 2. Flag sizes:
 - a. National: 4 feet by 6 feet.
 - b. State: 4 feet by 6 feet.
- B. Performance Requirements:
 - 1. Wind Speeds: Poles shall withstand the following minimum "flagged" wind and gust speeds; Wind Speed = 100 mph, Gust Speed = 130 mph (Verify if greater wind speed design criteria is required for local conditions).

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: Manufacturer's descriptive literature for flagpoles, including all components.
- C. Shop Drawings: Indicate locations and types of flagpoles in project; indicate mounting details.
- D. Quality Assurance Submittals:
 - 1. Design Data: Documentation of compliance to specified performance requirements, bearing seal and signature of registered Professional Structural Engineer licensed to practice in the State in which the project is located.
 - 2. Manufacturer's printed installation instructions for indicated project conditions.
- E. Closeout Submittals:
 - 1. Project record documents:
 - 2. Operation and maintenance data for specified flagpoles.
 - 3. Warranty documents: Issued and executed by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- B. Protect flagpole and accessories from damage or moisture.

1.6 SCHEDULING

- A. Ensure that anchoring devices are supplied to installers requiring them in time for building-in to substrates.

1.7 WARRANTY

- A. Manufacturer's Warranty: Furnish flagpole manufacturer's standard warranty against defects in product workmanship and materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. Concord Industries, Inc.: 4150 Kellway Cir. P. O. Box 2449 ; Addison, TX 75001-2449; Tel: 800-527-3902
 - 2. Interstate Pole Industries: 525 Maple Ave.; Carpinteria, CA 93013; Tel: 805-684-9551
 - 3. Pole Tech; 97 Gnarled Hollow Rd; East Setauket, NY 11733; Tel: 800-633-6733
- B. Requests for substitutions prior to bidding shall be considered in accordance with provisions of Section 016000.

2.2 GROUND SET FLAGPOLES

- A. Acceptable Product: Concord Independence Concealed Halyard System.
- B. Shaft:
 - 1. Material: Seamless cone-tapered aluminum tubing conforming to ASTM B 241, Alloy 6063, Temper T6.
 - 2. Finish: Clear Anodized Finish
- C. Truck: Cast aluminum housing and spindle, with one 2-3/8 inches diameter cast nylon sheaves; revolving mounting with 26 stainless steel ball bearings, non-fouling.
- D. Halyard: Internal Halyard with stainless steel aircraft cable complete with proper size flag arrangement, shock spring, counterweight (with neoprene coating to match shaft), beaded retainer ring and flag snaps.
- E. Collar: Flash collar of spun aluminum with a diameter of at least 1" larger than foundation sleeve. Collar finish shall match flagpole finish.
- F. Winch and Handle: Internal direct-drive, gearless type mounted on rotating plate; winch constructed of stainless steel, locking in any position upon removal of winch handle; single reinforced access opening and door with keylock, with access hole in door for winch handle.

2.3 ACCESSORIES

- A. Ground Sleeve: Galvanized steel components as follows:
 - 1. Foundation tube: Corrugated, 16 gage, diameter and length specified in manufacturer's descriptive literature for indicated flagpole height; centered on, and welded to face of base plate.

2. Base plate: Square, side dimensions 4 inches greater than inside dimension of foundation tube.
 3. Ground spike: 3/4 inch diameter, 18 inches long; centered on, and welded to face of base plate opposite foundation tube attachment.
 4. Setting plate: 6 inches square, with drilled hole at center for attachment to ground spike; welded perpendicular to length of ground spike 6 inches from base plate.
- B. Finial: Spun aluminum, 14 gage wall thickness, flush seam, gold anodized finish, diameter matching butt diameter of shaft.

2.4 MIXES

- A. Concrete: 3,000 pounds per square inch compressive strength at 28 days; 6 percent air entrainment.

2.5 FABRICATION

- A. Provide self-aligning internal sleeves for shafts fabricated in sections for field assembly; field-welded connections, including plug-welding, are not permitted.
- B. Fabricate end-to-end joints of shaft sections for hairline joint after connection; match mark and number shaft sections for field assembly.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Installer's Examination:
1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
 2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
 3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
 4. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 INSTALLATION

- A. Install flagpole components and accessories in accordance with approved shop drawings and manufacturer's installation instructions.
- B. Ground Sleeve:
1. Excavate in undisturbed soil to indicated depth, width, and length, providing shoring for unstable soil conditions; remove non-soil materials from excavation.
 2. Coat surface of ground sleeve assembly, and surfaces of shaft that will be installed below grade, with bituminous paint, minimum 5 mil dry film thickness (DFT).
 3. Place ground sleeve assembly in excavation, locating as indicated; drive ground spike into undisturbed soil to extent that base plate is flush with bottom of excavation.
 4. Place concrete in excavation immediately after mixing, using chute to deliver concrete to placement; surround ground sleeve with concrete, placing concrete to finish grade, and compacting with vibrators.

5. Slope concrete surface from top of ground sleeve to grade for water run-off to grade; screed concrete surface to smooth trowel finish.
6. Moist-cure concrete surface; allow concrete to attain full 28-day compressive strength before installing flagpole.

END OF SECTION

SECTION 124920

MANUAL ROLLER SHADES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Manual roller shades

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM E 21 - Standard Test Method for Elevated Temperature Tension Tests of Metallic Materials.
 - 2. ASTM E 22 - Recommended Practice for Conducting Long Time High Temperature Tension Test of Metallic Materials.
 - 3. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
 - 4. ASTM G 22 - Standard Practice for Determining Resistance of Plastics to Bacteria.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 70 - National Electrical Code.
 - 2. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.
- C. Underwriters Laboratories Inc. (UL).

1.03 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: Latest edition of Manufacturer's literature including:
 - 1. Performance data and installation procedures meeting the requirements herein. Including installation details, styles, material descriptions, profiles, features, finishes and operating instructions.
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Mounting details and Installation methods.
- C. Maintenance Data: Submit instructions and precautions for cleaning and maintenance; operating hardware and controls as applicable.
- D. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.
- E. Submit working hand sample or mock up shade (mock up shade may be used as a final shade if approved).
- F. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, product details and finishes, installation details, operational clearances, wiring diagrams if applicable, and relationship to adjacent work.
- G. Window Treatment Schedule: Submit a schedule with same room designations indicated on the Drawings; including but not limited to opening sizes and key to typical mounting details. Indicate side Control Loop shall be installed.
- H. Samples:
 - 1. Submit two 4" x 6" samples of shade fabric material indicating color.
 - 2. Submit two 4" x 6" samples of the fascia material indicating color.

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Engaged in manufacturing of products of similar type to that specified, with a minimum of 10 years successful experience.
- B. Installer Qualifications: Minimum 2 years successful experience installing similar products.
- C. Single Source Requirements: To the greatest extent possible, provide products specified in this section from a single manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Product to be delivered in manufacturer's original packaging.
- B. Products to be handled and stored to prevent damage to materials, finishes and operating mechanisms. Store in a clean, dry area, laid flat to prevent sagging and twisting of packaging.

1.06 PROJECT CONDITIONS, COORDINATION AND SEQUENCING

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
 - 1. Building shall be enclosed; windows, frames and sills shall be installed and glazed.
 - 2. Wet work shall be complete and dry.
 - 3. Ceilings, window pockets, electrical and mechanical work above window covering shall be complete.

1.07 WARRANTY

- A. Minimum 5 year.

PART 2 - PRODUCTS

2.01 MANUFACTURER AND PRODUCT DESCRIPTION

- A. InPro
 - 1. Clickeze
 - 2. Arid solar screen fabric
 - 3. Fabric Color: Charcoal/Sable
- B. Springs Window Fashions (SWF) Contract
 - 1. Shading Systems
 - 2. Double-Take T300
 - 3. Fabric Color: Grey/Bronze
- C. Substitution Request: In accordance with Section 016000

2.02 MANUAL ROLLER SHADES

- A. Product: manual roller shade
 - 1. **Shade fabric** shall be flame retardant, fade and stain resistant, anti-static, anti-microbial.

- a. Passes NFPA 701-1999 FR
- b. Passes ASTM-G21 and G22
- c. Shades with railroaded fabric will have heat-welded seams.
- d. Fabric Style: 3% Openness
- e. Shading Coefficient with single ¼" clear glass: 0.65-0.68
- f. All shades within a room shall be from the same dye lot
- g. Shades at Room 116 shall be opaque
- 2. **Roller tube** shall be extruded aluminum engineered with a channel to accept fabric spline. The tube size will be determined by the manufacturer based on window size and fabric selection.
- 3. **Clutch** system shall be made of glass-reinforced, polyester thermopolymer (PBT) for wear resistance, smooth operation and corrosion resistance. The clutch is comprised of multi-banded, steel springs that lock the shade in any position when operating the control loop. The clutch mechanism is bi-directional and never requires adjustment or lubrication.
- 4. **Control loop** shall be a #10 stainless steel bead chain. Bead stops attached to the chain protect the shade from over rotation. Bead stop shall be placed so that no more than the hembar shows below fascia when shade is fully rolled up.
 - a. Length of chain shall be from mechanism to 48-inches above finished floor.
- 5. **Idler** end shall be made of high strength, glass-reinforced, polyester thermopolymer (PBT) for wear resistance, smooth operation and corrosion resistance.
- 6. **Lift assist system** shall be a heavy-duty torsion spring located inside the roller tube. The mechanism reduces the pull force allowing easy lifting of larger shades.
- 7. **Spline system** shall consist of a PVC spline heat-welded to the shade fabric and inserted into a channel on the roller tube. The spline system allows for adjustability on-site and ease in changing fabric panels in the field.
- 8. **Hem bar** shall be an aluminum extrusion enclosed in a fabric hem pocket with heat-welded seams and ends. Optional fabric wrapped hem bar.
- 9. **Battens** shall be enclosed in a heat-welded pocket providing additional stabilizing on large shades. Batten placement will be determined by the manufacturer based on window size and fabric selection.
- 10. **Installation brackets** shall be .125" thick steel and can accommodate overhead, side and face mounting. Optional dual shade brackets shall hold two shades in one bracket assembly. Coupled shades shall be connected with a linking bracket mechanism.
- 11. **Mounting:**
 - a. Typically outside mounted.
 - b. Measure so a run of fascias are butting next to each other with no gaps and out to wall on ends.
 - c. Control loop shall typically be on the right side of the window unless access does not meet accessibility codes.

2.03 ACCESSORIES

- A. **Fascia panel** shall be 4.25" or 7.625" dual shade snap-on design and made of 062" thick extruded 6063 T-5 aluminum alloy
 - 1. Finish: A powder-coated finish to match window mullion that is dark bronze.

2. Brackets shall be universal and shall be dark bronze anodized finish.
- B. **End Caps.** Same finish as fascia shall be placed on all fascia's with exposed ends. This may be a gap between fascia ends of 1-1/2 inch or more.
- C. **Locking Chain Guide.** User to identify each location per window due to odd situations.

2.04 FABRICATION

- A. Fabricate shades to hang flat without buckling or distortion.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Installer shall be responsible for inspection of jobsite, approval of mounting surfaces, blocking for shade brackets or pocket assemblies, suspended acoustical or gypsum ceiling for recessed shades, verification of field measurements and installation conditions. Installation shall commence when satisfactory conditions are met.
- B. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.02 INSTALLATION

- A. Install window treatments in accordance with manufacturer's instructions including the following.
 1. Install with adequate clearance to permit smooth operation of the shades throughout entire operational range.
 2. Adjust and balance window coverings to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- B. Provide manual roller shades where indicated on Room Finish Schedule. Connecting Corridor windows do not require roller shades.

3.03 CLEANING AND PROTECTION

- A. Clean surfaces after installation in accordance with manufacturer's written instructions. Do not use cleaning methods involving heat, bleach, abrasives, or solvents.
- B. Protect installed products until completion of project. Repair damaged or improperly installed before Substantial Completion.

END OF SECTION

SECTION 131220

METAL BUILDING SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal building systems including:
 - a. Metal framing components.
 - b. Metal wall panels and trim.
 - c. Metal roof panels and trim.
 - d. Metal building accessories.
- B. Related Sections:
 - 1. Section 033000 – Structural Concrete

1.2 REFERENCES

- A. American Institute of Steel Construction (AISC) - Specification for Structural Steel Buildings.
- B. American Iron and Steel Institute (AISI) - Specifications for the Design of Cold-Formed Steel Structural Members.
- C. American Welding Society (AWS) D1.1 - Structural Welding Code - Steel.
- D. ASTM International (ASTM):
 - 1. A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. A475 - Standard Specification for Zinc-Coated Steel Wire Strand.
 - 4. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 5. A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 - 6. A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - 7. A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 8. A792/A792M - Standard Specification for Steel Sheet, 55 Percent Aluminum-Zinc Alloy-Coated by Hot-Dip Process.
 - 9. A992 - Standard Specification for Structural Steel Shapes.
 - 10. A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength, Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - 11. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across Specimen.
 - 12. E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- E. International Accreditation Service (IAS) - Accreditation Procedures.
- F. Metal Building Manufacturers Association (MBMA):
 - 1. Common Industry Practices.
 - 2. Low Rise Building Systems Manual.
- G. Underwriters Laboratories (UL) 580 - Tests for Uplift Resistance of Roof Assemblies.

1.3 DEFINITIONS

- A. Traditional Metal Building System: Building system using either continuous or simple span "Z" purlins for support of roof covering material.
- B. Long Bay System (SBS): Building system using simple span, cold-formed, open web purlins to support roof covering material.
- C. Gable Symmetrical: Continuous frame building with ridge in center of building, consisting of tapered or straight columns and tapered or straight rafters. Sidewall girts may be continuous (by-passing columns) or simple span (flush in column line). Rafters may or may not have interior columns.
- D. Gable Unsymmetrical: Continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. Eave height and roof slope may differ on each side of ridge. Sidewall girts may be continuous (by-passing columns) or simple span (flush in column line). Rafters may or may not have interior columns.
- E. Single Slope: Continuous frame building which does not contain ridge, but consists of one continuous slope from side to side. Building consists of straight or tapered columns and tapered or straight rafters. Sidewall girts may be continuous (by-passing columns) or simple span (flush in column line). Rafters may or may not have interior columns.
- F. Lean-to (LT): Building extension, which does not contain ridge, but consists of one continuous slope from side to side, usually with same roof slope and girt design as building to which attached.
- G. Roof Slope: Pitch expressed as inches of rise for each 12 inches (300 mm) of horizontal run.
- H. Building Width: Measured from outside to outside of sidewall secondary structural member (girt).
- I. Building Eave Height: Nominal dimension measured from finished floor to top flange of eave strut.
- J. Building Length: Measured from outside to outside of end-all secondary structural member.
- K. Acrylic-Coated Galvalume: Galvalume with light acrylic coating such as Galvalume Plus by Bethlehem, Acrylume by National or Galvalume Plus by U.S. Steel, eliminating need for roll-forming oil and reducing incidence of field marking by handling or foot traffic.
- L. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or material handling systems.
- M. Collateral Loads: Weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.
- N. Dead Load: Actual weight of building system (as provided by Metal Building Company) supported by given member.
- O. Floor Live Loads: Loads induced on floor system by building occupants and possessions including but not limited to furniture and equipment.
- P. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and or movable or moving loads but not including wind, snow, seismic, crane, or dead loads.
- Q. Roof Snow Loads: Gravity load induced by weight of snow or ice on roof, assumed to act on horizontal projection of roof.
- R. Seismic Loads: Loads acting in any direction on structural system due to action of an earthquake.
- S. Wind Loads: Loads on structure induced by forces of wind blowing from any horizontal direction.

1.4 DESIGN REQUIREMENTS

A. General:

1. Use standards, specifications, recommendations, findings, and interpretations of professionally recognized groups as basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances.
2. Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances govern, unless specifically required otherwise by Contract Documents.
3. Design structures in accordance with MBMA Practices and Manual.
4. Design structural mill sections and welded plate sections in accordance with AISC Specification.
5. Design cold-formed steel structural members and panels will generally be designed in accordance with AISI Specification.
6. Building Code: International Building Code, 2018 Edition

B. Design Loads:

1. In accordance with Contract Documents and manufacturer's standard design practices.
2. Design loads include dead loads, roof live loads, wind loads, seismic loads, collateral loads, auxiliary loads, floor live loads and applied or specified loads.
3. Roof Design Dead Load: Self-weight of structure.
Roof Collateral Load: 2 psf
Fire Suppression System: 2 psf
Lights: 2 psf
4. Ground Snow Load: 10 psf
Roof Snow Load: 11 psf
Design Roof Live Load Required: 20 psf
5. Wind Design Velocity: 90 mph
Wind Site Exposure: C
6. Mapped Spectral Accelerations for short periods (S_s) = 0.135g
Mapped Spectral Accelerations for 1- second periods (S_1) = 0.068g
Seismic Hazard Exposure Group: I
Seismic Performance Category: D
7. Service Equipment: Contractor shall refer to Mechanical Schedules in Contract Drawings for HVAC and Electrical Equipment weights.
8. Deflections (IBC 2018):
Purlins: Span / 240
Girts: Span / 200
Building Frames & Braced Frames: Span or Height / 200
9. Load Combinations: As required per the Building Code specified.
10. Connections:
 - a. Bolted moment connections shall be designed in accordance with accepted industry standards utilizing flush plate design methods or extended plate design methods as determined by the manufacturer.
 - b. Field connections made with high strength bolts, shall be made in accordance with the AISC Specification for Structural Joints using ASTM A325 or A490 bolts. Recommended method of installation is "Turn-of-Nut" method.
11. Foundations: Foundation loads, anchor rod diameters and anchor rod patterns shall be determined by the building manufacturer's Professional Engineer. Footing sizes, anchor bolt lengths and method of transferring lateral and uplift forces from the anchor rods to the concrete foundation shall be determined by the Engineer of Record.
12. Metal Siding & Roofing: Metal siding and roofing shall be designed for loads in accordance with the specified code. All metal siding and roofing shall be designed, fabricated and erected to withstand the loading conditions without loss of weather tightness, without permanent distortion and without damage to any part of the installation.

1.5 SUBMITTALS

A. Submittals for Review:

1. Shop Drawings & Calculations:
 - a. Complete Erection Drawings with identification and assembly of building components.

- b. Show anchor bolt settings, transverse cross-sections, sidewall, end-all, and roof framing, flashing and sheeting, and accessory installation details.
 - c. Complete Design Calculations prepared by or under the direct supervision of the building manufacturer's engineer.
 - d. Bear seal and signature of Registered Professional Engineer responsible for system design (**licensed in the State of Oklahoma**) on Erection Drawings and Design Calculations.
- 2. Product Data: Manufacturer's data sheets on each proposed product including:
 - a. Preparation instructions and recommendations.
 - b. Storage and handling requirements and recommendations.
 - c. Installation methods.
- 3. Samples:
 - a. Submit color chip showing manufacturer's standard colors for wall panels.
 - b. After color selection submit samples representing actual product, color, and patterns.
- B. Quality Control Submittals:
 - 1. Design Analysis: Furnish upon request.
 - 2. Welder certifications: As required by AWS D1.1.

1.6 QUALITY ASSURANCE

- A. Manufacturer and Fabricator Qualifications: Primary products furnished by single IAS accredited manufacturer/fabricator with minimum 5 years experience.
- B. Erector Qualifications: Single installer with minimum 5 years experience in installing products of same or similar type and scope.
- C. Mockup:
 - 1. Show metal building components, roof and wall panels, flashings, and trim.
 - 2. Locate where directed.
 - 3. Approved mockup may remain as part of the Work.
 - 4. Purpose of mock-up is to see transitions from one metal wall panel style to another.

1.7 PROJECT CONDITIONS

- A. Do not install systems when temperature, humidity, or ventilation are outside of limits recommended by manufacturer.

1.8 WARRANTIES

- A. Furnish manufacturer's 20 year warranty providing coverage against flaking, chipping, cracking, fading, or delamination of Kynar 500 or Hylar 5000 panel finish.
- B. Furnish manufacturer's 20 year warranty providing coverage against water leakage through standing seam metal roof panels.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Nucor Building Systems, 600 Apache Trail Terrell, TX 75160; 972-524-5417
 - 2. Star Building Systems, 8600 S I-35 Service Rd OKC, OK 73149; 405-636-2010
 - 3. Shulte Building Systems, 17600 Badtke Rd Hockley, TX 77447; 281-304-6111
 - 4. American Buildings, a Nucor Company
- B. Substitutions: Other manufacturers meeting or exceeding these specifications.

2.2 MATERIALS

- A. Primary Framing Steel:
 - 1. Hot-rolled shapes: ASTM A36/A36M or ASTM A992/A992M, minimum yield of 36 or 50 ksi.
 - 2. Built-up sections: ASTM A1011/A1011A, A1018, A529/A529M, A572/A572M, or A36/A36M, minimum yield of 42, 46, 50, or 55 ksi.
 - 3. Pipe: ASTM A53/A53M, Grade B, minimum yield strength of 35 ksi.
 - 4. Round tube: ASTM A500, Grade B with minimum yield strength of 42 ksi.
 - 5. Square and rectangular tube: ASTM A500, Grade B, minimum yield strength of 46 ksi.
 - 6. Cold-formed end-all "C" sections: ASTM A1011/A1011A, Grade 55, or ASTM A653/A653M, Grade 55.
 - 7. X-bracing: ASTM A529/A529M, A572/A572M for rod bracing, ASTM A36/A36M for angle bracing, or ASTM A475 for cable bracing.
- B. Secondary Framing Steel:
 - 1. Purlins, girts, and eave struts: ASTM A1011/A1011A Grade 55, or ASTM A653/A653M, Grade 55.
- C. Panels:
 - 1. UL 580, Class 90, roll-formed acrylic coated Galvalume or pre-painted Galvalume.
 - 2. ASTM A792/A792M, minimum yield of 50 ksi, minimum 50 percent aluminum-zinc alloy coating.
 - 3. Finish: Fluoropon coating produced with Kynar 500, colors as identified above.
 - 4. Through-fastened panels:
 - a. Thickness: 24 gage.
 - 5. Fasteners:
 - a. Through-fastened panels: Self-drilling with sealing washer.
 - b. Standing seam panels: Long life self-drilling with sealing washer.
 - c. Ridge: Long-life self-drilling with sealing washer.
 - d. Clips to purlin or bar joists: Long-life self-drilling with hex washer head and washer.
 - 6. Clips:
 - a. Low or high fixed clips: Use where moderate thermal expansion and contraction in roof panel is expected.
 - b. Low or high sliding clips: Provide 2 to 4 inches of travel for panel thermal expansion and contraction.
 - c. Starshield clips: provide 1-1/2 inches to 3 inches of travel for panel thermal expansion and contraction.
 - 7. Sealants and closures:
 - a. Sidelaps: Factory applied, hot melt, foamable mastic.
 - b. Endlaps, eave, ridge assembly, and gable flashings: Field applied, 100 percent solids butyl-based elastomeric tape sealant, in roll form or pre-cut to length.
 - c. Outside closures: 24 gage steel sheet.
 - d. Inside closures: 18 gage Galvalume or galvanized coated metal.

2.3 PRIMARY FRAMING

- A. Frame Type: Rigid frame.
- B. Frame Design: As indicated on Drawings.
- C. Sidewall Column Profile: Tapered.
- D. Frame Span: Clear Span as indicated on Drawings.
- E. Bracing: Standard X-Bracing or Portal Frames where indicated on Drawings.

2.4 SECONDARY FRAMING

- A. Roof Zee Purlins:
 - 1. Horizontal structural members which support roof coverings.

2. Depth: As required by design.
 3. Gage: As required by design.
- B. Wall Zee Girts:
1. Horizontal structural members that support vertical panels.
 2. Depth: As required by design.
 3. Gage: As required by design.
- C. Spandrel Beams: Support of conventional wall systems, as required by design.

2.5 ACCESSORY MATERIALS

- A. Primary Framing Shop Finish: Gray or Red oxide primer.
- B. Welding Requirements: Standard or as required by design.
- C. Purlin and Girt Finishes: Gray or red oxide primer.
- D. Bolts - Coating and Finish: Manufacturer's standard.

2.6 ROOF SYSTEMS

- A. Standing Seam Panels (Administration Building):
1. Refer to Section 076100.
- B. Exposed Fastener Panels (Equipment Building):
1. Basis of Design Product: Subject to compliance with requirements provide Metal Sales Manufacturing Corporation; PBR-Panel.
 - a. Panel coverage: 36 inches (914.4 mm).
 - b. Rib Height: 1-1/4 inches (31.8 mm).
 - c. Material Thickness: 24 gauge.
 - d. Minimum Roof Slope Capability: 1:12.
 - e. Attachment: Exposed direct fastened panel.
 - f. Application: Designed for application over open framing or solid substrate.
 - g. Rib Configuration: Trapezoidal.
 - h. Surface Finish: PVDF (Kynar 500).
 - i. Color: As identified on drawings
 - j. Fire Resistance Rating: Comply with UL 263 and UL 790 Class A Fire Resistance Ratings.
 - k. Wind Uplift Resistance: Comply with UL 580, Class 90 Wind Uplift, Construction #161.
 - l. Impact Resistance: Comply with UL 2218, Class 4.

2.7 WALL PANEL SYSTEMS

- A. Application Codes:
1. WP - Exterior Wall Panels.
 2. LP - Liner Panels on Interior Walls or Ceilings.
 3. SP - Soffit Panels (Underside of Canopies, Purlin Extensions, Recessed Entries).
 4. UP - Utility Panels (Parapet Back Panels, Substrate for Stucco/EIFS, Draft Curtains).
 5. FP - Facade Panels (Facades and Equipment Screens).
 6. HW - Horizontal Wall Panels (Sub-Framing and Special Detailing Required).
 7. N/A - Wall Panels Are Not Required (Open Walls or Conventional Wall Construction).
- B. Through-Fastened Panels:
1. Refer to Section 074100
- C. Accessories:
1. Base condition:
 - a. Base member: Channel.
 - b. Base member flashing: As indicated on Drawings

2. Framed openings:
 - a. Finish: Match girt finish.
 - b. Framed opening trim: Standard jamb, head, sill trim package (full cover trim on exposed jambs and headers at overhead doors).
 3. Eave trim condition: Standard gutters and downspouts
 4. Trim profiles:[Manufacturer's standard profiles
- D. Walk Doors:
1. Walk doors and frames shall be provided by Section 081113 contractor.

2.8 FABRICATION

- A. General:
1. Shop fabricate framing members for field bolted assembly.
 2. Surfaces of bolted connections: Smooth and free from burrs and distortions.
 3. Shop connections to conform to manufacturer's standard design practices.
 4. Mark framing members with identifying mark.
 5. Welding to conform to AWS D1.1.
- B. Primary Framing:
1. Plates, stiffeners, and related members: Factory weld base plates, splice plates, cap plates, and stiffeners into place on structural members.
 2. Bolt holes and related machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricate webs to include bracing holes.
 3. Secondary structural connections (purlins and girts): Ordinary bolted connections; may include welded clips.
 4. Welding inspection: In accordance with AISC - MB category and IAS certifications.
 5. Non-destructive testing: Not required.
- C. Zee Purlins:
1. Fabricate girts from cold-formed Z-shaped sections with stiffened flanges.
 2. Size flange stiffeners to comply with requirements of latest edition of AISI Specification.
 3. Purlin flanges unequal in width for easier nesting during erection.
 4. Purlins pre-punched at factory to provide for field bolting to rigid frames.
- D. Girts: Simple or continuous span as required by design. Connection bolts will install through webs, not flanges.
- E. Bracing:
1. Diagonal Bracing:
 - a. Wind bracing in roof and/or walls not required it can be shown that diaphragm strength of roof or wall covering is adequate to resist applied wind or seismic forces.
 - b. Diagonal bracing in roof and sidewalls may be used to resist longitudinal loads in structure if diaphragm action cannot be used.
 - c. Furnish to length and equipped with hillside washers and nuts at each end.
 - d. Bracing may consist of rods threaded at each end or galvanized cable with suitable threaded end anchors.
 - e. If load requirements dictate, bracing may be of structural angle or pipe, bolted in place.
 2. Special Bracing:
 - a. When diagonal bracing is not practical or permitted in sidewall use rigid frame type portal.
 - b. Shear walls may be used where adequate to resist applied wind or seismic forces.
 3. Flange Braces: Not allowed on Building Main Frames outside of wall girts.
 4. Bridging:
 - a. Laterally brace top chord of long bay purlins with horizontal bridging if roof system being used will not supply adequate lateral support to top chord.
 - b. Horizontally bridge bottom chord for lateral bracing. One row of bolted diagonal bridging required for long span purlins 40 feet long and longer.
- F. Endlaps:
1. Fabricate with 16 gage backup plate and eight endlap joint fasteners installed in six pre-

- punched holes in flat and in dimples in trapezoidal legs.
- 2. Apply mastic between panels and secure with self-drilling fasteners through panels and backup plate.
- 3. Through roof fasteners may be used only at endlaps and eaves.

2.9 WALL AND ROOF INSULATION

- A. Wall and Roof Fiber Glass Insulation (for nonfactory insulated roof/wall panels):
 - 1. Manufacturer's standard noncombustible fiber glass blanket insulation with vapor barrier providing no more than 0.02 PERMS moisture vapor transmission (ASTM-E-96 Method A), R-Value as shown on drawings.
 - 2. Provide insulation and facing (as a composite material) carrying UL fire hazard (UL 723) rating indicating a flame spread rating of 25 or less.
 - 3. Facing shall consist of a white polypropylene film, fiberglass reinforcing yarn and a metalized polyester film laminated together with a high performance flame retardant adhesive. Equal to JohnsManville, VR-One.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean surfaces prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for best result for substrate

3.2 INSTALLATION

- A. Install system in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Fit members square against abutting components.
- C. Position members plumb, square, and level.
- D. Temporarily brace members until permanently fastened.
- E. Do not splice load bearing members.
- F. Align and adjust various members forming parts of a complete frame or structure after assembly but before fastening.
- G. Welding to conform to AWS D1.1.
- H. Fasten panels to supports.
- I. Install trim to maintain visual continuity of system.
- J. Install joint sealers and gaskets to prevent water penetration.
- K. Flash penetrations through roofing with metal trim to match panels

3.3 PROTECTION

- A. Protect installed products until completion of project.

3.4 ADJUSTING

- A. Touch up, repair, or replace damaged products prior to Substantial Completion.

END OF SECTION

SECTION 221113

FACILITY WATER DISTRIBUTION PIPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.03 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene-monomer rubber.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. PE: Polyethylene plastic.
- D. PVC: Polyvinyl chloride plastic.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.

2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
 - C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
 - E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
 - F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
 - G. NSF Compliance:
 1. Comply with NSF 14 for plastic potable-water-service piping.
 2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 1. Ensure that valves are dry and internally protected against rust and corrosion.
 2. Protect valves against damage to threaded ends and flange faces.
 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use hand wheels or stems as lifting or rigging points.

- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.07 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 PRODUCTS

2.01 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Gaskets: AWWA C111, rubber.

2.02 PVC PIPE AND FITTINGS

- A. PVC, Schedule 40 Pipe: ASTM D 1785.
 - 1. PVC, Schedule 40 Socket Fittings: ASTM D 2466.
- B. PVC, Schedule 80 Pipe: ASTM D 1785.
 - 1. PVC, Schedule 80 Socket Fittings: ASTM D 2467.
 - 2. PVC, Schedule 80 Threaded Fittings: ASTM D 2464.
- C. PVC, AWWA Pipe: AWWA C900, Class 200 (DR 14), with bell end with gasket, and with spigot end.
 - 1. Comply with UL 1285 for fire-service mains if indicated.

2. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.03 JOINING MATERIALS

- A. Brazing Filler Metals: AWS A5.8, BCuP Series.
- B. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.
- C. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.04 GATE VALVES

- A. AWWA, Cast-Iron Gate Valves:
 1. Manufacturers: Subject to compliance with requirements of City of Sapulpa.
 2. Nonrising-Stem, Resilient-Seated Gate Valves:
 - a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig.
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.

2.5 GATE VALVE ACCESSORIES AND SPECIALTIES

- A. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.
 1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
- B. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.06 CHECK VALVES

- A. AWWA Check Valves:
 1. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.

- a. Standard: AWWA C508.
- b. Pressure Rating: 175 psig.

2.07 CORPORATION VALVES AND CURB VALVES

- A. Manufacturers:
 - 1. Manufacturers: Subject to compliance with requirements of City of Sapulpa.
- B. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.
 - 1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
 - 2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
 - 3. Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.
- C. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.
- D. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches in diameter.
 - 1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

2.08 WATER METER BOXES

- 1. Description: Cast-iron body and cover for disc-type water meter, with lettering "WATER METER" in cover; and with slotted, open-bottom base section of length to fit over service piping. Subject to compliance with requirements of City of Sapulpa.

PART 3 EXECUTION

3.01 EARTHWORK

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.02 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.

- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

3.03 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated gate valves with valve box.
 - 2. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
 - 3. Use the following for valves in vaults and aboveground:
 - a. Gate Valves, NPS 2 and Smaller: Bronze, nonrising stem.
 - b. Gate Valves, NPS 3 and Larger: AWWA, cast iron, OS&Y rising stem, resilient seated.
 - c. Check Valves: AWWA C508, swing type.
 - 4. Pressure-Reducing Valves: Use for water-service piping in vaults and aboveground to control water pressure.
 - 5. Relief Valves: Use for water-service piping in vaults and aboveground.
 - a. Air-Release Valves: To release accumulated air.
 - b. Air/Vacuum Valves: To release or admit large volume of air during filling of piping.
 - c. Combination Air Valves: To release or admit air.

3.04 PIPING INSTALLATION

- A. Water-Main Connection: Tap water main according to requirements of City of Sapulpa water utility company and of size and in location indicated.
- B. Make connections larger than NPS 2 with tapping machine according to the following:
 - 1. Install tapping sleeve and tapping valve according to MSS SP-60.
 - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 - 4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.

- C. Make connections NPS 2 and smaller with drilling machine according to the following:
 - 1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
 - 2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 - 3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 - 4. Install corporation valves into service-saddle assemblies.
 - 5. Install manifold for multiple taps in water main.
 - 6. Install curb valve in water-service piping with head pointing up and with service box.
- D. Comply with NFPA 24 for fire-service-main piping materials and installation.
- E. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- F. Bury piping with depth of cover over top at least 36 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
- G. Install piping by tunneling by boring, under streets and other obstructions that cannot be disturbed.
- H. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- I. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping.
- J. See Division 21 Section "Water-Based Fire-Suppression Systems" for fire-suppression-water piping inside the building.
- K. See Division 22 Section "Domestic Water Piping" for potable-water piping inside the building.

3.05 JOINT CONSTRUCTION

- A. Make pipe joints according to the following:
 - 1. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
 - 2. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

3.06 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 - 1. Locking mechanical joints.
 - 2. Set-screw mechanical retainer glands.
 - 3. Bolted flanged joints.
 - 4. Heat-fused joints.
 - 5. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 - 1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 - 2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 - 3. Bonded-Joint Fiberglass, Water-Service Piping: According to AWWA M45.
 - 4. Fire-Service-Main Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.07 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.08 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according requirements of City of Sapulpa.

3.09 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.10 WATER METER BOX INSTALLATION

- A. Install water meter boxes in paved areas flush with surface.
- B. Install water meter boxes in grass or earth areas with top 2 inches above surface.

3.11 PROTECTIVE ENCLOSURE INSTALLATION

- A. Install concrete base level and with top approximately 2 inches above grade.
- B. Install protective enclosure over valves and equipment.
- C. Anchor protective enclosure to concrete base.

3.12 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
- B. AWWA Fire Hydrants: Comply with AWWA M17.

3.13 FLUSHING HYDRANT INSTALLATION

3.14 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect water-distribution piping to utility water main. Use tapping sleeve and tapping valve.
- C. Connect water-distribution piping to interior domestic water piping.
- D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.15 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
 - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

3.16 IDENTIFICATION

- A. Install continuous underground warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."

- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel.

3.17 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

- B. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 221313

FACILITY SANITARY SEWERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes gravity-flow, nonpressure and force-main, sanitary sewerage outside the building, with the following components:
 - 1. Cleanouts.

1.03 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene-monomer rubber.
- B. LLDPE: Linear low-density, polyethylene plastic.
- C. PE: Polyethylene plastic.
- D. PVC: Polyvinyl chloride plastic.
- E. TPE: Thermoplastic elastomer.

1.04 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water.

1.05 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe material.
 - 2. Special pipe fittings.
- B. Field quality-control test reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic pipe and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.

PART 2 PRODUCTS

2.01 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.

2.02 DUCTILE-IRON, GRAVITY SEWER PIPE AND FITTINGS

- A. Pipe: ASTM A 746, for push-on joints.
- C. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.
- D. Compact Fittings: AWWA C153, for push-on joints.
- E. Gaskets: AWWA C111, rubber.

2.03 PVC PIPE AND FITTINGS

- A. PVC, Schedule 40 Pipe: ASTM D 1785.
 - 1. PVC, Schedule 40 Socket Fittings: ASTM D 2466.
- B. 8 inch service main (only): PVC Sewer Pipe and Fittings: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.
 - 1. PVC, SDR 35 Socket Fittings: ASTM D 3034.

2.04 BACKWATER VALVES

- A. PVC Backwater Valves: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.
 - 1. Manufacturers:
 - a. Canplas Inc.
 - b. IPS Corporation.
 - c. NDS Inc.
 - d. Plastic Oddities, Inc.
 - e. Sioux Chief Manufacturing Company, Inc.
 - f. Zurn Light Commercial Specialty Plumbing Products; Zurn Plumbing Products Group.

2.05 CLEANOUTS

- A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 - 1. Top-Loading Classification: Heavy and Extra-heavy duty.

2. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

PART 3 EXECUTION

3.01 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.02 PIPING APPLICATIONS

- A. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
 1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.
 - a. Shielded flexible couplings for same or minor difference OD pipes.
 - b. Shielded, increaser/reducer-pattern, flexible or rigid couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
 2. Use pressure-type pipe couplings for force-main joints.
- B. Special Pipe Fittings: Use for pipe expansion and deflection. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

3.03 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install cleanouts for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow, nonpressure, drainage piping according to the following:
 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.

2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
 3. Install piping with 36-inch minimum cover.
 4. Install piping below frost line.
 5. Install piping below frost line.
 6. Install ductile-iron pressure piping according to AWWA C600 or AWWA M41.
 7. Install ductile-iron special fittings according to AWWA C600.
 8. Install PVC pressure piping according AWWA M23 or ASTM D 2774 and ASTM F 1668.
 9. Install PVC water-service piping according ASTM D 2774 and ASTM F 1668.
- F. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.04 PIPE JOINT CONSTRUCTION

- A. Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
- B. Join gravity-flow, nonpressure, drainage piping according to the following:
1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.

3.05 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318/318R.

3.06 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
 2. Use medium-duty, top-loading classification cleanouts in paved foot-traffic areas.
 3. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
 4. Use extra-heavy-duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.

- C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.07 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 22 Section "Sanitary Waste and Vent Piping."
- B. Make connections to existing piping.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 3. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.08 IDENTIFICATION

- A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.
 - 1. Use warning tape or detectable warning tape over ferrous piping.
 - 2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.09 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Re-inspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
 - a. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
 - b. Close openings in system and fill with water.
 - c. Purge air and refill with water.
 - d. Disconnect water supply.
 - e. Test and inspect joints for leaks.
 - f. Option: Test ductile-iron piping according to AWWA C600, "Hydrostatic Testing" Section. Use test pressure of at least 10 psig.
 6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.10 CLEANING

- A. Clean interior of piping of dirt and superfluous material. Flush with potable water.

END OF SECTION

SUBMERSIBLE FIBERGLASS GRINDER LIFT STATION

- A. The contractor shall furnish and install one factory built automatic underground submersible sewage pumping station with attached valve vault with valves and all needed equipment factory installed in a fiberglass pump chamber. The principal items of equipment shall include submersible sewage grinder pumps, slide away couplings with guide rail system, 2" stainless steel internal piping, valves, fittings, duplex control panel, floats, all as shown on the plans and specified herein and as supplied by Southwest Fluid Systems, LLC.

EQUIPMENT CHAMBER SUBMERSIBLE

- A. The submersible equipment chamber shall be a vertical cylindrical configuration with a minimum inside diameter of 60", and a minimum inside height of 156", with attached valve pit including all necessary riser piping, valves, and fittings, as shown on the plans.
- B. The station manufacturer shall have at least 5 installations in Oklahoma for no less than 5 years and be capable of producing references of the installations.
- C. The resins used shall be a commercial grade polyester and shall be evaluated as a laminate by test or determined by previous service to be acceptable for the intended environment.
- D. The reinforcing material shall be a commercial grade of glass fiber (continuous strand, chopped-strand, continuous mat and/or noncontinuous mat) having a coupling agent which will provide a suitable bond between the glass reinforcement material and resin.
- E. The FRP laminate wall thickness shall vary with the wet well height to provide the aggregate strength necessary to meet the tensile and flexure physical properties requirements. The wet well FRP laminate must be designed to withstand wall collapse or buckling based on a hydrostatic loading of 62.4 Lbs. per cubic foot; a saturated soil weight of 120 lbs per cubic foot; a soil modulus of 700 lbs per square foot; and the pipe stiffness values in ASTM D3753, the wet well FRP laminate must be constructed to withstand or exceed two times the assuming loading on any depth of the wet well.
- F. The finished RFP laminate will have a BARCOL hardness of at least 90% of the resin manufacturer's specified hardness for the fully cured resin. The BARCOL hardness shall be the same for both interior and exterior surfaces.
- G. The wet well top flange shall have an outside diameter at least 4" greater than the inside diameter of the wet well. A four- or six-inch pattern shall accommodate the mounting of a cover with at least 0.25 inches in diameter 300 series stainless steel fasteners. Non corroding stales steel threaded insert shall be fully encapsulated with non-continuous mat or chopped-strand glass fiber reinforcement. The inserts shall have an offset tab to prevent stripping or spinning out when removing and reinserting cover fasteners.
- H. The top of the equipment chamber and valve box shall be provided with prefabricated aluminum access cover door with suitable lifting handles and locking hasp. When the cover is in the full open position, a hold open device shall be provided to prevent accidental closing.
- I. An anti-flotation base plate shall be provided with a minimum thickness of 1/2". The base plate shall be sized large enough to provide sufficient anchorage from backfill without the need for anchor bolts. The station manufacturer shall provide calculations verifying adequate anti-flotation.

GATE VALVES

- A. All gate valves shall be resilient seat complying with the requirements of AWWA C 504 and AWWA C 500 and as manufactured by Mueller co., or equal.

CHECK VALVES

- A. Check valves shall be swing-type, operated with heavy cast iron body fully bronze mounted, with rubber-faced bronze clapper disc secured to large diameter stainless steel shaft with bronze bushings. Working pressure shall be 175 psi. Check valves shall be Mueller, or equal.

EMERGENCY PUMP CONNECTION

- A. The pump discharge piping shall be provided with a 2" male cam lock emergency pump connection with isolation plug valve and dust cap sized as shown on drawing. Access to the cam lock fitting shall be from inside of attached valve vault.

SUBMERSIBLE WET PIT SEWAGE PUMPS

SUBMERSIBLE WET PIT GRINDER SEWAGE PUMPS

PART 1 - GENERAL SYSTEM DESCRIPTION

1.01 PERFORMANCE REQUIREMENTS

- A. Operating Conditions - Design: 50 GPM @ 24 FT TDH
- B. Maximum Motor HP: 3.0 HP
- C. Maximum Motor RPM: 3550 RPM
- D. Voltage: 208 Volt, 3 Phase

1.02 QUALITY ASSURANCE - REFERENCED STANDARDS:

- A. American Iron & Steel Institute (AISI)
- B. American Society for Testing and Materials (ASTM)
- C. Factory Mutual (FM)
- D. Hydraulic Institute Standards for Centrifugal, Rotary, and Recip Pumps (HI)
- E. National Fire Protection Agency (NFPA)
- F. National Electric Code (NEC)
- G. National Electrical Manufacturers Association (NEMA)
- H. Anti-Friction Bearing Manufacturers Association (AFBMA)
- I. International Standards Organization (ISO) - ISO9001

1.03 WARRANTY

- A. The pump manufacturer shall warrant the pump and motor to the Owner against defects in workmanship and materials for a period of one (1) year under normal use and service. A copy of each warranty shall be provided to the Owner at startup.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following are acceptable:
 - 1. KSB AMAREX NS 50-170/012YLG or Equal as determined by the Engineer by Addendum.

2.02 MATERIALS

A. SUBMERSIBLE SEWAGE PUMPS

1. Pump Case/Motor Housing: Cast Iron, ASTM A48, Class 40B
2. Impeller: Cast Iron, ASTM A48, Class 40B
3. Cutter/Grinder Ring: White Iron, AISI D3 (X210Cr12), with a minimum Brinell Hardness 600
4. Intermediate Casing: Cast Iron, ASTM A48, Class 40B
5. Discharge Base Elbow: Cast Iron, ASTM A48, Class 40B
6. Pump Claw: Cast Iron, ASTM A48, Class 40
7. Pump/Motor Shaft: Stainless Steel, ASTM A276 Type 420
8. O-Rings: Nitrile Rubber (NBR)
9. Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 304.
10. Lower Seal Faces: Silicon Carbide/Silicon Carbide
11. Upper Seal Faces: Carbon rotating/ Al_2O_3 stationary
12. Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)
13. Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316
14. Oil-all uses (seal lubrication, etc): Ecologically safe, paraffin or mineral base
15. Power/Control Cable Jacket: Waterproof synthetic rubber compound with non-wicking fillers.

2.03 POWER CABLE

- A. Provide 30 ft of power/control cable with each pump shall be suitable for the flexible connection of the submersible pumps, sized in accordance with NEC requirements and shall be Ozone, UV, weather, oil, and water resistant. The conductors shall be made of finely stranded copper. Each conductor shall be insulated by ethylene-propylene-rubber (EPR). An inner sheath of rubber shall also be utilized. The cable outer sheath shall be water and oil resistant and made of a special rubber compound on chlorinated rubber (CM) base. Each cable shall be rated for 600/1000V, a maximum conductor temperature of 90 °C (194 °F), and a maximum medium temperature of 40 °C (104 °F). The cable entry system shall be approved by Factory Mutual and rated for a submerged depth of 100 feet. A triple sealed cable entry seal design along with strain relief and a bend protection shall be provided. First the cable entry seal shall consist of an elastomer grommet compressed by two stainless steel washers, sealing the outside of the cable against the cable entry casing. Secondly, the entire end of the cable shall be sealed inside the cable entry housing using a non-shrink epoxy resin. Thirdly, a monolithic dam formed by either solder on bare stripped section or by an inserted Copper bushing shall seal each individual cable lead making sure that no entry of moisture is possible into the high-voltage motor terminal area even in the cable is damaged or severed below water level. Cable entries providing only simple rubber grommet (external cable jacket) seals will not be accepted. If a triple sealed cable entry as described is not utilized in the pump's design, then the pump shall have installed a separate moisture sensor mounted in the separated terminal area to shut the pump down should moisture approach the high voltage terminal area. A cable plug and receptacle shall be an integral design of the submersible pump allowing the mechanics to easily replace or service the pump without needing an electrician to disconnect any wires. The plug and receptacle eliminate re-wiring errors and ensures operator safety. The cable entry shall be approved by Factory Mutual.

2.04 TEMPERATURE PROTECTION

- A. Temperature monitors shall be embedded in the motor windings for use in conjunction with and supplemental to external motor overload protection. These temperature sensitive switches shall allow for direct integration with the motor control circuit to shut down the

pump if high temperatures are detected. The switches shall be normally closed rated for 250 VAC and a current of not less than 2 A. The temperature monitors shall automatically reset once motor temperature returns to normal. Set temperature monitors at levels recommended by pump manufacturer.

2.05 SEAL LEAK DETECTION

- A. Provide a detector in the motor's stator cavity which allows a control panel mounted relay to indicate leakage and de-energize the motor should leakage occur.

2.06 “PumpSafe” MOTOR SENSOR MONITORING RELAY

- A. The pump supplier shall furnish all relays required for monitoring all pump and motor sensors. The relays shall be installed by others in the motor control panel and properly wired in accordance with pump manufacturer's instructions. Relays shall mount in standard 12-pin socket bases (provided) and shall operate on available control voltage of 24-240 VAC. If relays require an input voltage that is not available in the motor control panel an adequate transformer (with fused input) shall be provided by the pump supplier. Relays shall have a power consumption of no more than 2.8 watt and shall be UL approved. Relays shall be modular in design, with each relay monitoring no more than two motor sensor functions.
- B. Each relay module shall include a dual color (red/green or amber/green) LED to indicate the status of each monitored sensor. Green will indicate “status OK”; red or amber will indicate a high temperature failure or alarm condition. A self-corrected fault will allow the relay output contacts to reset and cause the LED to change from a steady alarm indication to a flashing signal. The LED shall continue to flash until locally cleared, providing the operator an indication of a potential intermittent fault. Each relay shall also include a power-on LED and both “test” and “reset” pushbuttons.
- C. An independent fail-safe (switch on power loss) form-C output contact shall be included for each monitored sensor to provide a normally open / normally-closed dry contact to initiate a remote alarm device or shut down the motor. Contacts shall be rated for 3 amps at 240 VAC.
- D. A manual/automatic selector switch shall enable the operator to provide automatic reset of temperature alarms or require a manual reset from the push button on the face of the unit or from an external controller. Seal failure alarm is always automatically reset when the fault is cleared.
- E. The standard unit will include an RS-485 communications channel which may optionally be used to monitor status and/or fault archive information. Optional: MODBUS communications port can be added using a serial RS-485 protocol, over which a host controller may monitor pump status and / or fault archived information and remotely reset individual alarms.

PART 3 - FABRICATION

3.01 GENERAL

- A. Provide pumps capable of handling raw unscreened wastewater. Design pumps to allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts, or other fasteners.
- B. Provide a pump which connects to a permanently mounted discharge connection by simple downward motion, without rotation, guided by at least two non-load-bearing guides. Pump

guides (cable or pipe) shall be fastened to the discharge elbow to prevent dislodging when subjected to upward force. Final connection shall insure zero leakage between pump and discharge connection flange. Provide a discharge connection/ guide system so that no part of the pump bears directly on the floor of the wet well.

- C. Provide Type 316 stainless steel chain of sufficient length to lift pumps properly and safely from the wet well. All exposed cast iron and ferrous surfaces shall be cleaned of dirt and grease, sandblasted to near white finish, and coated with an anti-corrosion reaction primer. The pump shall then be coated with two-component thick coat paint, with an epoxy resin base, having at minimum 82% solids by volume. This coating shall be non-toxic and approved for both wastewater and water applications. The pump shall be of submersible centrifugal, grinder, single stage, volute casing, and end suction type capable of satisfying the specified performance requirements. The pump shall be designed as "back pull-out" such that the entire rotating assembly can be removed from the casing. The pump shall be suited for continuous operation in a submerged condition driven directly by a fully submersible dry squirrel cage induction motor. The impeller shall be fitted directly to the motor shaft. The head-capacity curve shall have a single flow rate for each pumping head value and have a continuously rising head characteristic from the specified design point to shut-off so as to ensure stability and control in both individual and / or parallel operation. The operating range of the pump, as specified, is defined by the maximum and minimum operating heads against which the pump will be required to operate.

3.02 MAJOR COMPONENTS

- A. Furnish major components (pump case, impeller, intermediate housing, and motor housing) of cast material as specified with smooth surfaces devoid of blow holes and other irregularities. Pump case design shall incorporate a centerline discharge for stability when mounted on the base elbow. Pump case and motor housing shall be cast in one only piece allowing for robust design and ease of maintenance. The pump manufacturer shall have at least 5 installations in Oklahoma for no less than 5 years and be capable of producing references of the installations.

3.03 PUMP CONSTRUCTION

- A. Major components (pump casing, impeller, intermediate housing, motor housing) shall be of at minimum ASTM A48 Class 35 cast iron with smooth surfaces devoid of blowholes and other irregularities. All exposed fasteners shall be ASTM A 276 Type 316Ti stainless steel. The cutter/grinder assembly shall be of at minimum a hardened white iron having a minimum Brinell Hardness Rating (BHR) of 750 - 1000.

3.04 IMPELLER

- A. The impeller shall be of, free-flow, vortex action design combined with a cutter/grinder assembly capable of reducing the sewage to a fine slurry and passing a minimum 3/8 inch solid. The cutter/grinder assembly shall be a hardened white iron having a minimum Brinell Hardness (BHR) of 600 to provide sufficient wear resistance and ensure a long-life span. The free-flow vortex action impeller, having curved vanes, shall be arranged behind the cutting device and capable of handling the fine slurry produced by the cutter. The impeller shall be a one-piece casting of the material specified. It shall be smooth, will finished, free from blowholes and imperfections, and be dynamically balanced. The impeller shall be securely fitted to the pump shaft in such a manner that it does not loosen or become detached if the pump is operated in the wrong direction as may happen by reversed flow or reversed motor connections.

3.05 SHAFT

- A. Provide common pump/motor shaft of sufficient size to transmit full driver output with a maximum deflection of 0.002 inches measured at the lower mechanical seal. The pump/motor shaft shall be of stainless steel or be completely isolated from the pumped media using a stainless-steel shaft sleeve. Do not use carbon steel as a shaft material without using a stainless-steel shaft sleeve.

3.06 SHAFT SEAL

- A. Provide two totally independent mechanical shaft seals, installed in tandem, each with its own independent single spring system acting in a common direction. The sealing shall not depend on the direction of rotation. The primary and secondary seal faces shall operate in a generously proportioned lubricant chamber that hydro-dynamically lubricates the seal faces to allow for extended periods of dry-running operation without the need for external seal lubrication or cooling systems. The lubricant chamber liquid shall be an environmentally friendly and nontoxic. The seal face material of the primary seal shall be of at minimum Silicon Carbide versus Silicon Carbide (SiC/SiC) for excellent hardness and chemical resistance across the entire "pH" range. The secondary seal shall be of Carbon versus Aluminum oxide (Carbon/Al₂O₃) for best emergency running properties. The seal faces must be of the solid material capable of being re-lapped. The seals shall require neither routine maintenance nor adjustment, but capable of being easily inspected and replaced. Mechanical seal metal parts shall be of CrNiMo-stainless steel. Seal shall be non-proprietary in design and shall be available from another vendor in addition to the pump manufacturer. Conventional double mechanical seals with a single or multiple spring acting in opposed direction, cartridge-type mechanical seals; seals with materials other than those specified; shall not be considered as adequate for this critical sealing area and will not be acceptable.

3.07 BEARINGS

- A. Furnish upper and lower antifriction bearings. The bearing system shall be adequately designed so as to be capable of handling all axial thrust loads plus any and all radial load. The bearings shall be sealed/shielded (permanently lubricated for life).

3.08 BOLTS AND NUTS

- A. All nuts or bolts exposed to the pumped media shall be of stainless steel as specified.

3.09 NAMEPLATE

- A. Each pump shall be provided with a stainless-steel nameplate firmly attached to the pumping unit. It shall be clearly and durable inscribed with the manufacturer's name, year of manufacture, pump-type, serial number, and principal rating data. For easy identification of the submerged pumping unit, a second equal nameplate shall be supplied along with documentation for attachment outside the wet well.

3.10 MOTOR

- A. Provide a motor which is squirrel cage, induction in design, housed in a completely watertight and air-filled chamber, with a min 1.15 service factor. The motor shall be adequately sized and rated for continuous operation at a maximum fluid temperature of 104° F (40° C) Allowable maximum submergence shall not be less than 100ft (30 m). The motor stator shall be wound using Class H monomer-free polyester resin insulation resulting in an overall motor rating of 311 Degrees F (155 degrees C), Class F insulation. The stator windings shall be trickle impregnated resulting in a winding fill factor of at least 95%. The use of a multiple step "dip and bake" type stator insulation method shall not be

acceptable. The rotor bars and short circuit rings shall be made of aluminum. The motor and pump set complete shall be designed and manufactured by the same company. Provide temperature protection and seal leak detection as described in section above. Provide adequately rated motor with sufficient surface area for ambient only cooling suited for the intermittent mode of operation in wet well wastewater applications, submerged or partially submerged, without damage. Motors containing di-electric oils used for motor cooling and/or bearing lubrication or motors where the pumped media or externally provided fresh water is directed through the motor shell for cooling are not acceptable.

- B. Provide motors which are FM listed for use in Class I Division 1 Groups C&D hazardous locations as defined by the National Electric Code.

3.11 CONTROL PANEL

- A. The electrical control equipment shall be mounted and wired in a NEMA type 3R painted steel enclosure. The enclosure should be equipped with drip shield and door gasket to prevent liquid or moisture from entering the panel. The hinged outer door shall be securely held closed with provisions for padlocking. All operating controls and indicators shall be mounted through a hinged inner swinging dead front door equipped with screw fittings to hold it securely closed. It shall not be necessary to expose any internal components to perform normal operating procedures.
- B. The Control panel shall include the following standard features:
 - 1. overload relays
 - 2. circuit breakers
 - 3. running lights
 - 4. H-O-A switches
 - 5. Alternator
 - 6. terminal strip
 - 7. time delay relay (For lag pump following power failure.)
 - 8. SENSAPHONE 400 Dialer
- C. The magnetic across-the-line starters with manual reset shall be provided with the melting alloy type overload relays for each phase to assure positive motor protection.
- D. The sewage pumps shall alternate automatically on the completion of each pumping cycle. One pump shall start as the lead pump and the other pump shall be started if the wet well level continues to rise to the start level of the lag pump. After each operating cycle, the lead and lag positions shall alternate. A manual selector switch shall be provided so that the operator can designate either pump to stay continuously in the lead position. Adjustable time relays shall be provided to prevent simultaneous starting of pumps after power failure.
- E. A heavy-duty, three-position, hand-off-automatic selector switch shall be flush-mounted on the inner door of the control center for the operation of each motor magnetic starter. This selector switch shall operate the starter when it is in either the "hand" position or the "automatic" position and the automatic control system is calling for the operation of the equipment in the manner as herein described.
- F. All control wiring within the control panel shall conform to the National Electrical Code. All wiring shall be neatly installed and run-in plastic raceways to prevent interference with any operating devices. All door mounted devices shall be labeled to functions with permanently attached nameplates and all internal wiring, terminal strips, etc. shall be properly identified for field connections and trouble shooting.
- G. The following options shall also be included:

1. running time meters
 2. motor heat sensor with light
 3. moisture sensor with light
 4. alarm light and horn
 5. Four alarm dry contacts
 6. lightning arrestor
 7. SENSAPHONE 400 Dialer
 8. 115 Volt convenience outlet (Mounted on outside of panel)
 9. UL 508 listing
- H. A solid state, phase sequence/failure and under voltage release relay shall be provided when a three-phase service is supplied, to ensure additional running protection for the pump motors. The relay shall be complete with an LED to indicate proper phase sequence, all phases in operation and voltage within limits. The relay shall also include an adjustable voltage monitor, be UL and CSA certified and be complete with automatic reset feature.
- I. Heavy-duty oil tight red "High Level" indicating light shall operate from the pump controller.
- J. A door mounted heavy-duty oil tight type pilot light operated from a respective starter auxiliary contact shall be provided to indicate a "pump running" condition. The pilot light shall have a replaceable screw-base bulb.
- K. Over temperature protection shall be provided in the control panels to operate in conjunction with the over temperature switch in each pump motor. The control shall provide pump lockout of operation upon occurrence of high temperature. The circuitry shall also include a red failure indicating light and reset push button on the inner panel for each pump for alarm indication and manual reset capability.
- L. Pump seal failure alarm lights shall be provided to indicate pump seal failure alarm condition of each sewage pump. These lights shall be operated by a contact closure from each pump.
- M. A weatherproof, high water alarm light assembly including a high impact resistant lexan red lens shall be included. The alarm light bulb shall be replaceable from inside the control panel without having to remove the weatherproof red lens from the panel. A solid-state flasher shall be included to strobe the alarm light for any of the specified alarm conditions.
- N. A thermal magnetic circuit breaker shall be supplied as branch circuit protection for each pump motor. The circuit breaker must have a minimum ampere interrupting capacity of (10,000-240 volt - 14,000-480 volt) symmetrical RMS amps. The circuit breakers shall be operable through the operator's door of the enclosure.
- O. The circuit breaker shall be properly sized to protect the control circuit conductors, motor starter and the motor against overcurrent due to short circuit or grounds.
- P. A full voltage non-reversing motor starter with manual reset, ambient compensated, 3 phase thermal overload relay shall be provided for each of the pumps listed below.
- Q. A wetwell level-responsive automatic pump controller/alternator and abnormal level alarm module shall be furnished to control two pumps in response to direct-acting liquid level sensors in the wetwell. The controller/alternator shall have float operation LED indicators and terminals for connection of a three-position alternator override switch (1-2, auto, 2-1). The controller shall provide independent on, common off operation of 2 pumps with high-level alarm. An internal solid-state alternator shall change the pump sequence after each cycle of operation. Each pump control circuit shall have field adjustable time delay relay to provide staggered start and prevent simultaneous starting of the pump motors after a power failure condition. The

controller/alternator/alarm module shall be a standard stocked unit and be UL 913 listed intrinsically safe.

3.12 MERCURY FLOAT CONTROL SYSTEM

- A. To control the operation of the pumps with variations of sewage level in the wet well, UL listed direct acting mercury float switches shall be provided.
- B. The floats shall consist of a chemical resistant polypropylene casing encapsulating a single pole mercury switch which activates when the longitudinal axis of the float is horizontal and deactivates when the level falls one inch below the actuation elevation.
- C. The float cable shall be of the PVC type STO #18 AWG 41 strand, 600 volt rated conductors. The float switches shall be suspended in the wet well by means of a stainless-steel cable and a plastic-coated cast-iron weight. The floats shall be secured to the cable by stainless steel fasteners to assure drift free mounting and convenient removal for level adjustment.

3.13 INSPECTION AND TEST

- A. Prior to assembly, all station components shall be inspected for quality and tested for proper function and freedom from defects. Upon completion, the station shall be connected to a test tank and an operational test performed under simulated field conditions while a final inspection is conducted. Any deficiencies or irregularities shall be corrected at the factory. Automatic controls shall be adjusted to approximate job requirements.

3.14 INITIAL OPERATION

- A. After the installation is complete, the manufacturer shall provide the services of a factory trained representative for a maximum period of one day to perform initial start-up of the pump station and to instruct the owner's operating personnel in the operation and maintenance of the equipment. Two (2) copies of O and M manuals will be supplied to the owner prior to initial operation.

3.15 GUARANTEE

- A. The manufacturer of the pump station shall guarantee for a period of (1) one year from the date station is placed into operation or eighteen months from date of shipment, whichever occurs first, that the entire station and all equipment therein shall be free from defects in design, materials and workmanship. In the event a component fails or is proven defective during the guarantee period, the manufacturer will provide a replacement part without cost, upon return of the defective part. Normal use items, such as grease, light bulbs, mechanical seals, packing, and belts are excluded.

END OF SECTION

SECTION 221343

SUBMERSIBLE FIBERGLASS LIFT STATION

- A. The contractor shall furnish and install one factory built automatic underground submersible sewage pumping station with attached valve pit. The principal items of equipment shall include submersible sewage pumps, slide away couplings with 2" SS guide rail system, 3" ductile iron internal piping, valves, fittings, duplex control panel, floats, for operation off 208 Volt, 3 Phase power, all as shown on the plans and specified herein.

EQUIPMENT CHAMBER SUBMERSIBLE

- A. The submersible equipment chamber shall be a vertical cylindrical configuration with a minimum inside diameter of 5 feet, and a minimum inside height of 13 feet, with attached valve pit including all necessary riser piping, valves, and fittings, as shown on the plans.
- B. The top of the equipment chamber and valve box shall be provided with prefabricated aluminum access cover door with suitable lifting handles and locking hasp. When the cover is in the full open position, a hold open device shall be provided to prevent accidental closing.
- C. An anti-flotation base plate shall be provided with a minimum thickness of 1/2". The base plate shall be sized large enough to provide sufficient anchorage from backfill without the need for anchor bolts. The station manufacturer shall provide calculations verifying adequate anti-flotation.

SUBMERSIBLE WET PIT SEWAGE PUMPS

PART 1 - GENERAL SYSTEM DESCRIPTION

1.01 PERFORMANCE REQUIREMENTS

- 1. Operating Conditions - Design: 50 GPM @ 13 FT TDH
- 2. Maximum Motor HP: 3 HP
- 3. Maximum Motor RPM: 1750 RPM

1.02 QUALITY ASSURANCE - REFERENCED STANDARDS:

- 1. American Iron & Steel Institute (AISI)
- 2. American Society for Testing and Materials (ASTM)
- 3. Factory Mutual (FM)
- 4. Hydraulic Institute Standards for Centrifugal, Rotary, and Recip Pumps (HI)
- 5. National Fire Protection Agency (NFPA)
- 6. National Electric Code(NEC)
- 7. National Electrical Manufacturers Association(NEMA)
- 8. Anti-Friction Bearing Manufacturers Association(AFBMA)
- 9. International Standards Organization (ISO) - ISO9001

1.03 GENERAL

- A. Provide pumps capable of handling raw unscreened wastewater. Design pumps to allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.
- B. Provide a pump which connects to a permanently mounted discharge connection by simple downward motion, without rotation, guided by at least two non-load-bearing guides. All

system components for guide cable systems, including cable, shall be supplied and warranted by the pump manufacturer. For guide pipe systems, the pipe shall be supplied and warranted by the installing contractor. Guide cable systems shall be suitable for proper operation when installed at up to 5-degree misalignment from vertical, pipe guides must be installed perfectly plumb and vertical. Intermediate guide supports (between upper bracket and discharge elbow connections) shall not be required for cable systems but MUST be supplied where needed to maintain perfect alignment for pipe guides. Final connection shall insure zero leakage between pump and discharge connection flange. Provide a discharge connection/ guide system so that no part of the pump bears directly on the floor of the wet well. Provide Type 316 stainless steel chain of sufficient length to properly and safely lift pumps from the wet well. All exposed cast iron and ferrous surfaces shall be cleaned of dirt and grease, sandblasted to near white finish, and coated with an anti-corrosion reaction primer. The pump shall then be coated with two-component thick coat paint, with an epoxy resin base, having at minimum 83% solids by volume. This coating shall be non-toxic and approved for both wastewater and water applications.

1.04 MAJOR COMPONENTS

- A. Furnish major components (pump case, impeller, intermediate housing, motor housing) of cast material as specified with smooth surfaces devoid of blow holes and other irregularities. Pump case design shall incorporate a centerline discharge for stability when mounted on the base elbow.

1.05 IMPELLER

- A. The impeller shall be of, free-flow, vortex action design, having multiple curved vanes capable of handling coarse solids of at minimum 3-inch size, long fibers, and gas and air inclusions as may be normally found in wastewater. Back vanes shall be provided to minimize axial loads.
- B. The impeller shall be a one-piece casting of the material as specified. It shall be smooth, well finished, free from blowholes and imperfections, and be dynamically balanced. The impeller shall be securely fitted to the pump shaft in such a manner that it does not loosen or become detached if the pump is operated in the wrong direction as may happen by reversed flow or reversed motor connections.

1.06 SHAFT

- A. Provide common pump/motor shaft of sufficient size to transmit full driver output with a maximum deflection of 0.002 inches measured at the lower mechanical seal. Machine the shaft of carbon steel (for maximum strength and motor efficiency) and isolate the shaft from the pumped media with a replaceable Type 420 stainless steel shaft sleeve under the lower mechanical seal. Do not use carbon steel as shaft material without a stainless-steel sleeve. If a sleeve is not used, machine the entire pump/motor shaft of ASTM A276 Type 420 stainless steel

1.07 SHAFT SEAL

- A. Provide two totally independent mechanical shaft seals, installed in tandem, each with its own independent single spring system acting in a common direction. Install the upper seal in an oil-filled chamber with drain and inspection plug (with positive anti-leak seal) for easy access from external to the pump. Provide seals requiring neither routine maintenance nor adjustment, but capable of being easily inspected and replaced. Provide seals which are non-proprietary in design, with replacements available from a source other than the pump manufacturer or its distributors. Do not provide seals with the following

characteristics: conventional double mechanical seals with single or multiple springs acting in opposed direction; cartridge-type mechanical seals; seals incorporating coolant circulating impellers, seals with face materials other than those specified

1.08 BEARINGS

- A. Furnish upper and lower bearings, single row (preferred) or double row as needed to provide a B10 life of, at minimum, 100,000 hours at all anticipated axial and radial loadings. Provide sealed/shielded (permanently lubricated) bearings. If open-type (non-shielded) bearings are used, provide re-lubrication ports with positive anti-leak plugs for periodic addition of lubrication from external to the pump

1.09 MOTOR

- A. Provide a motor which is squirrel cage, induction in design, housed in a completely watertight and air-filled chamber, with a min 1.15 service factor. The motor shall be adequately sized and rated for continuous operation at a maximum fluid temperature of 104° F (40° C). Allowable maximum submergence shall not be less than 100ft (30 m). The motor stator shall be wound using Class H monomer-free polyester resin insulation resulting in an overall motor rating of 311 Degrees F (155 degrees C), Class F insulation. The stator windings shall be trickle impregnated resulting in a winding fill factor of at least 95%. The use of a multiple step "dip and bake" type stator insulation method shall not be acceptable. The rotor bars and short circuit rings shall be made of aluminum. The motor and pump set complete shall be designed and manufactured by the same company. Provide temperature protection and seal leak detection as described in section above. Provide adequately rated motor with sufficient surface area for ambient only cooling suited for the intermittent mode of operation in wet well wastewater applications, submerged or partially submerged, without damage. Motors containing di-electric oils used for motor cooling and/or bearing lubrication or motors where the pumped media or externally provided fresh water is directed through the motor shell for cooling are not acceptable.
- B. Provide motors which are FM listed for use in Class I Division 1 Groups C&D hazardous locations as defined by the National Electric Code

1.10 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following are acceptable:
 - 1.KSB Model KRT F 80-200/24 XG
 - 2.Equal alternates as approved by the engineer prior to bid
- B. All products, whether named as "acceptable" or proposed as "equal" must fully comply with these specifications. Standard product must be modified, if required, for compliance. The contractor shall base his bid price on product offered by KSB, Inc. for purposes of determining the successful bidder on this project. The contractor may submit, with the bid, an alternate proposal with applicable deduct if any for supplying product other than KSB. Alternate proposals must include a clear statement of each point of difference between the proposed alternate product and these specifications. The Owner and Engineer reserve the right to reject any bid not based on KSB product.

1.11 MATERIALS

- A. SUBMERSIBLE SEWAGE PUMPS

1. Pump Case: Cast Iron, ASTM A48, Class 35B
2. Motor Housing: Cast Iron, ASTM A48, Class 35B
3. Impeller: Cast Iron, ASTM A48, Class 35B
4. Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B
5. Discharge Base Elbow: Cast Iron, ASTM A48, Class 35B
6. Pump/Motor Shaft: Carbon Steel, ASTM A576, Gr.1045 with replaceable ASTM A276
7. Type 420 shaft protection sleeve. (NOTE: If sleeve is not supplied, entire shaft is to be ASTM A276 Type 420 stainless steel)
8. Shaft Sleeve (if used): Stainless Steel, ASTM A276 Type 420
9. Wear Ring, case: Cast Iron, ASTM A48, minimum 200 Brinell
10. Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell
O-Rings: Nitrile Rubber (NBR)
11. Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti.
12. Lower Seal Faces: Silicon Carbide/Silicon Carbide
13. Upper Seal Faces: Silicon Carbide stationary/Carbon rotating
14. Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)
15. Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316
16. Oil-all uses (seal lubrication, etc): Ecologically safe, paraffin or mineral base
17. Power/Control Cable Jacket: Chloroprene with non-wicking fillers

1.12 POWER CABLE

- A. Provide 30 ft of power/control cable with each pump, suitable for submersible wastewater application, sized in accordance with NEC requirements. Provide cable terminal box on side of motor housing, with cable entry sealed to ensure that no entry of moisture is possible into the high-voltage motor/ terminal area even if the cable is damaged or severed below water level. Cable seal shall include a compressed rubber grommet to seal the cable exterior and epoxy fill to seal the interior passages. A strain relief device, in direct contact with both the cable and the cast iron entry housing, shall be provided. The cable entry shall be rated by Factory Mutual (or UL) for submerged operating depths to 85 feet.

1.13 TEMPERATURE PROTECTION

- A. Furnish temperature monitoring devices in motor windings for use in conjunction with and supplemental to external motor overload protection. Arrange controls to shut down pump should any of the monitors detect high temperature and automatically reset once motor temperature returns to normal. Set temperature monitors at levels recommended by pump manufacturer

1.14 SEAL LEAK DETECTION

- A. Provide a detector in the motor's stator cavity which allows a control panel mounted relay to indicate leakage into the motor. In addition, on motors 80HP and larger provide a stainless-steel float switch in a separate leakage collection chamber to indicate leakage past the inner mechanical seal prior to its entrance into either the motor stator cavity or the lower bearing. Electronic probes which depend on sensing resistance value changes in seal oil will not be acceptable as seal leak indicators.

1.15 "PumpSafe" MOTOR SENSOR MONITORING RELAY

- A. The pump supplier shall furnish all relays required for monitoring all motor sensors. The relays shall be installed by others in the motor control panel and properly wired in

accordance with pump manufacturer's instructions. Relays shall mount in standard 12-pin socket bases (provided) and shall operate on available control voltage of 24-240 VAC. If relays require an input voltage that is not available in the motor control panel an adequate transformer (with fused input) shall be provided by the pump supplier. Relays shall have a power consumption of no more than 2.8 watt, and shall be UL approved. Relays shall be modular in design, with each relay monitoring no more than two motor sensor functions.

- B. Each relay module shall include a dual color (red/green) LED to indicate the status of each monitored sensor. Green will indicate "status OK"; red will indicate a failure or alarm condition. A self-corrected fault will allow the relay output contacts to reset, and cause the LED to change from a steady alarm indication to a flashing signal. The LED shall continue to flash until locally cleared, providing the operator an indication of a potential intermittent fault. Each relay shall also include a power-on LED and both "test" and "reset" pushbuttons.
- C. An independent fail-safe (switch on power loss) form-C output contact shall be included for each monitored sensor to provide a normally-open / normally-closed dry contact to initiate a remote alarm device or shut down the motor. Contacts shall be rated for 5 amps at 120 volt.

1.17 WARRANTY

- A. The pump manufacturer shall warrant the pump, motor and guide system to the Owner against defects in workmanship and materials for a period of **seven (7) years** under normal use and service. If a guide cable system is used the pump manufacturer shall warrant the guide cable system (including guide cables and brackets) to the Owner against defects in workmanship and materials for a period of ten (10) years under normal use and service. Both pump manufacturer warranties shall be in published form, and shall apply to all similar units. A copy of each warranty shall be provided to the Owner at startup.

1.18 CONTROL PANEL

- A. The electrical control equipment shall be mounted and wired in a NEMA type 3R enclosure fabricated of painted steel and reinforced as required. The enclosure should be equipped with drip shield and door gasket to prevent liquid or moisture from entering the panel. The hinged outer door shall be securely held closed with provisions for padlocking. All operating controls and indicators shall be mounted through a hinged inner swinging dead front door equipped with screw fittings to hold it securely closed. It shall not be necessary to expose any internal components to perform normal operating procedures.
- B. The Control panel shall include the following standard features:

overload relays
circuit breakers
running lights
H-O-A switches
Alternator
terminal strip
time delay relay (For lag pump following power failure.)

The magnetic across-the-line starters with manual reset shall be provided with the melting alloy type overload relays for each phase to assure positive motor protection.

The sewage pumps shall alternate automatically on the completion of each pumping cycle. One pump shall start as the lead pump and the other pump shall be started if the wet well level continues to rise to the start level of the lag pump. After each operating cycle, the lead and lag positions shall alternate. A manual selector

switch shall be provided so that the operator can designate either pump to stay continuously in the lead position. Adjustable time relays shall be provided to prevent simultaneous starting of pumps after power failure. A heavy-duty, three-position, hand-off-automatic selector switch shall be flush-mounted on the inner door of the control center for the operation of each motor magnetic starter. This selector switch shall operate the starter when it is in either the "hand" position or the "automatic" position and the automatic control system is calling for the operation of the equipment in the manner as herein described.

All control wiring within the control panel shall conform to the National Electrical Code. All wiring shall be neatly installed and run in plastic raceways to prevent interference with any operating devices. All door mounted devices shall be labeled to functions with permanently attached nameplates and all internal wiring, terminal strips, etc. shall be properly identified for field connections and trouble shooting.

The following options shall also be included:

- phase monitor
- running time meters
- motor heat sensor with light
- moisture sensor with light
- alarm light and horn
- Four alarm dry contacts
- lightning arrester
- UL 508 listing

A running time meter measuring hours and tenths of hours of operation up to 99999.9 hours shall be furnished for each pump motor indicated. This shall be a 120 VAC device operating from the control voltage by an auxiliary contact of the motor starter or other run contact. The pump motor shall have short circuit and overload protection by means of properly sized motor starters and thermal magnetic molded case. Circuit breakers shall be provided as disconnect switches, protection against short circuits, or a ground for each pump motor. Circuit breakers shall have an interrupting rating of 14,000 amps at 460 volts and shall be U.L. listed. The operating mechanism shall allow manual switching and shall indicate when the breaker has tripped.

A solid state, phase sequence/failure and under voltage release relay shall be provided when a three-phase service is supplied, to ensure additional running protection for the pump motors. The relay shall be complete with an LED to indicate proper phase sequence, all phases in operation and voltage within limits. The relay shall also include an adjustable voltage monitor, be UL and CSA certified and be complete with automatic reset feature.

Heavy-duty oil tight red "High Level" indicating light shall operate from the pump controller.

Heavy-duty oil tight red "Low Level" indicating light shall operate from the pump controller.

A door mounted heavy-duty oil tight type pilot light operated from a respective starter auxiliary contact shall be provided to indicate a "pump running" condition. The pilot light shall have a replaceable screw-base bulb.

Over temperature protection shall be provided in the control panels to operate in conjunction with the over temperature switch in each pump motor. The control shall provide pump lockout of operation upon occurrence of high temperature. The circuitry shall also include a red failure indicating light and reset push button on the inner panel for each pump for alarm indication and manual reset capability.

Pump seal failure alarm lights shall be provided to indicate pump seal failure alarm condition of each sewage pump. These lights shall be operated by a contact closure from each pump.

A weather proof, high water alarm light assembly including a high impact resistant lexan red lens shall be included. The alarm light bulb shall be replaceable from inside the control panel without having to remove the weatherproof red lens from the panel. A solid-state flasher shall be included to strobe the alarm light for any of the specified alarm conditions.

A thermal magnetic circuit breaker shall be supplied as branch circuit protection for each pump motor. The circuit breaker must have a minimum ampere interrupting capacity of (10,000-240 volt - 14,000-480 volt) symmetrical RMS amps. The circuit breakers shall be operable through the operator's door of the enclosure.

The circuit breaker shall be properly sized to protect the control circuit conductors, motor starter and the motor against overcurrent due to short circuit or grounds.

A NEMA rated full voltage non-reversing motor starter with manual reset, ambient compensated, 3 phase thermal overload relay shall be provided for each of the pumps listed below.

An inner door mounted ground fault interrupter (GFI) type convenience receptacle rated at 15 amperes shall be supplied for the operating of trouble lights, drill, etc. It shall be protected by a separate 15 ampere trip rated circuit breaker.

A wetwell level-responsive automatic pump controller/alternator and abnormal level alarm module shall be furnished to control two pumps in response to direct-acting liquid level sensors in the wetwell. The controller/alternator shall have float operation LED indicators and terminals for connection of a three-position alternator override switch (1-2, auto, 2-1). The controller shall provide independent on, common off operation of 2 pumps with high-level alarm. An internal solid-state alternator shall change the pump sequence after each cycle of operation. Each pump control circuit shall have field adjustable time delay relay to provide staggered start and prevent simultaneous starting of the pump motors after a power failure condition. The controller/alternator/alarm module shall be a standard stocked unit and be UL 913 listed intrinsically safe.

WETWELL LEVEL FLOAT SWITCHES

Three floats will be provided to control the operation of the duplex pumps. As the liquid level rises in the wetwell the pumps stop float energizes first. As the level increases the lead start float energizes and starts the lead pump. With the lead pump running, the level decreases to the pumps stop float, and turns the pump off. When the pump stops, the alternator shall index so that the other pump starts on the next rise in level. If the level continues to rise with the lead pump running, the lag start float will energize and start the lag pump. Both lead and lag pumps shall operate together until the stop float is deenergized. A fourth float shall be provided to signal the High-Level alarm if the level continues to rise with both pumps running.

Provide two back up float(s) for redundant control and alarm. The float(s) shall have a molded polyethylene body, internal redundant polyurethane foam floatation, potted switch/cable connections and fine stranded AWG #18 cable with heavy-duty synthetic rubber jacket in lengths as required to run unspliced to the control panel.

The contractor shall furnish, install and wire the float switches as shown on the drawings. The float switches shall be individually suspended in the wetwell with weight kits. The float switch cables shall be suspended from a cable rack mounted to the top of the wetwell.

The pump level controller shall connect to the float switch level sensors through an intrinsically safe module. The module shall provide an intrinsically safe interface for the sensors located in a hazardous area rated Class 1 Group A, B, C and D and Class 2 Group E, F and G. The module shall contain an LED indicator providing visible indication of sensor actuation. The intrinsic safety barrier shall be UL listed.

GATE VALVES

All gate valves shall be resilient seat complying with the requirements of AWWA C 504 and AWWA C 500 and as manufactured by Mueller co., or equal.

CHECK VALVES

Check valves shall be swing-type, lever and spring operated with heavy cast iron body fully bronze mounted, with rubber-faced bronze clapper disc secured to large diameter stainless steel shaft with bronze bushings. Working pressure shall be 175 psi. Check valves shall be Mueller, or equal.

1.19 INSPECTION AND TEST

- A. Prior to assembly, all station components shall be inspected for quality and tested for proper function and freedom from defects. Upon completion, the station shall be connected to a test tank and an operational test performed under simulated field conditions while a final inspection is conducted. Any deficiencies or irregularities shall be corrected at the factory. Automatic controls shall be adjusted to approximate job requirements.

1.20 INITIAL OPERATION

- A. After the installation is complete, the manufacturer shall provide the services of a factory trained representative for a maximum period of one day to perform initial start-up of the pump station and to instruct the owner's operating personnel in the operation and maintenance of the equipment. Two (2) copies of O and M manuals will be supplied to the owner prior to initial operation.

1.21 GUARANTEE

- A. The manufacturer of the pump station shall guarantee for a period of one year from the date station is placed into operation or eighteen months from date of shipment, whichever occurs first, that the entire station and all equipment therein shall be free from defects in design, materials and workmanship. In the event a component fails or is proven defective during the guarantee period, the manufacturer will provide a replacement part without cost, upon return of the defective part. Normal use items, such as grease, light bulbs, mechanical seals, packing and belts are excluded.

SECTION 231126

FACILITY LIQUEFIED-PETROLEUM GAS PIPING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Valves.
 - 5. Pressure regulators.

1.02 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. For Piping Containing Only Vapor:
 - a. Piping and Valves: 125 psig unless otherwise indicated.
 - 2. For Piping Containing Liquid:
 - a. Piping between Shutoff Valves: 350 psig unless otherwise indicated.
 - b. Piping Other Than Above: 250 psig unless otherwise indicated.
 - c. Valves and Fittings: 250 psig unless otherwise indicated.
- B. LPG System Pressure within Buildings: One pressure range.less than 0.5 psig.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Welding certificates.
- C. Field quality-control reports.
- D. Operation and maintenance data.

1.04 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.01 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedules 40, Type E or S, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
 - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.

- a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
- B. PE Pipe: ASTM D 2513, SDR 11.
 - 1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
 - 2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
 - 3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
 - b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B with corrosion-protective coating covering.
 - c. Aboveground Portion: PE transition fitting.
 - d. Outlet shall be threaded suitable for welded connection.
 - e. Tracer wire connection.
 - f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
 - 4. Transition Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
 - b. Outlet shall be threaded suitable for welded connection.
 - c. Bridging sleeve over mechanical coupling.
 - d. Factory-connected anode.
 - e. Tracer wire connection.
 - f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

2.02 PIPING SPECIALTIES

- A. Appliance Flexible Connectors:
 - 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
 - 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
 - 3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
 - 4. Corrugated stainless-steel tubing with polymer coating.
 - 5. Operating-Pressure Rating: 0.5 psig.
 - 6. End Fittings: Zinc-coated steel.
 - 7. Threaded Ends: Comply with ASME B1.20.1.
 - 8. Maximum Length: 72 inches
- B. Quick-Disconnect Devices: Comply with ANSI Z21.41.
 - 1. Copper-alloy convenience outlet and matching plug connector.
 - 2. Nitrile seals.
 - 3. Hand operated with automatic shutoff when disconnected.
 - 4. For indoor or outdoor applications.
 - 5. Adjustable, retractable restraining cable.
- C. Y-Pattern Strainers:
 - 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
 - 2. End Connections: Threaded ends for NPS 2 and smaller.
 - 3. Strainer Screen: 40-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
 - 4. CWP Rating: 125 psig

- D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.03 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for LPG.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M.

2.04 MANUAL GAS SHUTOFF VALVES

- A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller for Vapor Service: Comply with ASME B16.33.
 - 1. CWP Rating: 125.
 - 2. Threaded Ends: Comply with ASME B1.20.1.
 - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 - 4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
 - 6. Service Mark: Valves 1-1/4 inch to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; a subsidiary of American Meter Company.
 - 2. Body: Bronze, complying with ASTM B 584.
 - 3. Ball: Chrome-plated bronze.
 - 4. Stem: Bronze; blowout proof.
 - 5. Seats: Reinforced TFE; blowout proof.
 - 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 - 7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 8. CWP Rating: 600 psig
 - 9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 - 10. Service: Suitable for LPG service with "WOG" indicated on valve body.
- D. Two-Piece, Regular-Port Bronze Ball Valves with Bronze Trim: MSS SP-110.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.

- c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; a subsidiary of American Meter Company.
- 2. Body: Bronze, complying with ASTM B 584.
 - 3. Ball: Chrome-plated bronze.
 - 4. Stem: Bronze; blowout proof.
 - 5. Seats: Reinforced TFE.
 - 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 - 7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 8. CWP Rating: 600 psig (4140 kPa).
 - 9. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 - 10. Service: Suitable for LPG service with "WOG" indicated on valve body.
- E. Bronze Plug Valves: MSS SP-78.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lee Brass Company.
 - b. McDonald, A. Y. Mfg. Co.
 - 2. Body: Bronze, complying with ASTM B 584.
 - 3. Plug: Bronze.
 - 4. Ends: Threaded or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 5. Operator: Square head or lug type with tamperproof feature where indicated.
 - 6. Pressure Class: 125 psig.
 - 7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 - 8. Service: Suitable for LPG service with "WOG" indicated on valve body.

2.05 PRESSURE REGULATORS

- A. General Requirements:
- 1. Single stage and suitable for LPG.
 - 2. Steel jacket and corrosion-resistant components.
 - 3. Elevation compensator.
 - 4. End Connections: Threaded for regulators NPS 2 and smaller.
- B. Line Pressure Regulators: Comply with ANSI Z21.80.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following:
 - a. Actaris.
 - b. American Meter Company.
 - c. Eclipse Combustion, Inc.
 - d. Fisher Control Valves and Regulators; Division of Emerson Process Management.
 - e. Invensys.
 - f. Maxitrol Company.
 - g. Richards Industries; Jordan Valve Div.
 - 3. Body and Diaphragm Case: Cast iron or die-cast aluminum.
 - 4. Springs: Zinc-plated steel; interchangeable.
 - 5. Diaphragm Plate: Zinc-plated steel.

6. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
7. Orifice: Aluminum; interchangeable.
8. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
9. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet and no pressure sensing piping external to the regulator.
10. Pressure regulator shall maintain discharge pressure setting downstream and not exceed 150 percent of design discharge pressure at shutoff.
11. Overpressure Protection Device: Factory mounted on pressure regulator.
12. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
13. Maximum Inlet Pressure

2.06 DIELECTRIC UNIONS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Capitol Manufacturing Company.
 2. Central Plastics Company.
 3. Hart Industries International, Inc.
 4. McDonald, A. Y. Mfg. Co.
 5. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
 6. Wilkins; Zurn Plumbing Products Group.
- B. Minimum Operating-Pressure Rating: 150 psig.
- C. Combination fitting of copper alloy and ferrous materials.
- D. Insulating materials suitable for LPG.
- E. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

2.07 SLEEVES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.08 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.02 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 58 and NFPA 54, the International Fuel Gas Code requirements for installation and purging of LPG piping.
- B. Install underground, LPG piping buried at least 36 inches below finished grade. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

1. If LPG piping is installed less than 36 inches below finished grade, install it in containment conduit.
- C. Install underground, PE, LPG piping according to ASTM D 2774.
- D. Steel Piping with Protective Coating:
 1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
 3. Replace pipe having damaged PE coating with new pipe.
- E. Install fittings for changes in direction and branch connections.
- F. Exterior-Wall Pipe Penetrations: Seal penetrations using steel or cast-iron sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Install pressure gage downstream from each service regulator. Pressure gages are specified in Division 23 Section "Meters and Gages for HVAC Piping."

3.03 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54, the International Fuel Gas Code for installation and purging of LPG piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install LPG piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Verify final equipment locations for roughing-in.
- L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

- N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- Q. Connect branch piping from top or side of horizontal piping.
- R. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment.
- S. Do not use LPG piping as grounding electrode.
- T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- U. Install pressure gage downstream from each line regulator. Pressure gages are specified in Division 23 Section "Meters and Gages for HVAC Piping."

3.04 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, or copper connector.
- B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

3.05 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full ID of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Ch. 22, "Pipe and Tube."
- F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

3.06 CONNECTIONS

- A. Install LPG piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- B. Install piping adjacent to appliances to allow service and maintenance of appliances.
- C. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliances and equipment. Install union between valve and appliances or equipment.
- D. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.07 LABELING AND IDENTIFYING

- A. Comply with requirements in Division 23 Section "Identification for HVAC Piping and Equipment" for piping and valve identification. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.08 FIELD QUALITY CONTROL

- A. Test, inspect, and purge LPG according to NFPA 58 and NFPA 54, the International Fuel Gas Code and requirements of authorities having jurisdiction.
- B. LPG piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.09 OUTDOOR PIPING SCHEDULE

- A. Underground LPG vapor piping shall be the following:
 - 1. Schedule 40, steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
 - 2. PE pipe and fittings joined by heat-fusion; service-line risers with tracer wire terminated in an accessible location.
- B. Aboveground LPG vapor piping shall be one of the following:
 - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
 - 2. Schedule 40, steel pipe with wrought-steel fittings and welded joints.
- C. Containment Conduit: Schedule 40, steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

3.10 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

- A. Aboveground, branch piping NPS 1 and smaller shall be the following:
 - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be the following:
 - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
 - 2. Schedule 40, steel pipe with wrought-steel fittings and welded joints.
- C. Underground, below building, piping shall be one of the following:
 - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
 - 2. Schedule 40, steel pipe with wrought-steel fittings and welded joints.

- D. Containment Conduit: Schedule 40, steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- E. Containment Conduit Vent Piping: Schedule 40, steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

3.11 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Valves for pipe NPS 2 and smaller at service meter shall be one of the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
 - 2. Bronze plug valve.
- B. Distribution piping valves for pipe NPS 2 and smaller shall be one of the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
 - 2. Bronze plug valve.
- C. Valves in branch piping for single appliance shall be one of the following:
 - 1. One-piece, bronze ball valve with bronze trim.
 - 2. Two-piece, full-port, bronze ball valves with bronze trim.
 - 3. Bronze plug valve.

END OF SECTION

SECTION 272000

ISS GENERAL SPECIFICATION FOR PREMISE WIRING

PART 1 GENERAL

- 1.01** The Premise Wiring System will be a copper and fiber optic based TIA/EIA 568-A compliant infrastructure for telephone and data communications. The CAT6 and fiber optic cabling shall be a Certified Systimax installation.

A. **Work Included**

The work covered under this section of the specifications consists of furnishing all labor, equipment, supplies and materials, and in performing all operations necessary for the fully complete installation of a Premise Wiring System in accordance with the specifications and the accompanying drawings, except as specifically noted as not included.

The work shall include, but not be limited to, the following:

1. Furnish and install cable and terminations as specified. Terminate all pairs.
2. Furnish and install Cat6 Patch Panels for termination of all network cabling.
3. Furnish and install cabinets or racks and extend AC power to the same.
4. Furnish and install telephone 110 blocks and surge protection.
5. Furnish and install all 110-C4 connecting blocks.
6. Furnish and install connectors and wall plates and terminate as specified.
7. Furnish and install all conduit, surface mounted raceway systems, back boxes, cover plates and connector housings for all communications systems outlet locations.
8. Furnish and install all bridge rings and or D-rings, J-hooks required to support the data and phone cable as specified here in.

B. **Acceptable Manufacturers**

These specifications are based on equipment manufactured by or for specific manufacturers. It is not the intent of these specifications to limit or restrict submission of proposals for products by other manufacturers but to maintain the current architecture and system integrity.

C. **Contractor Qualifications**

The installing contractor must have Systimax certification; have a minimum of 3 years previous experience in Premise Wiring and successfully implemented a Certified Systimax premise wiring system for three projects of similar size.

The installing Contractor's on site Project Manager shall be a registered Communications Distribution Designer (RCDD). Change of the Project Manager shall not be acceptable without prior approval from the owner's Project Architect.

D. **Functional Requirements**

This specification is built around a plenum rated copper and fiber optic cable based TIA/EIA 568-A compliant wiring infrastructure for telephone and data communications.

Data Cabling Copper- Provide TIA/EIA 568A Cat 6 compliant UTP four pair cable for locations noted herein. Do not exceed a total footage of 300' for any single run. Provide Cat 6 UTP, blue cable directly to local data port locations.

Voice Cabling Copper- Provide TIA/EIA 568A Cat 6 UTP, white cable directly to local phone port locations.

E. **Hardware**

Racks and Cabinets:

Data Rack shall meet these specifications.

- a. Four post open relay rack frame with 45 rack mount spaces with rear mounting rails.
- b. 25" minimum internal depth; to accept standard 19" wide equipment.
- c. Coordinate with the project electrical contractor or project lead to hardwire Electrical power from the proper circuit to the MDW rack mounted power strips.
- d. Provide surge protective AC power strips, shelves, etc. as required.
- e. Color: Black with matte (satin) finish.
- f. Provide Systimax Category 5E jumper cables for all active ports at this location. Install the cables using wire management in such a manner that there is no weight or stress on the connectors.
- g. Provide vertical and horizontal wire management for all data racks and cabinets.

Coordinate the installation of all racks with the owner's project lead or architect. Do not put any racks or cabinets in place without prior written approval of shop drawing submittals outlining the installation location and relation to walls and other cabinets. Installations that have not been approved and are incorrectly located will be moved at this contractor's expense.

Data Patch Panels – Terminate all Category 6 cabling on Systimax 5E compliant patch panels. Provide sufficient quantity of connection points for all Cat 6 active ports plus 10% open for spares. With each patch panel and associated switch location, provide a wire management panel with dimensions sufficient for the number of connections being supported.

Wall plates and connectors – Contractor will be responsible for providing all plates for communications boxes for interconnection to voice and data systems. Contractor will also be responsible for providing blank inserts for every communications face plate having available unused ports. Provide sample color to the owner for approval prior to purchase. Coordinate these plates and connectors with the existing components and match those components.

- a. Wall plates – Provide single gang Systimax flush mount wall plates for all communication box locations shown on drawings.
- b. Provide j-boxes and faceplates for surface mounted raceway.

Data Outlets – Terminate each data outlet with one blue Systimax Cat 6 snap in jack. Use the TIA/EIA T568B termination method. Provide blanks as necessary to fill all unused positions of the outlet.

Phone Termination System

- a. The telephone system will use Nortel BIX 110 type blocks for all terminations. Provide quantity of BIX type termination systems necessary to terminate all telephone system main equipment cabling.
- b. Provide a single ¾" ACX piece of plywood sized to accommodate the telephone system main equipment and twice the number of blocks required. This backboard must be painted with fire retardant, high quality white paint. Coordinate the location the backboard is to be installed with the owner. Mount all termination blocks and related telephone main equipment to this backboard.
- c. All ferrous hardware, screws and associated miscellaneous items will be galvanized or cadmium plated to prevent rust.
- d. Provide surge protection block with one plug-in gas type module for each incoming line. Each protection block will be grounded through a #8 conductor to a single star solid ground point. Protectors will be capable of clamping at a voltage of no more than (+) 15% of the sets operating voltage.

F. Execution

Perform this work in accordance with acknowledged industry standards and professional standards and practices, and the procedures specified herein. Furnish and install all materials, devices, components, and equipment for complete operational systems. Maintain a competent supervisor and supporting technical personnel, acceptable to the construction manager, during the entire installation. Change of the supervisor during the project shall not be acceptable without prior written approval from the owner, the construction manager and the architect.

Installers – These systems are to be installed only by contractors and personnel authorized to do so by the manufacturer of the equipment being provided.

All system equipment installations and tests are to be made by workmen skilled in the specific trade.

Installation – Provide and make connections to all specified products as indicated. Install all products in accordance with manufacturer's instructions. All installation practices and materials shall be fully TIA/EIA 568-A compliant.

Cable Identification – Blue for Data; White for Voice. (The jacks or outlets will follow the same standard.) All cable terminations shall be clearly and permanently labeled with the appropriate cable number. Labeling of the systems (voice and data), shall be provided on white labels with black typed characters. Hand written labels shall not be permitted. The installer will provide a sample of the labeling material planned for use at the facility with project submittals.

END OF SECTION

SECTION 311000

SITE CLEARING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees, vegetation to remain.
 - 2. Removing existing trees, vegetation.
 - 3. Clearing and grubbing.
 - 4. Stripping and stockpiling topsoil.
 - 5. Removing above- and below-grade site improvements.
 - 6. Disconnecting, capping or sealing, and removing site utilities.
 - 7. Temporary erosion and sedimentation control measures.
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for soil materials, excavating, backfilling, and site grading.

1.03 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.04 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.05 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings, according to Division 01 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.06 QUALITY ASSURANCE

- A. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.07 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

- A. Approved Engineered Fill Materials: Requirements for engineered fill soil materials are specified in Division 31 Section "Earth Moving."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 EXECUTION

3.01 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Refer to Stormwater Pollution Prevention Plan.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE PROTECTION

- A. Do not excavate within tree protection zones, unless otherwise indicated.
- B. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.04 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

3.05 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 12 inches below exposed subgrade.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.06 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Do not stockpile topsoil within tree protection zones.
 - 3. Stockpile surplus topsoil to allow for resspreading deeper topsoil.

3.07 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.08 DISPOSAL

- A. Disposal: Remove unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 311100
STORMWATER POLLUTION PREVENTION PLAN

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Stormwater Pollution Prevention Plan.
- B. Related Sections include the following:
 - 1. Division 02 Section "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 2. Division 02 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.03 QUALITY ASSURANCE

- A. Perform Work in accordance with Oklahoma Department of Transportation Standard Specifications for Highway Construction and Oklahoma Department of Environmental Quality. Maintain one copy on site.

PART 2 - PRODUCTS – Not applicable.

PART 3 - EXECUTION

3.01 EXECUTION

- A. Contractor shall review and familiarize himself with all aspects of the Stormwater Pollution Prevention Plan and perform work accordingly.
- B. Contractor is responsible for filling out and submitting the NOI along with the SWPPP to ODEQ for review and approval.
- C. Contractor is responsible for filling out and submitting the NOT upon completion of permanent erosion control measures.

END OF SECTION

Stormwater Pollution Prevention Plan (SWP3)

Authorization No. OKR10_____

For Construction Activities At:

Sapulpa Fire Department Training Facility

**15 Sahoma Lake Road
Sapulpa, Oklahoma 74066**

SWP3 Prepared For:

Sapulpa Fire Department

**Fire Chief James Vickrey
800 E Dewey Ave.
Sapulpa, Oklahoma 74066
918.224.3359**

SWP3 Prepared By:

Wallace Engineering

**Jordan Rodich, PE
123 North Martin Luther King Jr. Boulevard
Tulsa, Oklahoma 74103
918.584.5858**

SWP3 Preparation Date:

08 / 01 / 2025

Estimated Project Dates:

Project Start Date: 09 / 01 / 2025

Project Completion Date: 09 / 01 / 2026

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Section 1: Stormwater Team and Project/Site Information

1.1 Stormwater Team

Stormwater team is responsible for overseeing development of the SWP3, making any modifications to it, implementing and maintaining control measures, taking corrective actions when required, performing site inspection and monitoring, supervising pollution prevention and waste management activities, providing staff training, and communicating changes in the SWP3 to the people working on the site. The following personnel, along with their role and responsibility, will be part of the **stormwater team** for my construction site:

Team Leader (Name/Title/Telephone)	Roles & Responsibilities
TBD	Complete SP3 Implement and Maintain Control Measures Take Corrective Actions as Required Provide Staff Training and Communicate Changes

Team Member # 1 (Name/Title/Telephone)	Roles & Responsibilities
Jordan Rodich, PE	Prepare Preliminary SP3
Principal, Wallace Engineering	
918.584.5858	

Team Member # 2 (Name/Title/Telephone)	Roles & Responsibilities

Team Member # 3 (Name/Title/Telephone)	Roles & Responsibilities

Team Member # 4 (Name/Title/Telephone)	Roles & Responsibilities

[Repeat as necessary]

1.2 Nature of Construction Activity and Project Information

Project/Site Name and Address	
Project/Site Name: Sapulpa Fire Department Training Facility	
Project/Site Street/Location: 15 Sahoma Lake Road	
City: Sapulpa	County: Creek
State: Oklahoma	ZIP Code: 74066

General Description of the Project/Site: *The Sapulpa Fire Department Training Center is a project consisting of the renovation of one existing single story building, the construction of another single story building, and the construction of a fire training tower with associated drives, parking lots, sidewalks, and utilities.*

Estimated project start date:	09.01.2025
Estimated project end date:	09.01.2026
Total area of the construction site:	2.66 (acres)
Estimated area to be disturbed:	2.66 (acres)
Estimated current impervious area at the site:	2.08 (acres)
Estimated impervious area after construction:	1.26 (acres)
Pre-construction runoff coefficient of the site: 0.77	
Post-construction runoff coefficient of the site: 0.68	
Purpose of the Construction Project/Site: ☐ Residential ☐ Commercial ☐ Wind Farm ☐ Road/Bridge ☒ Other(s), please specify: Click here to enter text.	

Project Latitude/Longitude (for linear project, include latitude/longitude of start and end points)	
Latitude:	Longitude:
1. 35 ° 59 ' 48.3 " N (degrees, minutes, seconds)	1. 96 ° 07 ' 42.5 " W (degrees, minutes, seconds)
2. 35 . 9968 ° N (decimal)	2. 96 . 1285 ° W (decimal)
Latitude:	Longitude:
1. ____ ° ____ ' ____ " N (degrees, minutes, seconds)	1. ____ ° ____ ' ____ " W (degrees, minutes, seconds)
2. ____ . ____ ° N (decimal)	2. ____ . ____ ° W (decimal)
Method for determining latitude/longitude:	
☒ Google Maps ☐ EPA Website ☐ USGS topographic map ☐ GPS	

Description of soil type(s) and fill materials: <i>A geotechnical report was completed by Belongia Consultants, Inc. in July, 2020 by David Belongia, P.E. In the report, the subsurface conditions are generally described as follows:</i> • Stratum 1: 6" to 3' thick, fill - lean clay with trace of sand and gravel • Stratum 2: 3' to 4' thick, highly weathered sandstone. • Stratum 3: 4' to 9' lean clay, with sand and gravel • Stratum 4: 9' to 13' thick, shaley lean clay. • Stratum 5: 13' to 28.8' thick, highly weathered and weathered shale.
Description of slopes (describe existing slopes and note any changes due to grading or fill activities): The majority of the site is relatively flat with the exception of a portion of the site that rises to the north. The new grading will follow this slope and direction.
Description of drainage patterns (describe existing drainage patterns and note any changes due to grading or fill activities): The site is relatively flat with the exception of a portion of the site that rises to the north. The new grading will follow this slope and direction.
Description of existing or baseline vegetation on or immediately surrounding the project area: The current groundcover consists of an existing building, some concrete paving and some gravel surfaces. Some grass, brush and trees area also present on the site.
Climate/Rainfall Patterns - check the box that applies:
☐ (0-20" annual rainfall) ☐ (20" -30" annual rainfall)
☐ (30"-40" annual rainfall) ☒ (40" -50" annual rainfall)

(Note: Annual rainfall data can be found at the following link: <https://www.mesonet.org/index.php/weather/category/rainfall>)

1.3 Operators and Contractor's Contact Information

Operator(s) Information:		
Name: TBD		
Address: xxxxxxxx		
City: xxxxxxxx	State: XX	Zip Code: xxxxx
Operator's Point of Contact: xxxxx xxxxxxxxxxxx		
Telephone Number: xxx.xxx.xxxx		
Email address: xxxxxxxx@xxxxx.xxx	Fax number:	

(Repeat for multiple operators by copying and pasting the above rows. Specify are over which each operator controls if applicable.)

Contractor's Information:		
Name: TBD		
Address: xxxxxxxx		
City: xxxxxxxx	State: XX	Zip Code: xxxxx
Telephone Number: xxx.xxx.xxxx		
Email address: xxxxxxxx@xxxxx.xxx	Fax number:	

(If owner is a separate entity)

Sub-Contractor's Information:		
Name:		
Address:		
City:	State:	Zip Code:
Telephone Number:		
Email address:	Fax number:	

(If owner is a separate entity)

SWP3 Contact(s):	
SWP3 Contact Name (Primary): TBD	
Telephone number: xxx.xxx.xxxx	
Email address: xxxxxxxx@xxxx.xxx	Fax number:
SWP3 Contact Name (Backup):	
Telephone number:	
Email address:	Fax number:

1.4 Construction Support Activities *(if applicable)*

List of construction support activities that will be available at the construction project/site:

Type of Construction Support Activities ¹	Will be Present at the Construction Site?
Equipment Staging Yards	☒ Yes ☐ No
Material Storage Areas	☒ Yes ☐ No
Excavated Material Disposal Areas	☒ Yes ☐ No
Borrow Areas	☒ Yes ☐ No
Concrete Batch Plant ²	☐ Yes ☒ No
Asphalt Plant ²	☐ Yes ☒ No

(Note-1: Locate all the construction support activities on the site map. **Appropriate/additional** controls & measures are required for construction support activities. Support activities should not be located within the watershed of an Outstanding Resources Water (ORW).

Note-2: Include Section 8 if you have Concrete Batch Plant and/or Asphalt Plant as construction support activities at your construction site. Exclude/delete Section 8 if you don't have Concrete Batch Plant and/or Asphalt Plant at your construction site.)

1.5 Sequence of Construction Activities

Installation and removal of Stormwater Control Measures may be phased along with construction. For example, if the western half of a project is not being disturbed in the first phase of construction, the western perimeter silt fence may not be needed until just prior to disturbance.

No.	Sequence of Construction Activities	Estimated Start Date	Duration (in Days)
1.	Construction access/entrance to site, construction routes, areas designated for equipment parking/staging area	XX.XX.XX	XX
2.	Silt fences, berm or similar control measures as perimeter control	XX.XX.XX	XX
3.	Land clearing and grading, site preparation (cutting, filling, and grading, sediment traps, barriers, diversions, drains, surface roughening)	XX.XX.XX	XX
4.	Runoff control diversions, perimeter dikes, water bars, outlet protection	XX.XX.XX	XX
5.	Inlet/outlet protection, sediment traps and/or sediment basin	XX.XX.XX	XX
6.	Runoff conveyance system, stabilize stream banks, storm drains, channels, inlet and outlet protection, slope drains	XX.XX.XX	XX
7.	Surface stabilization - temporary and permanent hydraulic mulching, hydroseeding, straw mulch, sodding, riprap	XX.XX.XX	XX
8.	Building construction - buildings, utilities, paving etc.	XX.XX.XX	XX
9.	Landscaping and final stabilization, top-soiling, trees and shrubs, permanent seeding, mulching, sodding, riprap	XX.XX.XX	XX
10.	Removal of all structural controls where applicable	XX.XX.XX	XX
11.	Cessation of construction related pollutant-generating activities.	XX.XX.XX	XX

1.6 Allowable Non-Stormwater Discharges

List of allowable non-stormwater discharges that will be present at the construction site:

No.	Type of Allowable Non-Stormwater Discharge	Likely to be Present at Construction Site?
1.	Fire hydrant flushing	☐ Yes ☒ No
2.	Waters used to wash vehicles and equipment	☒ Yes ☐ No
3.	Water used to control dust	☒ Yes ☐ No
4.	Potable water including uncontaminated water line flushing	☒ Yes ☐ No
5.	Routine external building wash down	☐ Yes ☒ No
6.	Pavement washing waters	☒ Yes ☐ No
7.	Uncontaminated air conditioning or compressor condensate	☒ Yes ☐ No
8.	Uncontaminated, non-turbid discharges of ground water or spring water	☐ Yes ☒ No
9.	Foundation or footing drains	☐ Yes ☒ No
10.	Landscape Irrigation	☒ Yes ☐ No
11.	Discharges from emergency fire-fighting activities	☒ Yes ☐ No
12.	Uncontaminated construction dewatering water	☒ Yes ☐ No

*(Note: You are required to identify the likely locations of these allowable non-stormwater discharges on your **site maps**.)*

Section 2: Site Description and Site Map

2.1 Receiving Waters/Discharge Information

Receiving Water body's Information: Stormwater discharges from this construction project will flow to the following receiving water body(ies).

No.	Name of the Receiving Waters	Is this surface water listed as impaired?	Cause of Impairment ¹	Has a TMDL ² been completed?	TMDL Pollutant(s)
1.	Rock Creek	☐ Yes ☒ No		☐ Yes ☐ No	
2.		☐ Yes ☐ No		☐ Yes ☐ No	
3.		☐ Yes ☐ No		☐ Yes ☐ No	
4.		☐ Yes ☐ No		☐ Yes ☐ No	
5.		☐ Yes ☐ No		☐ Yes ☐ No	

(Note: Name of the receiving waters and cause of impairment and TMDL information can be found at the DEQ GIS website using the following link: <http://gis.deq.ok.gov/maps/>)

¹ If you discharge to impaired water that is impaired for **Sediment and/or Turbidity and located within 1 mile**, you are required to comply with the additional requirements in Part 3.5.1 of OKR10 permit.

² Total Maximum Daily Load (TMDL)

Does the project/site discharge stormwater to an **Aquatic Resource of Concern (ARC)** or an **Outstanding Resource Water (ORW)**?

☐ Yes ☒ No,

If yes, I must comply with specific buffer requirements (see Part 3.5.2 of OKR10 permit) and stabilization deadlines requirements (see Part 3.5.2 of OKR10 permit).

Does the project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?

☒ Yes ☐ No

If yes, what is the name of the MS4 operator? City of Sapulpa

Note: See OSEQ's list of MS4 Operators [here](#)

2.2 General Location Map

Provide a general location map (e.g., DEQ GIS Data Viewer or U.S. Geological Survey (USGS) quadrangle map or aerial image from the internet) with enough detail to identify the location of your facility and all receiving waters for your stormwater discharges within one mile of the construction site (see Part 4.3.5.D of the OKR10 permit).

☒ A **general location map** is included in **Attachment A** of this SWP3.

2.3 Site Map

SWP3 includes a legible site map or series of site maps/erosion and sediment control plans showing all the features (see also Part 4.3.5 of OKR10 permit) listed below:

- Pre-construction topographic view including vegetation, showing the location of
 - ✓ all surface water bodies within one mile of the site, including wetlands (indicating if they are impaired, in a TMDL watershed, it identified by the state as an ARC or ORW); and
 - ✓ direction of stormwater flow across the construction site (i.e., use arrows to show which direction stormwater will flow);
- Boundaries of property and identify the location(s) of:
 - ✓ Earth-disturbing activities;
 - ✓ boundary lines of any natural buffers;
 - ✓ approximate slopes before and after major grading activities,
 - ✓ areas of steep slopes, surface water crossings, Structures and other impervious surfaces upon completion of construction
- Locations of all structural and nonstructural controls/BMPs identified in the plan including showing the location of:
 - ✓ construction entrance/exit,
 - ✓ concrete wash-out area,
 - ✓ construction support activity areas such as locations of off-site materials, waste, borrow area, or equipment storage area;
 - ✓ stockpiled materials (sediment, topsoil, etc.), and
 - ✓ locations of all potential pollutant-generating activities;
- Locations where stormwater and allowable non-stormwater will be discharged off-site (should be continuously updated); sampling locations if project is subject to numeric limitations due to presence of an asphalt batch plant;
- Location where stabilization practices are expected to occur; Areas where final stabilization will be accomplished and no further construction phase permit requirements apply.

☒ The **site map or series of maps** for this facility can be found in **Attachment B** of this SWP3 showing all the above-mentioned features in Part 2.3 of this SWP3.

Section 3: Construction Site Pollutants

3.1 Pollutant-Generating Activities

Potential sources of sediment to stormwater runoff:

Clearing and grubbing operations, grading and site excavation operations, vehicle tracking, topsoil stripping and stockpiling, landscaping operations

Potential sources of pollutants, other than sediment, to stormwater runoff:

- Combined Staging Area - small fueling activities, minor equipment maintenance, sanitary facilities, and hazardous waste storage.
- Materials Storage Area - general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
- Construction Activity - paving, curb/gutter installation, concrete pouring/mortar/stucco, and building construction
- Concrete Washout Area

3.2 List of Potential Pollutants

List of Pollutants that can be present at the construction site:

(Note: Check all the boxes applicable to your project site; include additional pollutants, if necessary, in the space below)

Check	Materials/ Chemicals	Stormwater Pollutants	Location at the Site
☒	Dirt from land disturbed area	Sediment	General Site
☒	Pesticides (insecticides, fungicides, herbicides, rodenticides)	Chlorinated hydrocarbons, organophosphates, carbonates, arsenic	Planters and Trees
☒	Fertilizer and dirt/soil	Nitrogen, phosphorous	Sod, Planters and Trees
☒	Plaster	Calcium sulphate, calcium carbonate, sulfuric acid	Building Construction
☒	Cleaning solvents	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	Building Construction
☒	Asphalt	Oil, petroleum distillates	Parking Lot
☒	Concrete	Limestone, sand, pH, chromium	Curbs and Sidewalks
☒	Glue, adhesives	Polymers, epoxies	Building Construction
☒	Paints	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic	Building Construction
☒	Curing compounds	Naphtha	Building Construction

☒	Wood preservatives	Stoddard solvent, petroleum distillates, arsenic, copper, chromium	Building Construction
☒	Hydraulic oil/fluids	Mineral oil	General Site
☒	Gasoline	Benzene, ethyl benzene, toluene, xylene, MTBE	General Site
☒	Diesel Fuel	Petroleum distillate, oil & grease, naphthalene, xylenes	General Site
☒	Antifreeze/coolant	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	General Site
☒	Sanitary toilets	Bacteria, parasites, and viruses	Portable Facilities
☐			
☐			
☐			
☐			

Section 4: Compliance with Federal and State Requirements

4.1 Endangered or Threatened Species Protection

Eligibility Criterion

Under which criterion listed in NOI is the construction project/site eligible for coverage under the OKR10 permit?

☒ A

☐ B

☐ C

☐ D

☐ E

For reference purposes, the eligibility criteria listed in Part 1.2.2.E.2 of OKR10 permit are as follows:

- Criterion A.** The proposed construction site or land disturbing activity is not located within any of the corridors of the Federal or State identified Aquatic Resources of Concern, and further investigation is not required.
- Criterion B.** The proposed construction site or land disturbing activity is located within a corridor of a Federal or State identified Aquatic Resources of Concern. The SWP3 describes this area in relation to the identified water or watershed and specifies the measures to be employed to protect the endangered or threatened species or their critical habitat (see Parts 3.5.2 and 10 and Addendum A).
- Criterion C.** If one of those eligibility criteria under Part 1.2.2.E.2.b, d, or e cannot be met, applicants may use Addendum I Buffer Guidance to evaluate alternatives of buffer requirements and select equivalent sediment controls or contact DEQ for further consultation.
- Criterion D.** The applicant's federally approved construction activities are authorized by the appropriate Federal or State agency and that authorization addresses the Endangered Species Act Section 7 consultation for the applicant's stormwater discharge or stormwater discharge-related activities. Applicants selecting option d must include documentation from USFWS (U.S. Fish and Wildlife Service) or a qualified biologist that demonstrates Section 7 consultation has been completed. The SWP3 must comply with any conditions resulting from that consultation.
- Criterion E.** The applicant's stormwater discharges and stormwater discharge-related activities were already addressed in another operator's certification of eligibility under Part 1.2.2.E.2.a, b, c, or d. that included the applicant's project area. By certifying eligibility under Part 1.2.2.E.2.e, the applicant agrees to comply with applicable measures or controls upon which the other operator's certification under Part 1.2.2.E.2.b, c, or d. was based.

Note: For Criterion B, C, D, or E, you may subject to comply with additional requirements.

4.2 Federal, State, or Local Historic Preservation Laws

Will stormwater discharges or stormwater discharge-related activities (e.g., catch basin, pond, culver, etc.) affect a property that is protected by Federal, State, or local historic preservation laws? ☐ Yes ☒ No

If yes, describe any actions taken to mitigate those effects: [Click here to enter text.](#)

Describe how this determination was made: [Click here to enter text.](#)

4.3 TMDL Requirements

If a TMDL or watershed plan or local compliance plan has been approved for the waterbody, SWP3 must include all the applicable requirements in consistent with the TMDL or watershed plan or local compliance plan that are applicable to the stormwater discharges from the construction site.

Does the construction project/site discharge stormwater into a receiving stream that has an approved TMDL or watershed plan or local compliance plan?

☐ Yes ☒ No

If yes, is there any waste load allocations (WLAs) and/or the TMDL's associated implementation plan requirements applicable to stormwater discharges from the construction activity?

☐ Yes ☐ No

If yes, SWP3 must incorporate any limitations, conditions, or requirements applicable to permittee's discharges to ensure that the waste load allocations (WLAs) and/or the TMDL's associated implementation plan will be met within any timeframe established in the TMDL report or watershed plan. Monitoring and reporting of the discharges may also be required as appropriate to ensure compliance with the TMDL or watershed plan.

Note: *Approved TMDL reports or watershed plans can be downloaded from DEQ's website at <https://www.deq.ok.gov/water-quality-division/watershed-planning/tmdl/>*

Does the construction project/site discharge stormwater to the **Lake Thunderbird watershed**?

☐ Yes ☒ No

If **yes**, the following control measures will be used to meet the Lake Thunderbird TMDL requirements:

- ☐ **Additional Pollutant Prevention or Discharge Monitoring** - You must comply with any additional requirements established by the local MS4 municipalities;
- ☐ **Sites of Five Acres or Larger** - You must submit a copy of SWP3 to DEQ for review;
- ☐ **Vegetated Buffer** - You must ensure that a vegetated buffer of at least 100 feet is retained or successfully established or planted between the area disturbed and all receiving streams. If the nature of the construction activity or the construction site makes a buffer impossible, you must provide equivalent controls. There are exceptions from this requirement for water crossings, limited water access, and stream restoration authorized under a CWA Section 404 permit;
- ☐ **Sediment Basins** - For all drainage locations serving 5 or more acres disturbed at one time, you must use a temporary or permanent sediment basin and/or sediment traps to minimize sediment discharges;
- ☐ **Site Inspection** - You must conduct site inspections once every 7 calendar days at a minimum, and within 24 hours of a storm event of 0.5 inches or greater and within 24 hours of a discharge caused by snowmelt;
- ☐ **Corrective Actions** - You must implement corrective actions (e.g., repair, modify, or replace any stormwater control used at the site, clean up and dispose of spills, releases, or other deposits, or remedy a permit violation) by no later than 7 calendar days from the time of discovery. If it is infeasible to complete the installation or repair within 7 calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7 calendar days timeframe and document your schedule for installing the stormwater controls and making them operational as soon as practicable after the 7 days timeframe;
- ☐ **Stabilization** - You must initiate stabilization measures immediately whenever earth-disturbing activities have permanently or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. You are required to complete the stabilization activities within 7 calendar days after the permanent or temporary cessation;
- ☐ **Soil Nutrient Testing** - You are required to conduct a soil nutrient test to determine actual nutrient needs before applying fertilizer on your site. Fertilizer application must be limited to that necessary to meet actual needs on the site.
- ☐ Describe any additional measures or controls you will implement to comply with the Lake Thunderbird TMDL requirements: [Click here to enter text.](#)

Section 5: Stormwater Control Measures

The purpose of the implementation of different stormwater pollution controls is to reduce pollutants in the stormwater and the volume of stormwater leaving the construction site. All pollution control measures will be selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. Installation and removal of Stormwater Control Measures may be phased along with construction.

5.1 Stabilization Practices

Type of Site Stabilization Practice(s) that will be implementing at the construction project/site (select all that apply):

☒ Temporary ☒ Permanent ☒ Vegetative ☒ Non-Vegetative

Deadline to Initiate Stabilization: I shall initiate stabilization measures **immediately** whenever earth-disturbing activities have permanently or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.

Deadline to Complete Stabilization:

- ☒ I shall complete stabilization measures **as soon as practicable** but no later than 14 calendar days after the initiation of soil stabilization.
- ☐ My project/site is located in ARC/discharge to ORW; I shall complete stabilization measures **as soon as practicable** but no later than 7 calendar days after the initiation of soil stabilization.

Temporary Non-Vegetative Stabilization: The following **non-vegetative** controls/BMPs will be used to temporarily stabilize exposed portions of the construction site (*select all that apply*):

☐ Rolled erosion control products such as geotextiles, blankets or plastic cover ☐ Soil binders

☐ Straw mulch ☐ Wood mulch ☐ Compost Blanket ☒ Other, silt dike and rock dams

If any of the above-referenced controls is used to temporarily protect areas that are being vegetative stabilized, one of the effective non-vegetative cover will be used to stabilize any such exposed portions of our site.

Temporary Vegetative Stabilization: The following **vegetative** controls will be used to temporarily stabilize the exposed portions of the construction site (*select all that apply*):

☒ Hydroseeding with mulch ☐ Sod ☐ Other, _____

Permanent Vegetative Stabilization: The following **vegetative** controls will be used to permanently stabilize the exposed portions of the construction site (*select all that apply*):

☐ Hydroseeding with mulch ☒ Sod ☐ Planted vegetation ☐ Other, _____

One of the following criteria will be used for vegetative cover:

- Provide a vegetative cover which covers 70% or more of the vegetation prior to commencing earth-disturbing activities and no large bare areas (10 square feet).
- Immediately after seeding, you must select, design, and install non-vegetative erosion controls that provide cover (such as **straw mulch, jute matting, and straw blankets**) to the area while vegetation is being established.

Stabilization Practices Record: A record of the dates when grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be included with the plan. ☒ Yes ☐ No

If No, explain: _____

A record of the dates when grading activities occur will be documented using the Grading & Stabilization Activity logs in **Attachment-I** of this SWP3.

5.2 Natural Buffers and/or Equivalent Sediment Controls

Buffer Compliance Alternatives

Are there any **waters of the State** that are located within 50 feet (or 100 feet if the construction site is located in ARC or ORW or Lake Thunderbird Watershed) of your construction disturbances as measured from the top of the bank to the disturbed portions of your site? ☐ Yes ☒ No

*(Note: **Waters of the State** means all named/unnamed stream, creeks, rivers, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, storm sewers and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private located within the boundary of Oklahoma State.)*

Construction Project/Site Location (check one only):

- ☒ My construction project/site isn't located in **ARC** or discharge to **ORW**
- ☐ My construction project/site is located in **ARC or ORW**
- ☐ My construction project/site is located in Lake Thunderbird Watershed or in a watershed with established TMDL that has Wasteload Allocation (WLA) for Construction Project

Check the compliance alternative that you have chosen:

- ☐ I will provide and maintain a 50 feet (or **100 feet** if the construction site is located in ARC or ORW or Lake Thunderbird Watershed) undisturbed natural buffer.

(Note (1): You must show the boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls.)

- ☐ I will provide and maintain an undisturbed natural buffer that is less than 50 feet (or **100 feet** if the construction site is located in ARC or ORW or Lake Thunderbird Watershed) and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to required undisturbed natural buffer.

(Note (1): You must show the boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls.)

- i. Width of natural buffer to be retained: _____
- ii. Method used to determine equivalent sediment load reduction:
 - ☐ Addendum-H: Buffer Guidance in OKR10 permit
 - a. Soil Type: _____
 - b. Buffer Vegetation: _____
 - OR
 - ☐ Site-specific calculation
 - a. Model or other tool used to estimate sediment load reductions: _____
 - b. Results of calculations: _____
 - c. Description of additional erosion and sediment controls used: _____
- ☐ It is infeasible to provide and maintain an undisturbed natural buffer of any size; therefore, I will implement erosion and sediment controls that will achieve the sediment load reduction equivalent to a 50 feet (or 100 feet if the construction site is located in ARC or ORW or Lake Thunderbird Watershed) undisturbed natural buffer.
 - i. Rationale for concluding that it is infeasible to provide and maintain a natural buffer of any size: _____
 - ii. Method used to determine equivalent sediment load reduction:
 - ☐ Addendum-H: Buffer Guidance in OKR10 permit
 - a. Soil Type: _____
 - b. Buffer Vegetation: _____
 - OR
 - ☐ Site-specific calculation
 - a. Model or other tool used to estimate sediment load reductions: _____
 - b. Results of calculations: _____
 - c. Description of additional erosion and sediment controls used: _____
- ☐ I qualify for one of the following exceptions (*select one that applies to your project/site*):
 - ☐ There is no discharge of stormwater to the surface water that is located 50 feet from my construction disturbances.
 - ☐ No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.
 - ☐ Buffer disturbances are authorized under a CWA Section 404 permit.

- ☐ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail).

5.3 Structural Controls/Best Management Practices (BMPs)

The table below listed Structural and Non-Structural Stormwater Controls/Best Management Practices (BMPs) that should be considered for every construction project/site to meet **the non-numeric technology-based effluent limitations, water-based effluent limitations and applicable numeric technology-based effluent limitations**.

The following BMPs will be used or implemented at the construction project/site (*select all that apply*):

Erosion Controls		Sediment Controls	
☒	Preservation of Existing Vegetation	☒	Silt Fence
☐	Vegetative Swales	☒	Silt Dikes
☒	Hydroseeding with Mulch	☐	Compost Sock
☐	Hydraulic Mulch	☒	Check Dam
☐	Wood Mulching	☐	Fiber Rolls
☐	Straw Mulching	☒	Storm Drain Inlet Protection
☐	Compost Blankets	☐	Outlet Protection/Velocity Dissipation Devices
☐	Soil Binders	☐	Earth Berms and Drainage Swales
☐	Geotextiles and Mats	☐	Sand Bag Barrier
☒	Soil Preparation/Roughening	☐	Gravel Bag Berm/Barrier
☒	Sod	☐	Sediment Basin
☐	Streambank Stabilization	☐	Sediment Trap
Tracking Controls		☐	Rip-rap
☒	Stabilized Construction Entrance/Exit	☐	Gabions
☐	Stabilized Construction Roadway	Non-Structural Controls	
☐	Entrance/Exit Tire Wash	☐	Phasing and Scheduling
☒	Street Sweeping and Vacuuming	☒	Dust Suppression
Other Structural Controls		☒	Good Housekeeping
☐	Vegetative Buffers	☒	Preventive Maintenance
☐	Non-Vegetative Stabilization	☒	Preservation of Top Soil
☒	Concrete Waste Management	☐	Minimizing Soil Compaction
☐	Dewatering Controls	☐	Fertilizer Application Management
☐		☐	
☐		☐	

Did you **include specifications** of all the selected structural BMPs with the SWP3?

☒ Yes ☐ No, if no, explain the reason: [Click here to enter text.](#)

5.3.1 Perimeter Control

Permit requirement: *You must install controls along the perimeter of your site that will receive stormwater from your construction activities. (Examples of perimeter controls include, but are not limited to, **silt fences, fiber rolls, filter berms, and temporary diversion dikes.**)*

To comply with Part 3.3.1.C of OKR10 permit, I shall use the following type of perimeter control(s) at my construction site:

Perimeter Control Description: Silt fences will be installed along the **South, West and East** perimeters of the site and around the topsoil stockpile. Silt fences will be installed by excavating a 12-inch-deep trench along the line of proposed installation. Steel posts supporting the silt fence will be spaced 6 to 8 feet apart and driven securely into the ground; a minimum of 18 to 20 inches deep. The silt fence will be fastened securely to the steel posts with wire ties spaced every 24 inches at the top, mid section, and bottom of the wooden post. The bottom edge of the silt fence will extend across the bottom of the trench and the trench will be backfilled and compacted to prevent storm water and sediment from discharging underneath the silt fence. For design specifications, see plan sheets

Installation Date(s): Xxx _____

Maintenance Requirements: Silt fences will be inspected weekly and immediately after storm events to ensure it is intact and that there are no gaps where the fence meets the ground or tears along the length of the fence. If gaps or tears are found during the inspection, the fabric will be repaired or replaced immediately. Accumulated sediment will be removed from the fence base if it reaches one-third the height of the silt fence and hauled off-site for disposal at the local landfill. If accumulated sediment is creating noticeable strain on the fabric and the fence might fail from a sudden storm event, the sediment will be removed more frequently. Before the fence is removed from the project area, the sediment will be removed. The anticipated life span of the silt fence is 6 months and will likely need to be replaced after this period.

5.3.2 Sediment Track-Out

Permit requirement: *You must minimize the track-out of sediment onto off-site streets, other paved areas, and sidewalks from vehicles exiting your construction site.*

To comply with the Part 3.3.1.D of OKR10 permit, I shall use the following type of sediment track-out control at my construction site:

Track-Out Control/Construction Entrance/Exit Description: A stabilized construction entrance will be installed **at North Spocogee Street**. The stabilized construction entrance shall be 20'x50' and shall consist of 8" minimum AASHTO M43, Size No. 2 (2.5" to 1.5") crushed stone.

Installation Date(s): xxx _____

Maintenance Requirements: The exit will be inspected weekly and after storm events or heavy use. The exit will be maintained in a condition that will prevent tracking or flowing of sediment onto

North Spocogee Street and Sahoma Lake Road. This could require adding additional crushed stone to the exit. All sediment tracked, spilled, dropped, or washed onto any adjacent street will be swept up immediately and hauled off-site for disposal. Sediment will be swept from the anti-tracking pad at least weekly, or more often if necessary. If excess sediment has clogged the pad, the exit will be topdressed with new crushed stone. Replacement of the entire pad might be necessary when the pad becomes completely filled with sediment. The pad will be reshaped as needed for drainage and runoff control. Broken road pavement as a result of construction activities on roadways immediately adjacent to the project site will be repaired immediately. The stone anti-tracking pad will be removed before the subgrade of pavement is applied to the parking lot. The removed stone and sediment from the pad will be hauled off-site and disposed.

Track-out Removal/Cleaning:

- ☒ I shall remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal.
- ☒ I shall remove the deposited sediment by the **end of the same work day** in which the track-out occurs or by the end of the next work day if track-out occurs on a non-work day where sediment has been tracked-out from my construction site onto the surface of off-site streets, other paved areas, and sidewalks.
- ☒ I am prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance (unless it is connected to a sediment basin, sediment trap, or similarly effective control).

5.3.3 Stockpiled Sediment or Soil

Permit requirement: *You must control discharge of stormwater from Stockpiled Sediment or Soil.*

To comply with the Part 3.3.1.E of OKR10 permit, I shall use temporary perimeter sediment barrier such as berms, dikes, fiber rolls, silt fences, sandbag, or gravel bags to protect from contact with stormwater (including run-on).

I shall use appropriate cover or temporary stabilization such as mulching or hydro-mulching to avoid direct contact with precipitation or to minimize sediment discharge.

Installation Date(s): xxx_____

Maintenance Requirements: I shall not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, and/or surface water.

5.3.4 Minimize Dust

Permit requirement: *You must minimize the generation of dust to avoid pollutant discharges to the extent feasible through application of water or other dust suppression techniques.*

Dust Control Description: To comply with the permit requirement and to avoid any pollutants, particularly soil/sediment, from being discharged into surface waters, I shall apply/spray water using spray truck or sprinklers to minimize the generation of dust from my construction site.

5.3.5 Minimize the Disturbance of Steep Slopes

Permit requirement: *You must minimize the disturbance of steep slopes (i.e., slopes of 40% or greater).*

Steep Slope Control Description: _____

Installation Date(s): _____

Maintenance Requirements: [Click here to enter text.](#)

5.3.6 Preserve Topsoil

Permit requirement: *You must preserve native topsoil on your site, unless infeasible; you must stockpile and reuse it in areas that will be stabilized with vegetation.*

Topsoil Control Description: I shall preserve native topsoil on our site as much as possible and practicable.

Maintenance Requirements: I shall stockpile and reuse preserved top soil in areas that will be stabilized with vegetation.

5.3.7 Minimize Soil Compaction

Permit requirement: *In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed, you must minimize soil compaction.*

Soil Compaction Control Description: In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed, I shall restrict vehicle and/or equipment use in these areas to avoid or minimize soil compaction.

5.3.8 Protection of Storm Drain Inlets

Permit requirement: *If you discharge to a storm drain inlet that you have access to, you must install protection measures that remove sediment from your stormwater discharge. (Examples of inlet*

*protection measures include **fabric filters, sandbags, or gravel barriers** -- Install inlet protection measures that remove sediment from your discharge prior to entry into the storm drain inlet.)*

Storm Drain Inlet Control Description: ODOT Temporary Silt Dikes will be installed around all new inlets on site. The silt dike will discharge over the dike through a riser outlet with a trash rack. The trap will discharge into the storm sewer. For design specifications, see plan sheets, Attachment B. The temporary silt dikes around the existing inlets are to be constructed prior to site clearing activities. Other silt dikes will be installed as needed.

Installation Date(s): xxx_____

Maintenance Requirements: I shall clean, or remove and replace the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, I shall remove the deposited sediment by **the end of the same work day** in which it is found or by the end of the following work day if removal by the same work day is not feasible.

5.3.9 Constructed Stormwater Conveyance Channels

*(Note: Examples of velocity dissipation devices include **check dams, sediment traps, riprap, or grouted riprap at outlets**, include design specifications)*

Stormwater Conveyance Channel Control Description: [Click here to enter text.](#)

- ☐ If Silt dikes/Check dams are **used in series**, I shall space them at appropriate interval so that ***the base of the upstream dike is at the same elevation as the top of the next downstream dike.*** Spacing of silt dikes/check dams is indicated on the site plans of SWP3.

Installation Date(s): _____

Maintenance Requirements: all check dams/rip-rap will be inspected during facility inspection for erosion, undermining or breeches. Any damage will be repaired immediately.

5.3.10 Sediment Basins

Permit requirement: *For common drainage locations that serve an area of 10 or more acres disturbed at one time (or 5 acres if it is located in ARC), a temporary (or permanent) sediment basin shall be provided where attainable until final stabilization of the site.*

Are 10 or more (or 5 or more if site discharges to an ORW/ARC) acres draining to a common point?

☐ Yes ☒ No

Is a sediment basin included in the project? ☐ Yes ☒ No

If yes, what is the designed capacity for the storage?

☐ 3600 cubic feet per acre: _____

OR

☐ 2-year, 24 hour storm: _____

OR

☐ Other criteria were used to design basin: _____

If no, explain why no sedimentation basin was included and describe required natural buffer areas and other controls implemented instead: _____

Maintenance Requirements: I shall keep the sediment basin in effective operating condition and remove accumulated sediment to maintain at least ½ of the design capacity of the sediment basin at all times.

5.3.11 Dewatering Practices

Permit requirement: *You are prohibited from discharging stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation associated with a construction activity, unless such waters are first effectively managed by appropriate controls.*

Dewatering Practice Description:

1. Do not discharge visible floating solids or foam
2. Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering wastewater is found to contain these materials
3. To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. In no case will surface waters be considered part of the treatment area
4. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 3.3.1.K
5. With backwash water, either haul away for disposal or return it to the beginning of the treatment process
6. Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications

Installation Date(s): xxx _____

5.3.12 Other Stormwater Controls

Temporary Stabilization

Topsoil stockpiles and disturbed portions of the site, where construction activity temporarily ceases for at least 14 days, will be stabilized immediately with temporary seed and mulch. The temporary seed shall be as outlined:

Plant Type	per acre	per 1000 s.f.	Planting Date	Seeding Depth
Annual Ryegrass	40 lbs	0.9 lbs	09/05-11/30	0.25 inch
Elbon Rye	2 bu	3.0 lbs	08/15-11/30	2 inches
Wheat	2 bu	3.0 lbs	08/15-11/30	2 inches
Oats	3 bu	2.5 lbs	08/15-11/30	2 inches
Sorghums	60 lbs	1.4 lbs	03/01-09/15	2 inches
Sudan Grass	60 lbs	1.4 lbs	04/01-09/15	2 inches

Prior to seeding, subgrade shall be loosened to a depth of 2 to 3 inches and 450 pounds of 10-20-10 fertilizer applied to each acre to be stabilized. Soil shall be tested and lime treated if required. Mulch shall be used on all slopes greater than 5 percent or as needed. Area shall be watered daily or as needed to maintain adequate soil moisture until the plants exceed 1 inch in height.

Permanent Stabilization

Disturbed portions of the site where construction activities permanently cease shall be stabilized no later than 14 days after the last construction activity. The permanent stabilization shall consist of Bermuda grass, solid slab, sodding or seeding. Prior to sodding, subgrade shall be loosened to a depth of 2 to 3 inches and 450 pounds of 10-20-10 fertilizer applied to each acre to be stabilized. Soil shall be tested and lime treated if required. After sodding, each area shall be watered daily, or as required, to maintain adequate soil moisture until final acceptance. Placement and maintenance shall be in accordance with ODOT Specifications and City specifications.

Section 6: Pollution Prevention Controls

6.1 Spill Prevention and Responses

Spill Prevention

Is there an existing Spill Prevention Control and Countermeasure (SPCC) plan developed for the site?

☐ Yes ☒ No, if yes, keep a copy of the SPCC plan onsite with this SWP3.

If No, describe procedures for quickly stopping, containing, and cleaning up spills, leaks, and other releases:

Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

1. Good Housekeeping: The following good housekeeping practices will be followed onsite during the construction project.
 - a. An effort will be made to store only enough products required to do the job.
 - b. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
 - c. Products will be kept in their original containers with the original manufacturer's label.
 - d. Substances will not be mixed with one another unless recommended by the manufacturer.
 - e. Whenever possible, all of a product will be used up before disposing of the container.
 - f. Manufacturers' recommendations for proper use and disposal will be followed.
 - g. The site supervisor will inspect daily to ensure proper use and disposal of materials.
2. Hazardous Products: These practices are used to reduce the risks associated with hazardous materials.
 - a. Products will be kept in original containers unless they are not resealable.
 - b. Original labels and material safety data will be retained; they contain important product information.
 - c. If surplus must be disposed of, manufacturers', or local and State recommended methods for proper disposal will be followed.

Product Specific Practices

The following product specific practices will be followed onsite:

1. Petroleum Products

All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers and clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.
2. Fertilizers

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

3. Paints

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system, but will be properly disposed of according to manufacturer's instructions, or State and local regulations.

4. Concrete Trucks

All washing and back flushing of concrete mixer trucks will be done in an area established by the project superintendent. The area shall be fully contained by the use of silt fence or earth dikes. The debris left from the back flushing of concrete mixer trucks shall be removed from the site and disposed of according to local regulations.

5. Equipment and Vehicle Washing

Per section 3.3.3.A.4 of OKR10, soaps, detergents, or solvents used in vehicle and equipment washing may not be discharged from the construction site (see Appendix E).

6. Sanitary Waste – All sanitary waste will be collected from the portable units a minimum of three times per week by a licensed sanitary waste management contractor, as required by local regulation. Portable units shall be staked securely to the ground to prevent turnover and spills from the unit.

Spill Control Practices

1. In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:
 - a. Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
 - b. Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include, but not be limited to, brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
 - c. All spills will be cleaned up immediately after discovery. In the event of a petroleum based, or other hazardous substance spill (paints, fertilizers, cement), immediately prevent further discharge from hazardous source. Stop the spill from spreading by using an absorbent material such as Kitty Litter. Protect the contaminated area by placing a tarp and diverting all runoff from that area. Contact the proper authorities as to how to dispose of the contaminated materials.
 1. Small spills - stop the spill from spreading by using an absorbent material such as kitty litter. Protect the contaminated area by placing a tarp and diverting all runoff from that area. Contact the proper authorities as to how to dispose of the contaminated materials.

2. Large spills - stop the spill from spreading by using appropriate equipment to create a containment area, i.e. berms, sand bags, etc. Defer to ODOT for large scale cleanup and decontamination procedures.
- d. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- e. Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.
- f. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
- g. The site supervisor will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.

Emergency Spill Notification

In case of a toxic or hazardous material spill, notify:	Phone Numbers
Project Manager/Team Leader	Xxx.xxx.xxxx
Emergency – Fire, Police	911
County Local Emergency Planning Committee (LEPC)	
DEQ Spill Reporting Hotline (24-hr)	800-522-0206
NRC (National Response Center)	800-424-8802

6.2 Waste Management Procedures

All wastes generated at the construction site, including, but not limited to, clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste, shall be prevented from being discharged to Waters of the State. The following BMP measures will be used to handle trash disposal, hazardous or toxic waste, sanitary waste, recycling, and proper material handling:

- ☒ **Trash Dumpsters:** dumpsters will have a secure watertight lid, will be closed during precipitation or not in use, and will be placed away from stormwater conveyances and drains, and meet all federal, state, and municipal regulations. Only trash and construction debris from the site will be deposited in the dumpster. No construction materials will be buried on site.

- ☒ **Hazardous Waste Containment:** hazardous waste materials will be stored in appropriate and clearly marked containers and segregated from other non-waste materials.
- ☒ **Portable Toilets:** portable toilets will be secured to prevent tipping, located away from stormwater inlets and conveyances. These toilets will be anchored with the ground to prevent any tipped or knocked over and/or sand bags around to ensure wastewater doesn't mix with the stormwater.
- ☒ **Recycling Bins/Dumpsters:** wood pallets, cardboard boxes, and other recyclable construction scraps will be disposed of in a designated dumpster for recycling. The dumpster will have a secure watertight lid, will be closed during precipitation or not in use, and will be placed away from stormwater conveyances and drains and meet all local and state solid-waste management regulations.
- ☒ **Proper Material Handling:** containers will be tightly sealed when not in use, and excess paint shall be disposed of according to Oklahoma requirements and manufacturer's recommendations. Minimum amounts of fertilizer, as recommended by the manufacturer, will be used. Upon application the fertilizer will be worked into the soil to limit exposure to stormwater. Contents of partially used bags will be transferred to a sealable plastic bin, and then stored in a covered area.
- ☒ **Good housekeeping:** construction debris, trash, and other floatable material will be collected and prevented from becoming a pollutant source on the following schedule:
TBD
- ☒ **Minimizing exposure:** construction products, materials, chemicals, and wastes will be stored in such a way that they are prevented from coming into contact with stormwater (e.g., plastic sheeting or temporary roofs).
- ☐ **Designated concrete washout:** all concrete washwater will be directed into a leak-proof container or pit. The container or pit will be designed so that no overflows can occur due to inadequate sizing or precipitation and located as far away as possible from surface waters and stormwater inlets or conveyances. I shall use *compacted clay liner, 20 mil synthetic liners or similar equivalent liners* to make the pit leak proof.
- ☐ Other: [Click here to enter text.](#)

6.3 Prohibited Discharges

The following discharges from the construction project/site are prohibited under the permit, and are considered a violation should any occur.

- Wastewater from the washout of concrete, unless managed by an appropriate control as described in Part 3.3.3.B.4 of OKR10 permit;
- Wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials, unless managed by an appropriate control as described in Part 3.3.3.B.4 of OKR10 permit;
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
- Soaps, detergents or solvents used in vehicle and equipment washing; and
- Toxic or hazardous substances from a spill or other release.

☒ In the event that one of these above-mentioned discharges occurs, I will take corrective action consistent with Part 7.4 of this SWP3.

Section 7: Procedures and Documentations

7.1 Maintenance and Repair

I shall ensure that all pollution prevention controls installed in accordance with the requirements of OPDES Construction General Permit OKR10 and remain in effective operating condition and are protected from activities that would reduce their effectiveness. All structural BMPs (i.e. all the Erosion & Sediment Controls) that require a repair of any kind (due to normal wear and tear, or as a result of damage) or require maintenance in order for the control to continue operating effectively shall be required/maintained in accordance with the OPDES Construction General Permit requirements. At a minimum, maintenance will be performed in the following specific instances:

- ☒ for perimeter controls, whenever sediment has accumulated to 1/3 or more the above-ground height of the control (Part 3.3.1.C of OKR10 permit requires at 1/2);
- ☒ where sediment has been tracked-out onto the surface of off-site streets or other paved areas (Part 3.3.1.D of OKR10 permit);
- ☒ for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (Part 3.3.1.J of OKR10 permit); and
- ☒ for sediment basins, as necessary to maintain at least ½ of the design capacity of the basin (Part 3.3.1.L of OKR10 permit).
- ☒ for all structural BMPs, repair of any kind (due to normal wear and tear, or as a result of damage) or maintenance will be performed in order for the BMPs to continue operating effectively.

7.2 Approval from Local Office

- ☒ I shall check/already checked local offices (city and county offices) to ensure SWP3 for my construction activities is consistent with requirements of the City and/or County Offices.
- ☒ I shall update the SWP3, if necessary, to make consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits, or stormwater management site plans or site permits approved by local officials for which I received written notice.

7.3 Inspections

(Note: An inspector must be knowledgeable in the principles and practices of erosion and sediment controls and pollution prevention to assess conditions at the construction site that could impact stormwater quality, and the effectiveness of any stormwater controls.)

Person Responsible for Inspections: The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that the person who conducts inspections is a “qualified person.” A “qualified person” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention. The Contractor’s site representative, will be the primary person responsible for inspections. The Contractor, at his discretion, delegates inspection responsibilities to other construction staff members who are qualified

General Procedures: During each inspection, the following areas of the construction site will be inspected:

- Cleared, graded, or excavated areas of the site;
- Stormwater controls (e.g., perimeter controls, silt dikes, check dams, sediment basins, inlets, exit points etc.) and pollution prevention practices (e.g., pollution prevention practices for vehicle fueling/maintenance and washing, construction product storage, handling, and disposal, etc.) at the site;
- Material, waste, or borrow areas covered by the permit, and equipment storage and maintenance areas;
- Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge;
- Areas where stormwater flows within the site, stormwater discharge points;
- Identify any other incidents of non-compliances observed; and
- Areas where stabilization has been implemented.

Inspection Frequency:

- ☐ **Once every 7 calendar days** and within 24 hours of the end of a storm event of 0.5 inches or greater, since my project is located in **ARC** or discharge to an impaired water.
- ☒ **Once every 14 calendar days** and within 24 hours of the end of a storm event of 0.5 inches or greater.

Reductions in Inspection Frequency (if applicable):

- For the reduction in inspections resulting from stabilization: **Once per month** for the portion of the site that was stabilized per Part 3.3.2 of OKR10 permit.

Rain Gauge to Measure Qualified Storm Event of 0.5 inches or greater:

Location of the Rain Gauge: at job trailer in an uncovered area

Inspection Report Forms:

Inspection Report Form has been prepared in accordance with the requirements of Part 4.3.13 of OKR10 permit. A copy of the Inspection Report Form that will be used during construction of this project included in **Attachment E** of this SWP3.

7.4 Corrective Action

General: Corrective actions are actions taken to modify, replace, or reinstall any stormwater control used at the site; clean up and dispose of spills, releases, or other deposits; or remedy a permit violation.

Corrective actions are triggered only for specific, more serious conditions. For any of the following conditions, a new or modified control shall be installed **no later than 7 calendar days** from the discovery:

- A required stormwater control was never installed or was installed incorrectly, or not in accordance with the corresponding OKR10 permit requirement;
- A stormwater controls needs to be repaired or replaced (beyond routine maintenance required in Part 4.3.12 of OKR10 permit);
- A stormwater control is not effective enough for the discharge to meet applicable water quality standards;
- A prohibited discharge (Parts 3.1 and 3.3.3.A of OKR10 permit) is occurring or has occurred; or
- DEQ or MS4 Operator requires corrective action as a result of permit violations found during a inspection.

- ☒ I shall immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. I shall conduct corrective action(s) for each of the above-mentioned triggering conditions should they occur at my construction site.

Person Responsible for Corrective Actions: The Contractor's site representative will be the primary person responsible for corrective action. The Contractor may, at his discretion, delegate corrective action responsibilities to other construction staff members who are qualified.

Corrective Action Schedule/Specific Action Frequency:

- ☒ I shall perform all Corrective Actions (modify, replace, or reinstall), if identified, **no later than 7 calendar days from** the time of discovery.

Corrective Action Forms:

Corrective Action Report Form has been prepared in accordance with the requirements of Part 4.3.14 of OKR10 permit. A copy of the Corrective Action Report Form that will be used during construction of this project included in **Attachment F** of this SWP3. Completed Corrective Action Forms are to be kept at the construction site or at an easily accessible location.

7.5 Employee Training

Person Responsible for Staff Training

Name: TBD

Title: _____

Staff Training Requirements

Prior to the start of earth-disturbing activities, personnel with the following responsibilities shall be trained to understand all the requirements of this SWP3:

- Proper design, installation, and maintenance/repair of stormwater controls.
- The proper application and storage of chemicals.
- Proper Inspection and corrective actions.

At minimum, all Personnel must be trained to understand:

- The location of all stormwater controls and the maintenance requirements for each of the control.
- The pollution prevention requirements outlined in this SWP3.
- When and how to conduct inspections, record applicable findings and take necessary corrective actions.

Frequency/Schedule of Employee Training: _____

(Note: Employee training shall be conducted at least annually or more often if employee turnover is high).

Employee training records and documentations shall be maintained using the **Employee Training Report** located in **Attachment G** of this SWP3.

7.6 Notification of Change of Ownership (NCO) for Individual Lots

- ☐ SWP3 will include documents if lots are sold and transfer to other new operator(s), (see Part 2.2.3 of OKR10 permit). Documents will be included under **Attachment N** of this SWP3.
- ☒ NCO is not applicable to my project/site.

7.7 Sub-contractor Certifications

- ☐ Sub-contractor certification forms will not be used for this project.
- ☒ DEQ's sub-contractor certification form (**Attachment J**) will be used and kept onsite with the SWP3.
- ☐ A form other than DEQ's form will be used and kept onsite with the SWP3.

7.8 Record Keeping and Record Retention

- ☒ I shall retain copies of the SWP3 and all reports required by the 2017 OKR10 permit, and records of all data used to complete the NOI to be covered by this permit, for a **period of at least 3 years** from the date that the site is finally stabilized.

7.9 Posting a Notice

- ☒ I shall post a notice near the main entrance of the construction site or in a publicly accessible location as outlined by Section 4.2.2 of the OKR10 with the following information:
- The OPDES permit number for the project or a copy of the NOI if a permit number has not yet been assigned;
 - The name and telephone number of a local contact person;
 - A brief description of the project; and
 - Location of the SWP3

Section 8: SWP3 Certification

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.

Name: _____ **Title:** _____

Signature: _____ **Date:** _____

Section 9: SWP3 Modifications

I shall maintain records of modifications that will be made per Part 4.3.19 of OKR10 permit, and other reasons in [Attachment H](#) of this SWP3:

Section 10: SWP3 Attachments & Additional Documentation

The following documentations are attached to the SWP3:

Attachment A – General Location Map

[A copy of general location map is included in Attachment A.](#)

Attachment B – Site Map(s)

[Copy of the site map\(s\) is/are included in Attachment B.](#)

Attachment C – 2017 OKR10

[Note: it is helpful to keep a printed-out copy of the 2017 OKR10 so that it is accessible to you for easy reference. However, you do not need to formally incorporate the entire 2017 OKR10 into your SWP3. As an alternative, you can include a reference to the permit and where it is kept at the site.](#)

Attachment D – Notice of Intent (NOI)

[A copy of your NOI is included in Attachment D.](#)

Attachment E – Inspection Report

[A copy of the Routine Facility Inspection Report Form is included in Attachment E.](#)

Attachment F – Corrective Action Report

[A copy of Corrective Action Report Form is included in Attachment F.](#)

Attachment G – Employee Training Report

[A copy of Employee Training Log is included in Attachment G.](#)

Attachment H – SWP3 Modifications Log

[A copy of Report on SWP3 Modifications/Amendments Log is included in Attachment H.](#)

Attachment I – Site Stabilization Log

[A copy of Site Stabilization Log is included in Attachment I.](#)

Attachment J – Subcontractor Certification Form

[A copy of Subcontractor Certification Form is included in Attachment J.](#)

Attachment A
General Location Map



Turner Turnpike (Toll road)

W Line St

Sahoma Lake Rd

Project Site

66

97

E Line Ave

S Main St

Sapulpa

S Main St

117

W Dewey Ave

117

W Taft Ave

Walmart Supercenter

S Hickory St

Attachment B

Site Map(s)

GENERAL NOTES:

1. CONDUCT SITE CLEARING OPERATIONS TO ENSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES. DO NOT CLOSE OR OBSTRUCT STREETS, WALKS, OR OTHER OCCUPIED OR USED FACILITIES WITHOUT PERMISSION FROM AUTHORITIES HAVING JURISDICTION. STREETS AND ROADWAYS SHALL BE THOROUGHLY CLEANED AND/OR SWEEPED ON A DAILY BASIS OR MORE FREQUENTLY AS REQUIRED BY THE GOVERNING AUTHORITY. RESTORE DAMAGED IMPROVEMENTS TO ORIGINAL CONDITION AS ACCEPTABLE TO PARTIES HAVING JURISDICTION.
2. THE CONTRACTOR SHALL PROVIDE DUST CONTROL MEASURES IN ACCORDANCE WITH LOCAL AUTHORITIES.
3. ALL STREET SURFACES, DRIVEWAYS, CULVERTS, ROADSIDE DRAINAGE DITCHES, AND OTHER STRUCTURES THAT ARE DISTURBED OR DAMAGED IN ANY MANNER AS A RESULT OF CONSTRUCTION SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. UNLESS SPECIFIED OTHERWISE, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STANDARDS, SPECIFICATIONS, AND REGULATIONS OF THE CITY OF SAPULPA, OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY, AND STATE DEPARTMENT OF TRANSPORTATION, AND/OR THE APPROPRIATE LOCAL AUTHORITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS, PERMIT FEES, LICENSES, LICENSE FEES, TAP FEES, ETC.
6. ALL ELEVATIONS IN PAVED AREAS ARE TOP OF FINISHED PAVEMENT UNLESS OTHERWISE NOTED.
7. RELOCATION OF ANY UTILITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE APPROPRIATE UTILITY COMPANY AND/OR REGULATORY AGENCY. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM ENGINEER BEFORE ANY UTILITY RELOCATION.
8. NO DIMENSION MAY BE SCALED. REFER UNCLEAR ITEMS TO THE ENGINEER FOR INTERPRETATION.

EXCAVATION NOTIFICATION

1. ALL CONTRACTORS SHALL NOTIFY UTILITY COMPANIES AND GOVERNMENT AGENCIES IN WRITING OF THE INTENT TO EXCAVATE NO LESS THAN 72 HOURS PRIOR TO SUCH EXCAVATION (EXCLUSIVE OF SATURDAYS, SUNDAYS, AND HOLIDAYS).
2. CONTRACTORS TO CALL 811 (OR VISIT CALL811.COM) TO REQUEST UTILITY LOCATES. ONCE COMPLETION OF MARKINGS HAS BEEN CONFIRMED BY THE CONTRACTOR, NO AUTOMATED OR MECHANICAL EQUIPMENT SHOULD BE USED WITHIN TWO FEET ON EITHER SIDE OF THE MARKINGS (OR ANOTHER MORE STRINGENT TOLERANCE AS DIRECTED), AND EXISTING FACILITIES MUST BE EXPOSED BY HAND.
3. EXISTING UTILITY LOCATIONS SHOWN SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION. LOCATIONS OF UNDERGROUND UTILITIES ON THESE DRAWINGS ARE APPROXIMATE ONLY AND BASED ON ACTUAL FIELD LOCATIONS OF VISIBLE STRUCTURES AND PLAN COMPUTATIONS.

UNANTICIPATED SOIL CONDITIONS

1. IF UNSUITABLE BEARING MATERIALS ARE ENCOUNTERED AT THE SPECIFIED SUBGRADE DEPTHS, THE CONTRACTOR SHALL NOTIFY THE OWNER. SOIL SUBGRADES WHICH ARE UNSTABLE DUE TO INADEQUATE CONSTRUCTION DEWATERING OR EXCESSIVE SUBGRADE DISTURBANCE ARE NOT DEEMED UNSUITABLE SOILS.
2. FILL SOIL THAT IS NOT WITHIN +/- 2% OPTIMUM MOISTURE FOR COMPACTION OF THE PARTICULAR MATERIAL IN PLACE AS DETERMINED BY THE OWNER'S REPRESENTATIVE AND IS DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION OPERATIONS SO THAT PROPER COMPACTION CANNOT BE REACHED SHALL NOT BE CONSTRUED AS UNSUITABLE BEARING MATERIAL.
3. THE CONTRACTOR SHALL FOLLOW A CONSTRUCTION PROCEDURE WHICH PERMITS VISUAL IDENTIFICATION OF FIRM NATURAL GROUND.
4. SURFACE RUNOFF: SURFACE WATER ON AND AROUND THE SITE SHALL BE COLLECTED INTO LOCAL SUMPS BY MEANS OF TRENCHES, PIPES, ETC., AND PUMPED INTO THE STORM WATER SYSTEM. USE APPROPRIATE FILTRATION OR SEDIMENTATION TO PREVENT PUMPING OF SUSPENDED SOLIDS INTO THE STORM SEWER. A PERMIT MUST BE OBTAINED FOR SUCH PUMPING.
5. DEWATERING OF TRENCHES AND EXCAVATIONS: TRENCHES AND EXCAVATIONS SHALL BE KEPT FREE OF STANDING WATER AT ALL TIMES. PUMPING IS TO BEGIN AS SOON AS WATER BEGINS TO ACCUMULATE AND IS TO CONTINUE UNTIL WATER IS REMOVED.



Know what's below.
Call before you dig.

CAUTION
NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THE LOCATION AND ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES.

SITE ACCESSIBILITY

1. ALL FEATURES OF THIS PROJECT INCLUDING, BUT NOT LIMITED TO, SIDEWALKS, CURB RAMPS, ACCESSIBLE PARKING, AND ACCESSIBLE ROUTES SHALL COMPLY WITH THE APPLICABLE ACCESSIBILITY CODES (AMERICANS WITH DISABILITIES ACT (ADA) ACCESSIBILITY GUIDELINES; THE PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG) PUBLISHED IN THE FEDERAL REGISTER AUGUST 2023; INTERNATIONAL BUILDING CODE (IBC); ICC A117.1; ETC.)
2. WHERE SPATIAL LIMITATIONS OR EXISTING FEATURES WITHIN THE LIMITS OF THE PROJECT PREVENT FULL COMPLIANCE WITH THESE GUIDELINES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER UPON DISCOVERY OF SUCH FEATURES. THE CONTRACTOR SHALL NOT PROCEED WITH ANY ASPECT OF THE WORK WHICH IS NOT IN FULL COMPLIANCE WITH THESE GUIDELINES WITHOUT PRIOR, WRITTEN PERMISSION FROM THE ENGINEER. ANY WORK WHICH IS NOT PERFORMED WITHIN THESE GUIDELINES, FOR WHICH THE CONTRACTOR DOES NOT HAVE WRITTEN APPROVAL, SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
3. GENERAL SLOPE GUIDANCE:
 - 3.1. GROSS SLOPES SHALL NOT EXCEED 1:50 (2.0%). PREFERRED SLOPE IS 1.5%.
 - 3.2. RUNNING SLOPES SHALL NOT EXCEED 5% EXCEPT AT RAMPS. PREFERRED MAXIMUM SLOPE IS 4.5%.
 - 3.3. RAMP RUNNING SLOPES SHALL NOT EXCEED 1:12 (8.3%). PREFERRED MAXIMUM SLOPE IS 7.8%.
 - 3.4. SLOPES AT LANDINGS, ACCESSIBLE PARKING STALLS, AND ACCESSIBLE AISLES SHALL NOT EXCEED 2% IN ANY DIRECTION. PREFERRED MAXIMUM SLOPE IS 1.5%.
 - 3.5. EXCEPTIONS WITHIN THE PUBLIC RIGHT-OF-WAY: WHERE THE ESTABLISHED ADJACENT STREET GRADE EXCEEDS 5%, RUNNING SLOPES PARALLEL TO THE STREET SLOPES SHALL NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT STREET. CURB RAMP RUNNING SLOPE CAN EXCEED 8.3% TO LIMIT THE RESULTING THE RAMP LENGTH TO 15 FEET.

GEOTECHNICAL

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT PREPARED BY BELONGIA CONSULTANTS INC. DATED JULY 14, 2020, REPORT #1205035 AND ADDENDUM LETTER #1205035A

SURVEY

1. EXISTING BOUNDARY AND TOPOGRAPHIC INFORMATION ARE SHOWN PER THE FIELD SURVEY PERFORMED BY SHAWN A. COLLINS DATED JUNE 5, 2025.

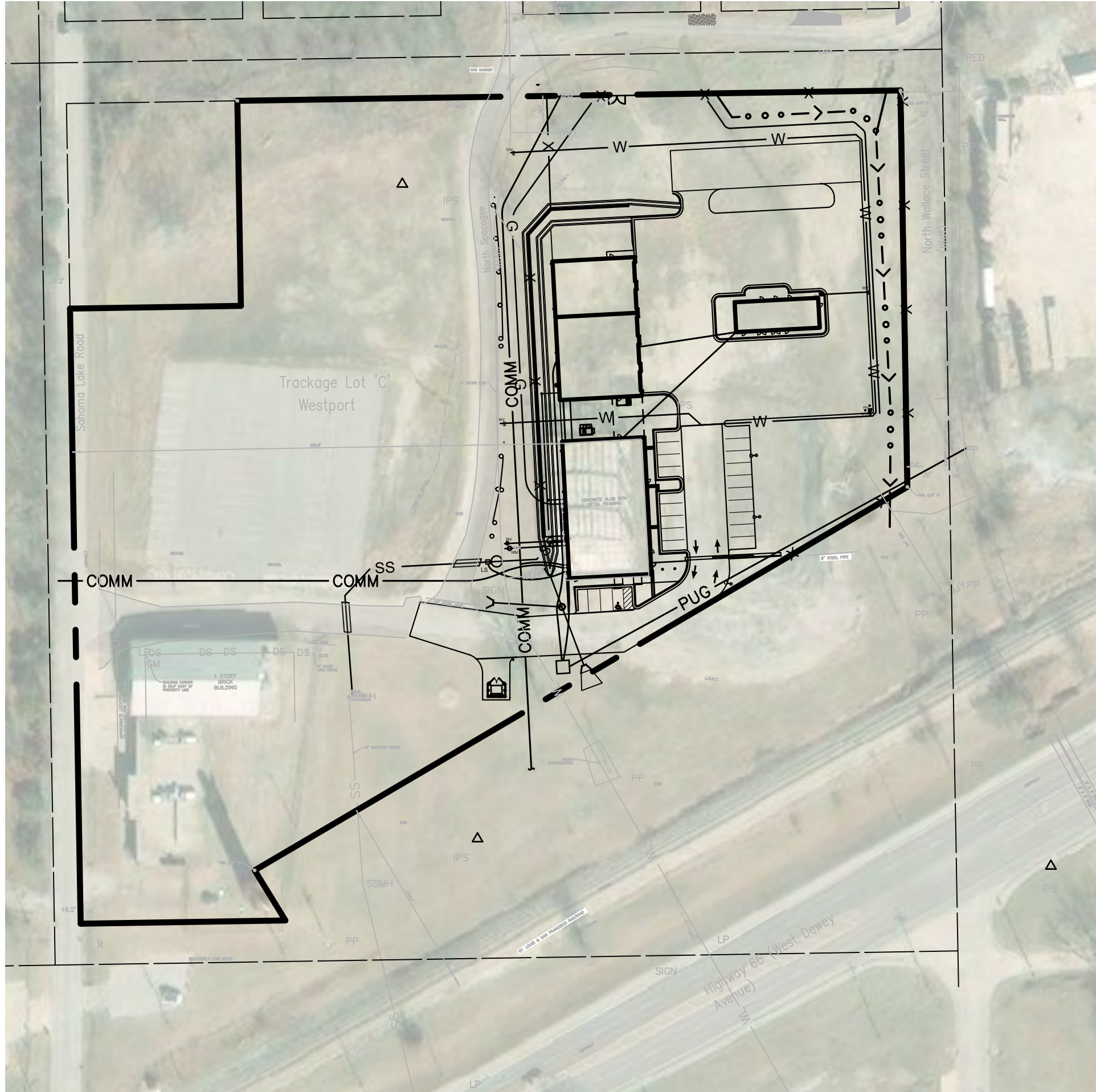
BENCHMARKS:

BENCHMARKS PER TOPOGRAPHIC SURVEY COMPLETED BY SHAWN A. COLLINS DATED JUNE 5, 2025

CONTROL POINT #2	CONTROL POINT #3	CONTROL POINT #4
SET 3/8" IRON PIN	SET 3/8" IRON PIN	SET 3/8" IRON PIN
ELEV: 710.84	ELEV:689.72	ELEV:683.76
N:368,336.50	N:367,855.89	N:367,833.10
E:2,521,894.47	E:2,522,332.05	E:2,522,332.05

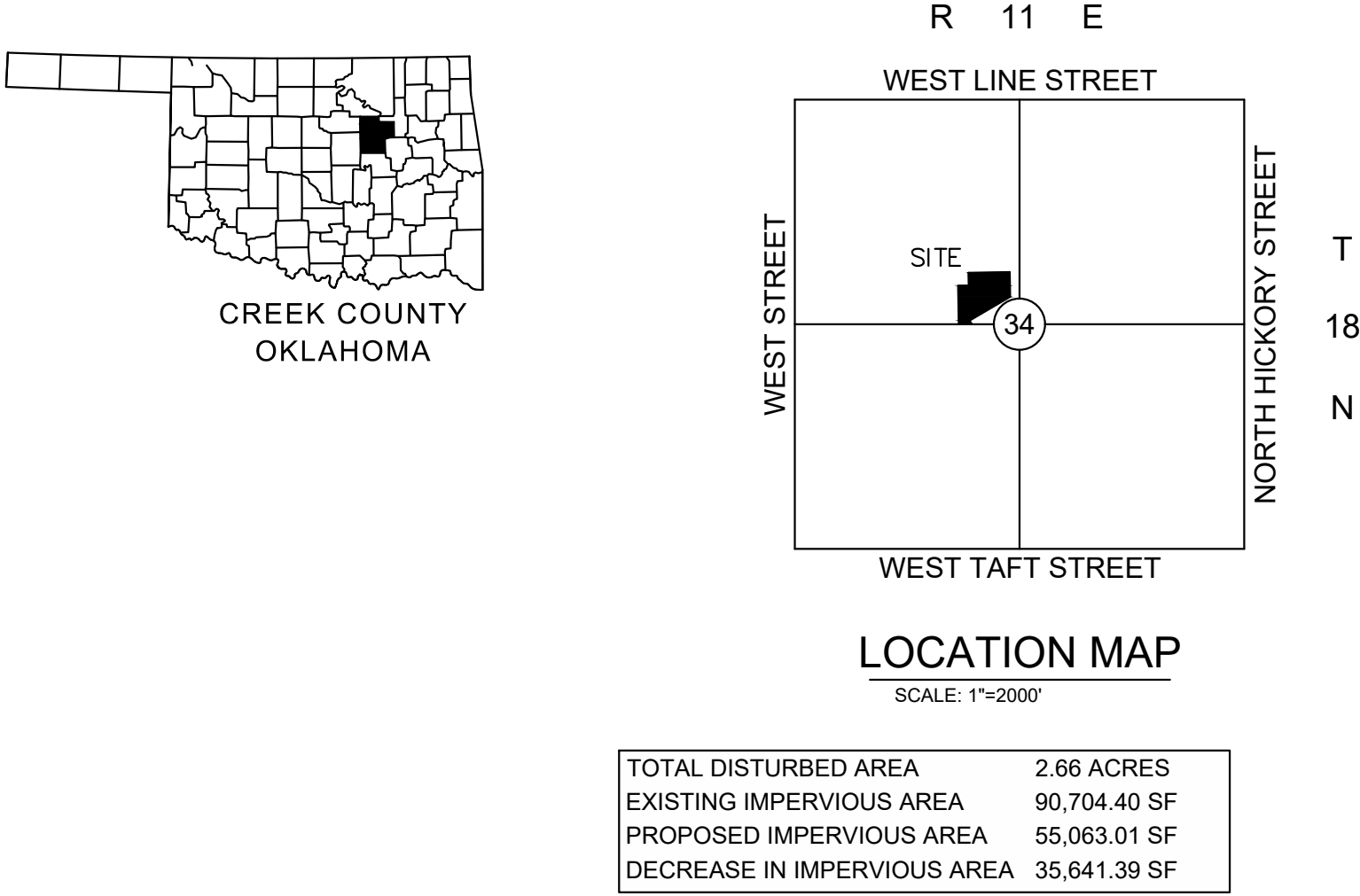
CONSTRUCTION PLANS FOR SAPULPA FIRE DEPARTMENT TRAINING FACILITY

15 SAHOMA LAKE ROAD, SAPULPA, OK 74066



LEGEND

ABBREVIATIONS	LINETYPES	SYMBOLS
BC BACK OF CURB	_____	⚡ UTILITY POLE
BL BUILDING LINE	_____ SF _____	⚡ LIGHT POLE
CL CENTERLINE	-----	⚡ GUY ANCHOR
EG EXISTING GRADE	===== 660 =====	⚡ ELECTRIC BOX
FF FINISHED FLOOR	===== 661 =====	⚡ ELECTRIC METER
FG FINISHED GRADE	===== 660 =====	⚡ ELECTRIC TRANSFORMER
FL FLOWLINE	===== 661 =====	⚡ A/C UNIT
GL GUTTER LINE	_____	⚡ ELECTRIC MANHOLE
HP HIGH POINT	_____ X _____	⚡ GAS METER
INV INVERT	_____	⚡ GAS VALVE
LF LINEAR FEET	_____	⚡ OIL/GAS WELLHEAD
LP LOW POINT	_____	⚡ VENT PIPE
RW RIGHT-OF-WAY	_____ FO _____	⚡ PIPELINE MARKER
SF SQUARE FEET	_____ UC _____	⚡ COMMUNICATION PEDESTAL
SY SQUARE YARDS	_____ OE _____	⚡ COMMUNICATION MANHOLE
TBK TOP OF BANK	_____ UE _____	⚡ SEWER CLEAN-OUT
TC TOP OF CURB	_____ G _____	⚡ SANITARY SEWER MANHOLE
TG TOP OF GRATE	_____ FM _____	⚡ DOWNSPOUT
TOE TOP OF BANK	_____ SS _____	⚡ ROOF DRAIN
TP TOP OF PAVEMENT	_____ SSL _____	⚡ STORM DRAIN MANHOLE
TR TOP OF RIM	=====	⚡ FIRE DEPARTMENT CONNECTION
TS TOP OF SIDEWALK	=====	⚡ FIRE HYDRANT
TW TOP OF WALL	=====	⚡ IRRIGATION CONTROL VALVE
	----->----->-----	⚡ SHUT-OFF VALVE
	_____ SD _____	⚡ SPRINKLER HEAD
	_____ F _____	⚡ WATER METER
	_____ W _____	⚡ WATER VALVE
	_____ WSL _____	⚡ YARD HYDRANT
	_____ IRR _____	⚡ PIPE BOLLARD
		⚡ BENCHMARK
		⚡ ACCESSIBLE PARKING
		⚡ MAILBOX
		⚡ MONITORING WELL
		⚡ POTHOLE
		⚡ SIGN



SHEET NUMBER	SHEET TITLE
C1.0	GENERAL NOTES
C2.0	SURVEY
C3.0	OVERALL DEMOLITION & EROSION CONTROL PLAN
C3.1	DEMOLITION & EROSION CONTROL PLAN
C3.2	DEMOLITION & EROSION CONTROL PLAN
C4.0	OVERALL SITE PLAN
C4.1	SITE PLAN
C4.2	SITE PLAN
C5.0	GRADING PLAN
C5.1	GRADING PLAN
C5.2	GRADING PLAN
C5.3	EXISTING DRAINAGE PLAN
C5.4	PROPOSED DRAINAGE PLAN
C6.0	UTILITY PLAN
C6.1	UTILITY PLAN
C6.2	UTILITY PLAN
C7.0	UTILITY PROFILES
C7.1	UTILITY PROFILES
C8.0	DETAILS
C8.1	DETAILS
C8.2	DETAILS
C8.3	DETAILS
C8.4	DETAILS
C8.5	DETAILS

UTILITIES:

DEPARTMENT OF PUBLIC WORKS
CITY OF SAPULPA
DAVID NORRIS
425 E. DEWEY AVE.
SAPULPA, OK 74066
918.248.5928

CITY ENGINEERING:
DEPARTMENT OF PUBLIC WORKS
CITY OF SAPULPA
STEVE HARDT
425 E. DEWEY AVE.
SAPULPA, OK 74066
918.218.4352

FIRE:
CITY OF SAPULPA FIRE DEPARTMENT
FIRE CHIEF, JAMES VICKREY
800 E DEWEY AVE.
SAPULPA, OK 74066
918.224.3359

GAS:

OKLAHOMA NATURAL GAS COMPANY
ATTN: DONALD KAHER
5848 EAST 15TH STREET
TULSA, OKLAHOMA 74112
918.527.1089

TELEPHONE:

AT&T COMMUNICATION INC.
ATTN: ROGER HURST
509 S DETROIT AVE, FLOOR 9
918.859.9453

CABLE:

COX COMMUNICATIONS
ATTN: LUCAS MARES
11811 E 51ST STREET S
TULSA, OK 74146
918.286.4587

OWNER:

SAPULPA FIRE DEPARTMENT
800 E DEWEY AVE.
SAPULPA, OK 74066
918.224.3359

ELECTRIC:

OG&E, OKLAHOMA GAS & ELECTRIC
ATTN: STEVE WHITEHOUSE
18511 WEST HIGHWAY 33
EMAIL: WHITEHSD@OGE.COM

ENGINEER:

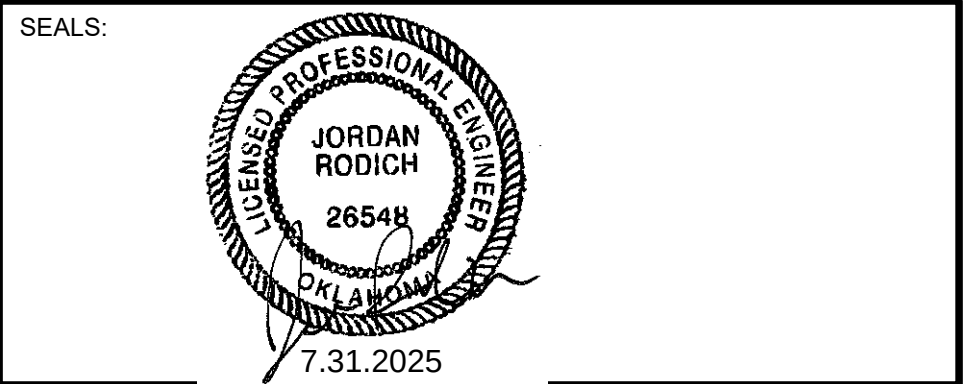
WALLACE DESIGN COLLECTIVE
JORDAN RODICH, P.E.
123 N MARTIN LUTHER KING JR. BLVD.
TULSA, OKLAHOMA 74103
918.584.5858
JORDAN.RODICH@WALLACE.DESIGN

AS-BUILTS:

THE CONTRACTOR SHALL KEEP ON SITE A CURRENT SET OF THE APPROVED CONSTRUCTION WORKING DRAWINGS AT ALL TIMES. THE CONTRACTOR SHALL MARK (IN RED INK) ALL CHANGES MADE TO THE APPROVED PLANS. THESE CHANGES MAY BE INITIATED FROM FIELD CONDITIONS, CHANGES MADE BY THE ENGINEER OF RECORD, OR CHANGES REQUESTED BY REPRESENTATIVES OF THE JURISDICTIONS HAVING AUTHORITY. ALL CHANGES SHALL BE REVIEWED AND AGREED TO BY THE ENGINEER OF RECORD PER AN RFI SUBMITTAL PROCESS. THE CONTRACTOR SHALL SUBMIT THE WORKING DRAWINGS TO THE ENGINEER OF RECORD AFTER FINAL INSPECTION OF THE PROJECT TO SERVE AS A BASIS FOR DEVELOPMENT OF FINAL AS-BUILT RECORD DOCUMENTS.

GSHELMS & ASSOCIATES, LLC ARCHITECTURAL CERTIFICATE OF AUTHORITY NUMBER: 02332

A	100% CONSTRUCTION DOCUMENTS	08.01.25
#	REVISION	DATE



PROJECT NO.:	17-00901
FILE:	
ISSUE DATE:	08.01.25
SCALE:	AS NOTED
DRAWN BY:	JE
CHECKED BY:	JE
APPROVED BY:	JR

ARCHITECT:



ph: 918.298.7257
wb: gshelms.com

424 e. main st.
jenks, ok 74037



wallace design collective, pc
structural civil landscape survey
123 north martin luther king jr. blvd.
tulsa, oklahoma 74103
918.584.5858
oklahoma ca1460
exp: 6-30-27

PROJECT TITLE:

CITY OF SAPULPA, OK
SAPULPA FIRE DEPARTMENT
TRAINING FACILITY
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

GENERAL NOTES

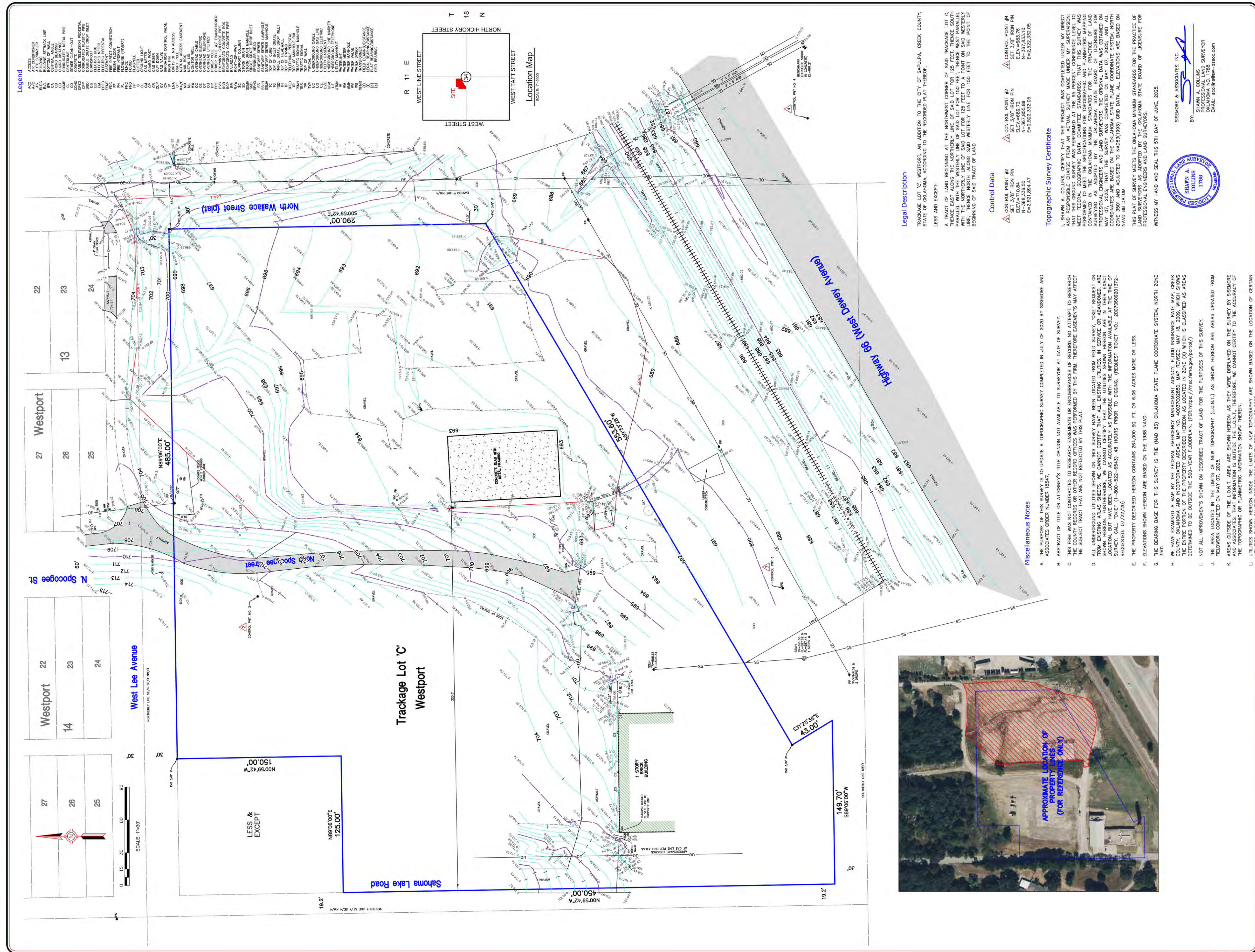
SHEET NUMBER:

C1.0

A	100% CONSTRUCTION DOCUMENTS	08.01.25
#	REVISION	DATE

SEALS:

PROJECT NO.:	17-00901
FILE:	
ISSUE DATE:	08.01.25
SCALE:	AS NOTED
DRAWN BY:	JE
CHECKED BY:	JE
APPROVED BY:	JR



RAYMOND K:\18547.01\combined.doc
SISEMORE & ASSOCIATES, INC., 2020

**SISEMORE
& ASSOCIATES**
Surveying ~ Civil Engineering ~ Land Planning
PHONE (918) 965-3900
FAX (918) 965-8668
EXP. DATE 6/30/21
(www.sisw-esoc.com)

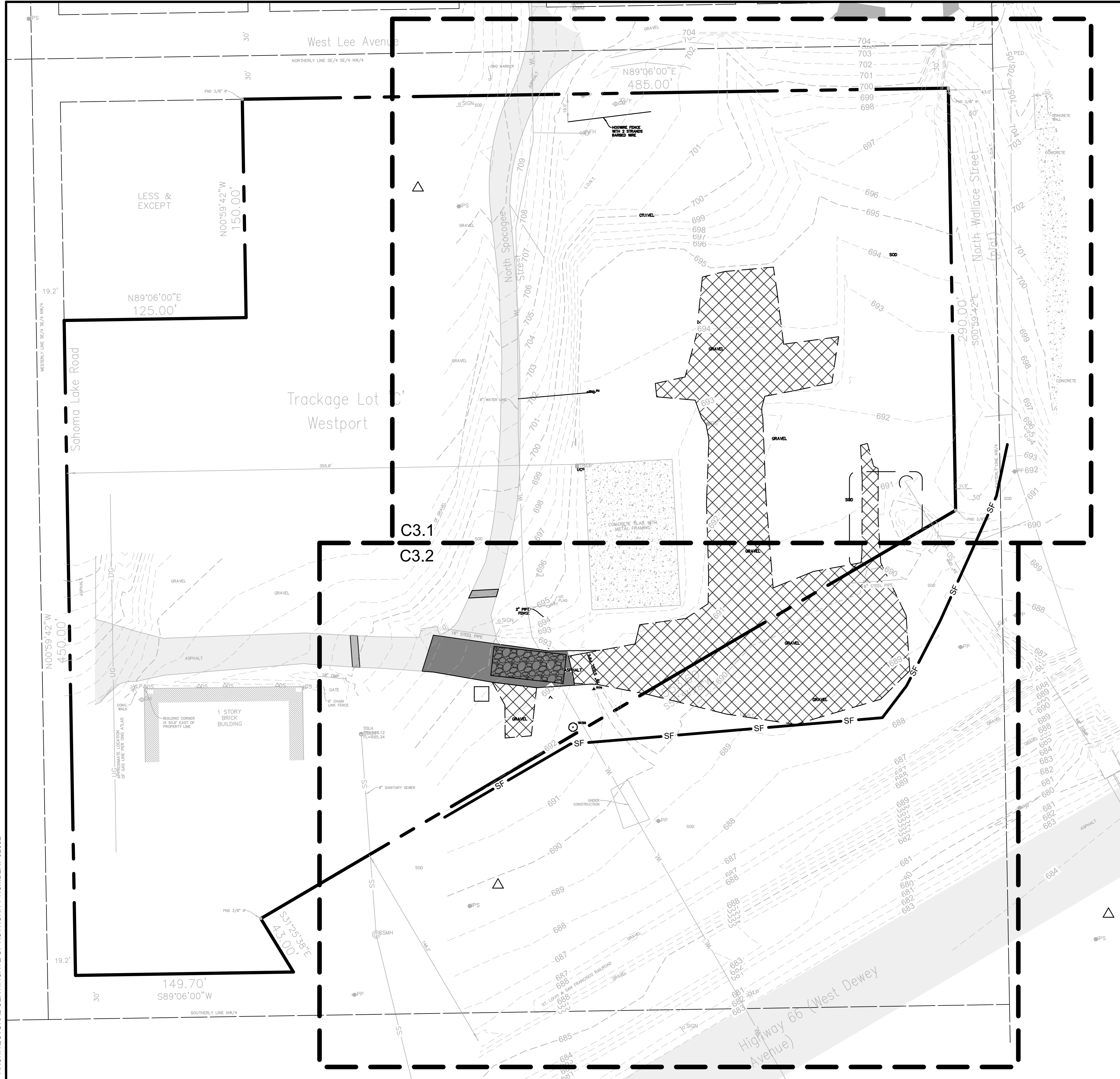
SHEET
1 OF 1

Topographic Survey
of
Part of Trackage Lot 'C'
Westport Addition
City of Sapulpa, Creek County, Oklahoma

REVISION	BY	DATE
FILE: 1B11.3-400	SURVEY BY:	CM
ORDER: 18547.01	DRAWN BY:	ET
BOOK:	CHECKED BY:	SAC
DATE: 6/5/25	SCALE:	1"=30'

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SURVEY NOTE:
THIS SHEET IS FOR THE CONVENIENCE OF THE CONTRACTOR. IT IS INTENDED FOR GENERAL SURVEY INFORMATION ONLY. WALLACE DESIGN COLLECTIVE HAS NOT CONFIRMED ITS ACCURACY. SURVEY INFORMATION WAS REPRODUCED BY ELECTRONIC TRANSFER FROM THE SURVEYOR. ORIGINAL SURVEY DRAWINGS AVAILABLE FROM THE SURVEYOR.
NOTE: SURVEY SCALED TO FIT PAGE.

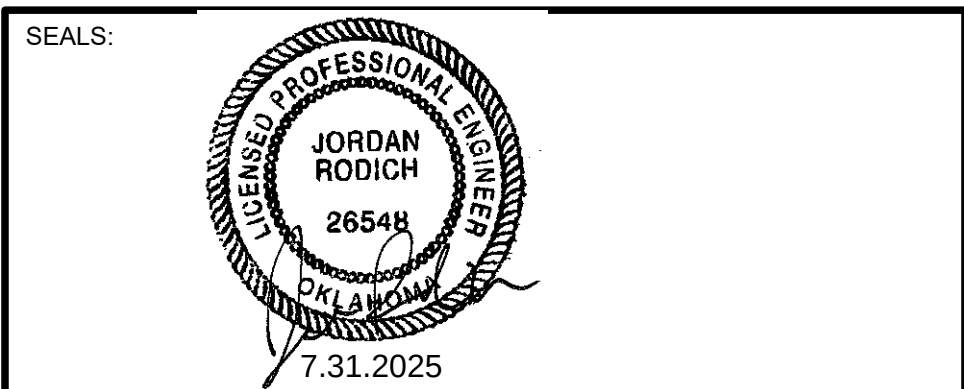


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CAUTION NOTICE TO CONTRACTOR

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A	100% CONSTRUCTION DOCUMENTS	08.01.25
#	REVISION	DATE



PROJECT NO.:	17-00901
FILE:	
ISSUE DATE:	08.01.25
SCALE:	AS NOTED
DRAWN BY:	JE
CHECKED BY:	JE
APPROVED BY:	JR

ARCHITECT:

GS HELMS + ASSOCIATES

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oklahoma.co1460
exp: 6-30-27

PROJECT TITLE:

CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

OVERALL DEMOLITION & EROSION CONTROL PLAN

SHEET NUMBER:

C3.0

GENERAL EROSION CONTROL NOTES:

- ALL GRADING AND EROSION CONTROL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN, THE CITY OF SAPULPA STANDARDS AND SPECIFICATIONS, AND STATE PERMITTING REQUIREMENTS, RE: ODEQ PERMIT OKR10.
- 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.
- 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:
 - CONTROL STORMWATER VOLUME, VELOCITY, AND PEAK FLOW RATES WITHIN THE SITE TO MINIMIZE SOIL EROSION;
 - 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;
 - MINIMIZE THE AMOUNT OF EXPOSED SOIL DURING CONSTRUCTION ACTIVITY;
 - MINIMIZE THE DISTURBANCE OF STEEP SLOPES;
 - MINIMIZE SEDIMENT DISCHARGES FROM THE SITE. DESIGN, INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS THAT ADDRESS FACTORS SUCH AS THE AMOUNT, FREQUENCY, INTENSITY AND DURATION OF PRECIPITATION, THE NATURE OF RESULTING STORMWATER RUNOFF, AND SOIL CHARACTERISTICS, INCLUDING THE RANGE OF SOIL PARTICLE SIZE EXPECTED TO BE PRESENT ON THE SITE.
 - PROVIDE AND MAINTAIN NATURAL BUFFERS AROUND SURFACE WATERS
 - DIRECT STORMWATER TO VEGETATED AREAS TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORMWATER INFILTRATION AND FILTERING, UNLESS INFEASIBLE; AND
 - MINIMIZE SOIL COMPACTION AND PRESERVE TOPSOIL WHERE PRACTICABLE
- INSTALLATION OF BMPS NECESSARY TO PREVENT SOIL EROSION AND SEDIMENTATION AT THE DOWNGRADE 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, DOWNGRADE 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. FOLLOWING THE INSTALLATION OF THESE INITIAL BMPS, ALL BMPS NEEDED TO CONTROL DISCHARGES SHALL BE INSTALLED AND MADE OPERATIONAL PRIOR TO SUBSEQUENT EARTH DISTURBING ACTIVITIES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A STABILIZED CONSTRUCTION ENTRANCE AND FOR CLEANING OF VEHICLE WHEELS IN ACCORDANCE WITH THE CITY OF SAPULPA STANDARDS AND SPECIFICATIONS.
- SILT FENCES: PLACEMENT OF SILT FENCES SHALL BE AS SHOWN ON THESE PLANS. FENCING WHICH BECOMES DAMAGED SHALL BE REPLACED PROMPTLY. DEPOSITS OF SILT WHICH BUILD UP BEHIND DIKES MAY BE DISKED ONTO THE SITE BEFORE PLACEMENT OF TEMPORARY COVER. AFTER TEMPORARY COVER IS PLACED OR AFTER LANDSCAPING COMMENCES, SILT SHALL BE REMOVED AND DISPOSED OF IN A MANNER APPROVED BY THE ENGINEER.
- UNLESS LOCAL OR STATE REQUIREMENTS NECESSITATE MORE FREQUENT MONITORING, CONTRACTOR SHALL INSPECT EROSION CONTROL DEVICES EVERY 7 DAYS OR WITHIN 24 HOURS OF A STORM OF 0.5 INCHES OR MORE IN DEPTH (EXCLUSIVE OF HOLIDAYS). THE CONTRACTOR SHALL REPAIR DAMAGE, CLEAN OUT SEDIMENT, AND ADD ADDITIONAL CONTROL DEVICES AS NEEDED AS SOON AS POSSIBLE AFTER INSPECTION. DEFICIENCIES MUST BE CORRECTED WITHIN 7 DAYS.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY AND ALL FINES ASSOCIATED WITH EROSION CONTROL VIOLATIONS.

TEMPORARY STABILIZATION:

- INITIATE THE INSTALLATION OF STABILIZATION MEASURES IMMEDIATELY IN ANY DISTURBED AREAS WHERE CONSTRUCTION ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE SITE OR WILL BE TEMPORARILY INACTIVE FOR 14 OR MORE CALENDAR DAYS ON ANY PORTION OF THE SITE.
- TEMPORARY STABILIZATION SHALL INCLUDE TEMPORARY SEEDING, GEOTEXTILES, MULCHES, AND/OR 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.
- TEMPORARY STABILIZATION SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL AND STATE REQUIREMENTS.

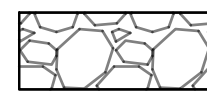
FINAL STABILIZATION:

- FINAL STABILIZATION SHALL BE INSTALLED IN ACCORDANCE WITH THE LANDSCAPE PLANS AND LOCAL AND STATE REQUIREMENTS.
- UNLESS OTHERWISE INDICATED, ALL DISTURBED SOIL AREAS SHALL RECEIVE FOUR (4) INCHES OF TOPSOIL AND SHALL BE PERMANENTLY STABILIZED WITH SOD.
- CONTRACTOR SHALL MAINTAIN PERENNIAL VEGETATION UNTIL UNIFORM COVER IS ESTABLISHED. UNLESS OTHERWISE INDICATED IN THE CONTRACT DOCUMENTS, THIS SHALL INCLUDE A MINIMUM OF 70% COVERAGE AND NO BARE AREAS OF 10 SQUARE FEET OR MORE.

GENERAL DEMOLITION NOTES:

- ALL CONCRETE AND ASPHALT NOTED FOR REMOVAL SHALL BE SAW CUT FULL DEPTH AND REMOVED OFF SITE.
- CONTRACTOR SHALL PROTECT ALL SURVEY CONTROL POINTS.
- CONTRACTOR SHALL REMOVE ALL WASTE MATERIALS OFF SITE.
- ALL EXISTING STRUCTURES, UNLESS OTHERWISE NOTED TO REMAIN, FENCING, TREES, ETC., WITHIN CONSTRUCTION AREA SHALL BE REMOVED & DISPOSED OF OFF SITE. ALL COST SHALL BE INCLUDED IN BASE BID.
- WITH PRIOR APPROVAL, CONTRACTOR MAY ESTABLISH AN ON-SITE STAGING AREA. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING STAGING AREA TO ITS ORIGINAL CONDITION. SECURITY OF STAGING AREA SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- ON-SITE VEGETATION SHALL BE PROTECTED AS NOTED. IN DESIGNATED PROTECTION AREAS WHERE THE CONTRACTOR DOES NOT PROTECT VEGETATION AS NOTED, CONTRACTOR SHALL RESTORE VEGETATION TO EXISTING CONDITION AT NO ADDITIONAL EXPENSE TO THE OWNER, TO THE SATISFACTION OF THE ARCHITECT.
- CONTRACTOR SHALL PROTECT ALL ABOVE GROUND UTILITY FEATURES NOT BEING REMOVED INCLUDING, BUT NOT LIMITED TO, MANHOLES, VALVES, AND INLETS. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE THE EXISTING STRUCTURE AS NECESSARY.
- TOPSOIL STOCKPILES AND DISTURBED PORTIONS OF THE SITE, WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR AT LEAST 14 DAYS SHALL BE STABILIZED IMMEDIATELY WITH TEMPORARY SEED AND MULCH PER THE AUTHORITY HAVING JURISDICTION.
- CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC CONTROL DURING CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, LANE CLOSURES, DETOURS, ETC. BOTH VEHICULAR AND PEDESTRIAN.
- CONTRACTOR SHALL PROVIDE TEMPORARY UTILITY SERVICE IF REQUIRED.
- CONTRACTOR SHALL ENSURE CONSTRUCTION SITE HAS POSITIVE DRAINAGE THROUGHOUT THE DURATION OF CONSTRUCTION.
- PRIOR TO UTILITY DEMOLITION COORDINATE WITH AUTHORITY HAVING JURISDICTION.
- UTILITIES BEING REMOVED OR RELOCATED SHALL BE ISOLATED AND SERVICE DISCONNECTED PRIOR TO ANY DEMOLITION.
- NO UTILITY INTERRUPTIONS WILL BE ALLOWED WITHOUT CONSENT OF THE OWNER. CONTRACTOR SHALL NOTIFY THE OWNER AND ARCHITECT A MINIMUM OF FOUR WORKING DAYS PRIOR TO THE REQUESTED SHUT DOWN.

LEGEND



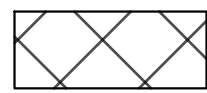
STABILIZED CONSTRUCTION ENTRANCE
RE: 5/C8.3

SF

SILT FENCE
RE: 11/C8.0



ASPHALT REMOVAL

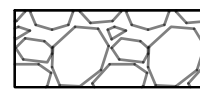


GRAVEL REMOVAL



RE: C3.0 FOR DEMOLITION & EROSION CONTROL NOTES

LEGEND



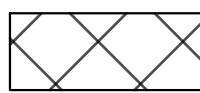
STABILIZED CONSTRUCTION ENTRANCE
RE: 4/C8.3

SF

SILT FENCE
RE: 11/C8.0



ASPHALT REMOVAL



GRAVEL REMOVAL



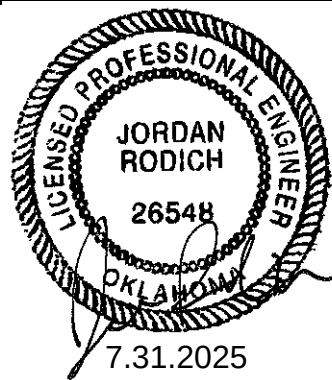
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SEALS:



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**SAPULPA FIRE DEPARTMENT
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15 SAHOMA LAKE ROAD SAPULPA, OK 74066

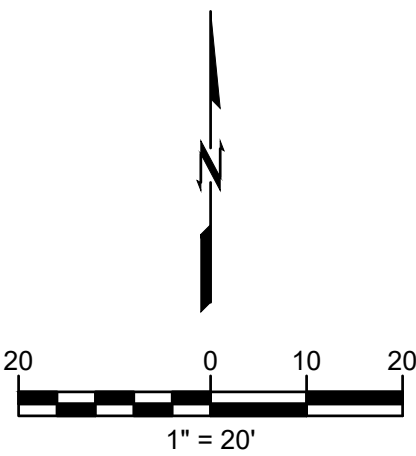
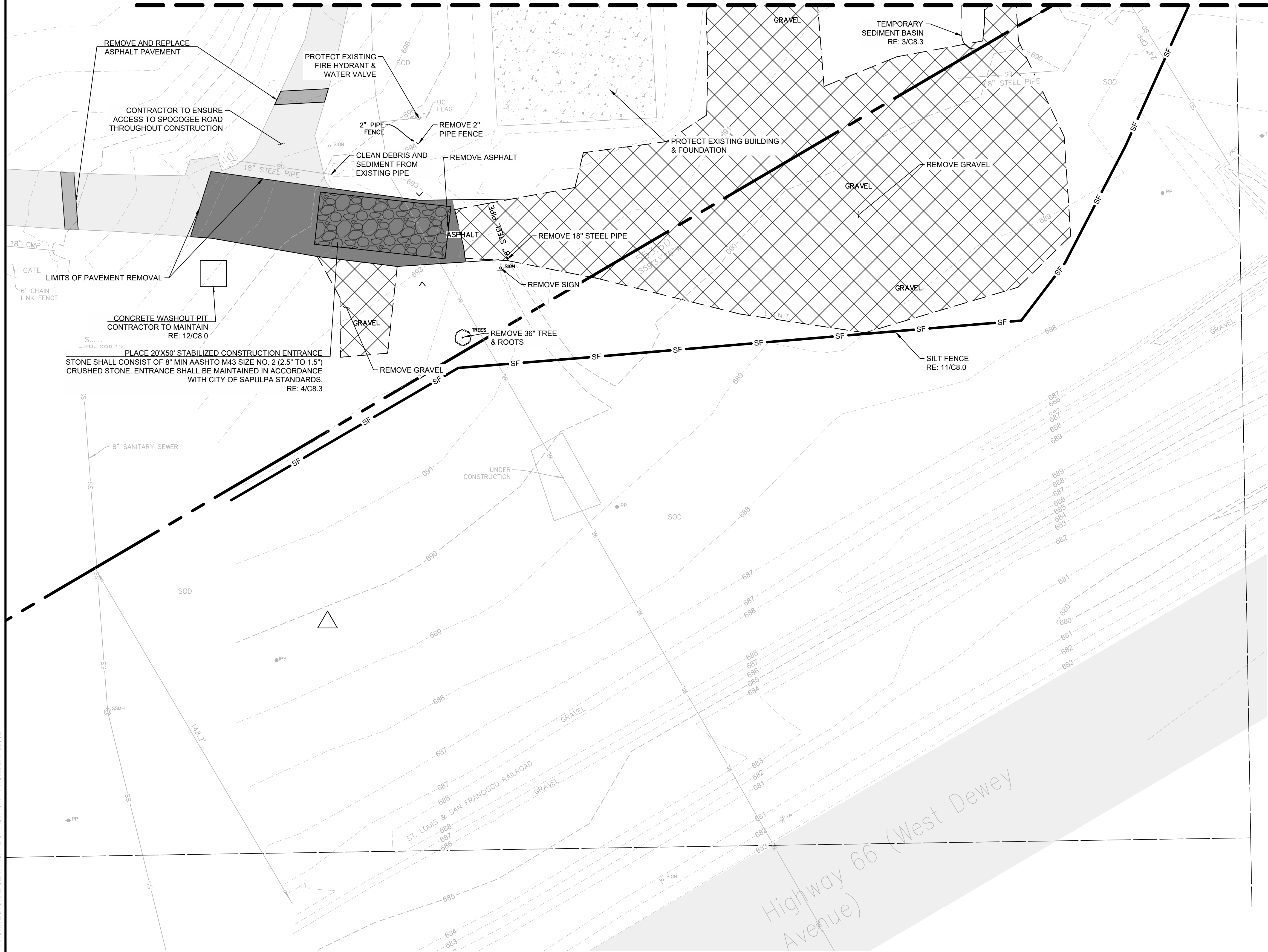
SHEET TITLE:

DEMOLITION & EROSION CONTROL PLAN

SHEET NUMBER:

C3.1

MATCH LINE SEE SHEET C3.1



RE: C3.0 FOR DEMOLITION & EROSION CONTROL NOTES

LEGEND

- STABILIZED CONSTRUCTION ENTRANCE
RE: 4/C8.3
- SILT FENCE
RE: 11/C8.0
- ASPHALT REMOVAL
- GRAVEL REMOVAL

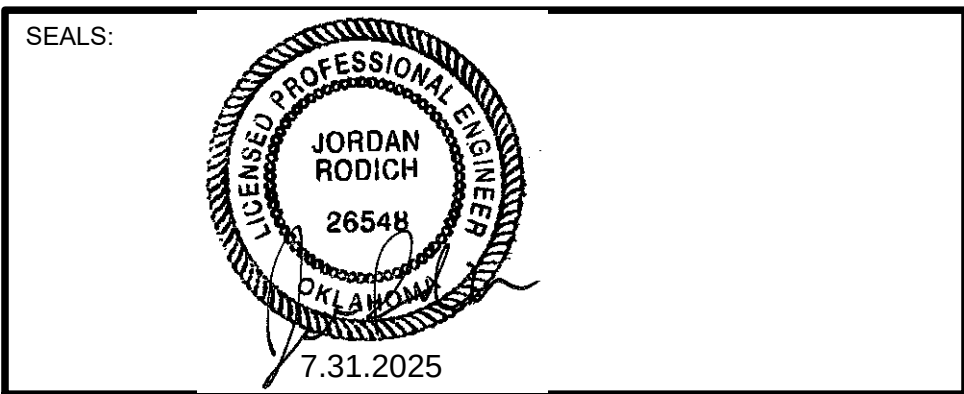


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tulsa, oklahoma 74103
918.584.2558
oklahoma: co1460
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PROJECT TITLE:

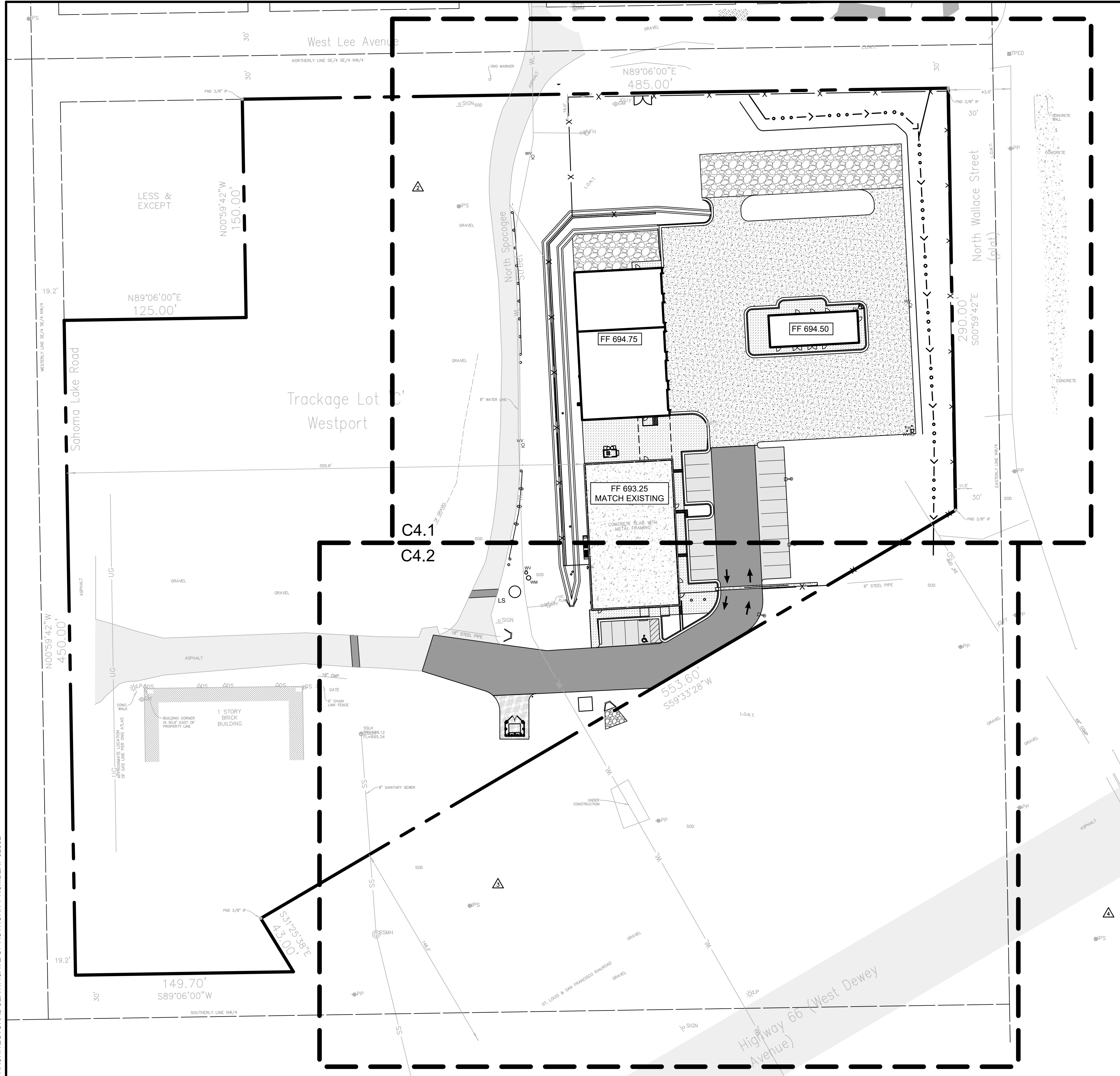
CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD | SAPULPA, OK 74066

SHEET TITLE:

DEMOLITION & EROSION CONTROL PLAN

SHEET NUMBER:

C3.2



GENERAL PAVING NOTES:

- ALL MATERIALS, EXECUTION, AND TESTING TO CONFORM TO AHJ REQUIREMENTS (I.E. LOCAL OR STATE DOT STANDARDS AND SPECIFICATIONS).
- ALL PAVING AND EARTHWORK OPERATIONS SHALL CONFORM TO THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT.
- CONTRACTOR TO PROVIDE PRODUCT DATA SUBMITTALS INCLUDING, BUT NOT LIMITED TO, DESIGN MIXES, MATERIAL CERTIFICATES, AND MATERIAL TEST REPORTS FOR MATERIALS AND PRODUCTS ASSOCIATED WITH PAVING AND PAVEMENT MARKING OPERATIONS.
- CONTRACTOR SHALL DEVELOP AND IMPLEMENT PROPER TRAFFIC CONTROL IN CONFORMANCE WITH THE LATEST REVISION OF THE MUTCD. ACCESS FOR EMERGENCY VEHICLES AND LOCAL TRAFFIC SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
- PAVEMENT SUBGRADE SHALL BE PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT AND TO THE GRADES AND ELEVATIONS REQUIRED BY THE CONSTRUCTION DOCUMENTS.
- PAVEMENT CONTRACTOR TO INSPECT PAVEMENT SUBGRADE AND CORRECT ANY DEFICIENCIES PRIOR TO PAVING OPERATIONS.
- CONTRACTOR TO COORDINATE CONSTRUCTION TESTING UNLESS OTHERWISE INDICATED IN THE CONTRACT DOCUMENTS.
- THE PAVEMENT SECTIONS SHOWN IN DETAIL 1/ C8.0 ARE SHOWN FOR REFERENCE AND WERE PROVIDED BY DAVID L. BELONGIA BASED ON SITE SPECIFIC CONDITIONS AS OUTLINED IN THEIR REPORT DATED 07.14.2020. ANY QUESTIONS REGARDING THE SUITABILITY OF THESE OR ALTERNATE PAVEMENTS SECTIONS, SPECIFIC PAVEMENT MAINTENANCE REQUIREMENTS, OR POTENTIAL PAVEMENT LIFE SHOULD BE DIRECTED TO DAVID L. BELONGIA, AS THIS IS BEYOND WALLACE'S SCOPE OF SERVICES FOR THIS PROJECT.

ASPHALT PAVEMENT:

- CONSTRUCT JOINTS TO ENSURE A CONTINUOUS BOND BETWEEN ADJOINING PAVEMENT SECTIONS. OFFSET LONGITUDINAL JOINTS, IN SUCCESSIVE COURSES, A MINIMUM OF 6 INCHES AND TRANSVERSE JOINTS A MINIMUM OF 24 INCHES.
- WHERE DIFFERENT THICKNESS PAVEMENTS ABUT, PROVIDE A THICKENED EDGE ON THE THINNER PAVEMENT SECTION, WHICH TRANSITIONS TO THE THICKER PAVEMENT DEPTH ACROSS FOUR FEET.
- UNIFORM DENSITY REQUIREMENTS:
 - AVERAGE DENSITY: 96 PERCENT OF REFERENCE LABORATORY DENSITY ACCORDING TO ASTM D 6927 BUT NOT LESS THAN 94 PERCENT OR GREATER THAN 100 PERCENT, OR
 - AVERAGE DENSITY: 92 PERCENT OF REFERENCE MAXIMUM THEORETICAL DENSITY ACCORDING TO ASTM D 2041 BUT NOT LESS THAN 90 PERCENT OR GREATER THAN 96 PERCENT.
- INSTALLATION TOLERANCES:
 - PAVEMENT THICKNESS: BASE COURSE PLUS OR MINUS 1/2 INCH; SURFACE PLUS 1/4 INCH.
 - PAVEMENT SMOOTHNESS: BASE COURSE 1/4 INCH IN 10 FEET; SURFACE COURSE 1/8 INCH IN 10 FEET.

LEGEND

	HEAVY DUTY ASPHALT PAVEMENT RE: 1/C8.0
	STANDARD DUTY ASPHALT PAVEMENT RE: 1/C8.0
	HEAVY DUTY CONCRETE PAVEMENT RE: 1/C8.0
	REINFORCED CONCRETE PAVING RE: 1/C8.0
	CONCRETE SIDEWALK RE: 5/C8.0
	GRAVEL PAVEMENT RE: 9/C8.0

BENCHMARKS:

BENCHMARKS PER TOPOGRAPHIC SURVEY COMPLETED BY SHAWN A. COLLINS DATED JUNE 5, 2025		
CONTROL POINT #2	CONTROL POINT #3	CONTROL POINT #4
SET 3/8" IRON PIN	SET 3/8" IRON PIN	SET 3/8" IRON PIN
ELEV: 710.84	ELEV: 689.72	ELEV: 683.76
N:368,336.50	N:367,855.89	N:367,833.10
E:2,521,894.47	E:2,522,332.05	E:2,522,332.05

CONCRETE PAVEMENT:

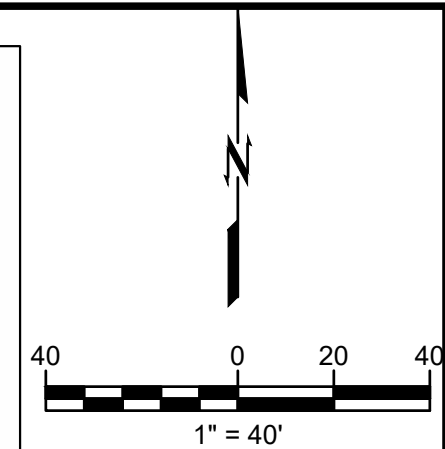
- CONCRETE PLACEMENT TO CONFORM TO ACI 301 / 306 / 330 REQUIREMENTS.
- CONCRETE MATERIAL:
 - 28 DAY COMPRESSIVE STRENGTH: 4000 PSI MINIMUM
 - MAXIMUM W/C RATIO AT POINT OF PLACEMENT: 0.45
 - SUMP: 4 INCHES PLUS OR MINUS 1 INCH
 - AIR CONTENT: 6 PERCENT PLUS OR MINUS 1-1/2 PERCENT
- STEEL:
 - GRADE 60
 - COMPLY WITH CRSI'S "MANUAL OF STANDARD PRACTICE" FOR FABRICATION, PLACEMENT, AND SUPPORT.
- JOINTS:
 - FORM CONSTRUCTION, ISOLATION, AND CONTRACTION JOINTS WITH FACES PERPENDICULAR TO SURFACE PLANE OF CONCRETE. WHEN JOINING EXISTING PAVING, PLACE JOINTS TO ALIGN WITH PREVIOUSLY PLACED JOINTS UNLESS OTHERWISE INDICATED.
 - FORM ISOLATION JOINTS OF PREFORMED JOINT-FILLER STRIPS ABUTTING LIGHT STANDARD FOUNDATIONS, MANHOLES, INLETS, STRUCTURES, OR OTHER FIXED OBJECTS. EXTEND JOINT FILLERS THE FULL WIDTH AND DEPTH OF PAVEMENT.
 - CONTRACTION JOINT DEPTH TO BE 1/4 OF THE TOTAL CONCRETE THICKNESS.
 - JOINTS SHOULD EXTEND THROUGH ADJACENT CURB AND GUTTER.
- JOINT SPACING
 - JOINT SPACING SHALL NOT EXCEED 24 TO 30 TIMES THE PAVEMENT THICKNESS (E.G. 0.5' THICK CONCRETE x 30 = 15' MAXIMUM JOINT SPACING) WITH A MAXIMUM SPACING OF 15 FEET.
 - LAY OUT JOINTS TO FORM SQUARE PANELS. WHEN THIS IS NOT PRACTICAL, RECTANGULAR PANELS CAN BE USED, BUT THE LENGTH SHALL NOT BE MORE THAN 25% LONGER THAN THE WIDTH (E.G. A 15' LONG PANEL CANNOT BE WIDER THAN 12').
 - CONTRACTOR TO SUBMIT A JOINT LAYOUT PLAN FOR REVIEW AND APPROVAL PRIOR TO COMMENCING PAVING OPERATIONS. CONTRACTOR TO TAKE INTO ACCOUNT REVIEW TIME AND CHANGES PER ANY COMMENTS WHEN SCHEDULING THE SUBMISSION OF THE JOINT LAYOUT PLAN.
- REINFORCEMENT OF IRREGULARLY SHAPED PANELS OR MISMATCHED JOINTS
 - ON PANELS WITH RADII, ON PANELS THAT TAPER TO A SHARP ANGLE, AND/OR WHEN THE LENGTH TO WIDTH RATIO EXCEEDS 1.25, PROVIDE A MINIMUM OF 0.05 PERCENT STEEL IN BOTH DIRECTIONS ACROSS THE ENTIRE PANEL.
 - WHERE JOINT PATTERNS OF ABUTTING PAVEMENTS DO NOT MATCH AND ARE NOT SEPARATED BY AN EXPANSION JOINT, PROVIDE A MINIMUM OF 0.05 PERCENT STEEL IN THE PAVEMENT OPPOSITE OF THE MISMATCHED JOINT FOR A DISTANCE OF THREE FEET BACK FROM THE JOINT ALONG THE FULL WIDTH OF THE PANEL.
- WHERE DIFFERENT THICKNESS PAVEMENTS ABUT, PROVIDE A THICKENED EDGE ON THE THINNER PAVEMENT SECTION WHICH TRANSITIONS TO THE THICKER PAVEMENT DEPTH ACROSS FOUR FEET.
- PROVIDE MEDIUM TO FINE TEXTURED BROOM FINISH UNLESS OTHERWISE INDICATED ON THE PLANS.
- INSTALLATION TOLERANCES
 - ELEVATION: 1/4 INCH
 - THICKNESS: PLUS 3/8 INCH, MINUS 1/4 INCH
 - SURFACE: 1/4 INCH IN 10 FEET

PAVEMENT MARKINGS:

- ALLOW PAVING TO AGE A MINIMUM OF 30 DAYS BEFORE STARTING PAVEMENT MARKING OPERATIONS.
- PAVEMENT MARKING PAINT SHALL BE ACRYLIC, WATERBORNE EMULSION, LEAD AND CHROMATE FREE, READY MIXED, COMPLYING WITH FS TT-P-1952, TYPE II, WITH A DRYING TIME OF LESS THAN THREE MINUTES.
- COLOR AS INDICATED.

GENERAL SITE NOTES:

- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL MUNICIPAL REGULATIONS AND CODES, WHICHEVER IS MORE STRINGENT.
- ALL WORK AND MATERIALS SHALL COMPLY WITH O.S.H.A. STANDARDS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS, INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS & POLES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES' SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COST SHALL BE INCLUDED IN BASE BID.
- ALL DIMENSIONS AND COORDINATES ARE FROM FACE OF CURB UNLESS SHOWN OTHERWISE.
- RADII = 2'-0" UNLESS OTHERWISE INDICATED.

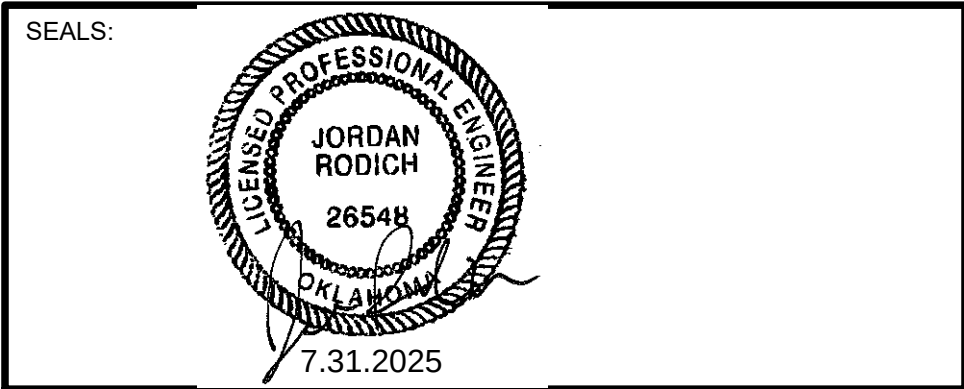


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918.584.5555
oklahoma.co1460
exp: 6-30-27

PROJECT TITLE:

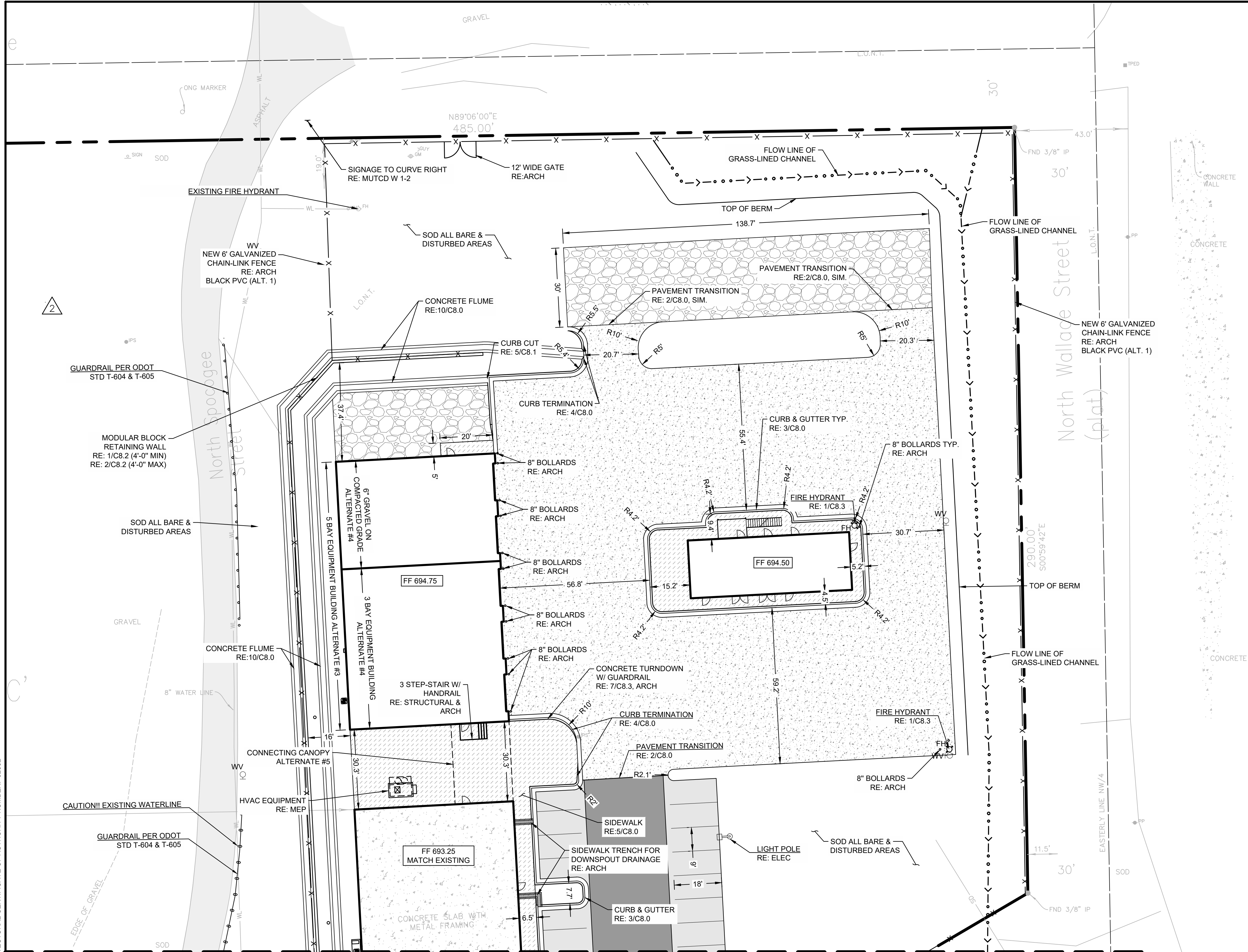
CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

OVERALL SITE PLAN

SHEET NUMBER:

C4.0



RE: C4.0 FOR SITE & PAVING NOTES

LEGEND

- HEAVY DUTY ASPHALT PAVEMENT
RE: 1/C8.0
- STANDARD DUTY ASPHALT PAVEMENT
RE: 1/C8.0
- HEAVY DUTY CONCRETE PAVEMENT
RE: 1/C8.0
- REINFORCED CONCRETE PAVING
RE: 1/C8.0
- CONCRETE SIDEWALK
RE: 5/C8.0
- GRAVEL PAVEMENT
RE: 9/C8.0

MATCH LINE SEE SHEET C4.2

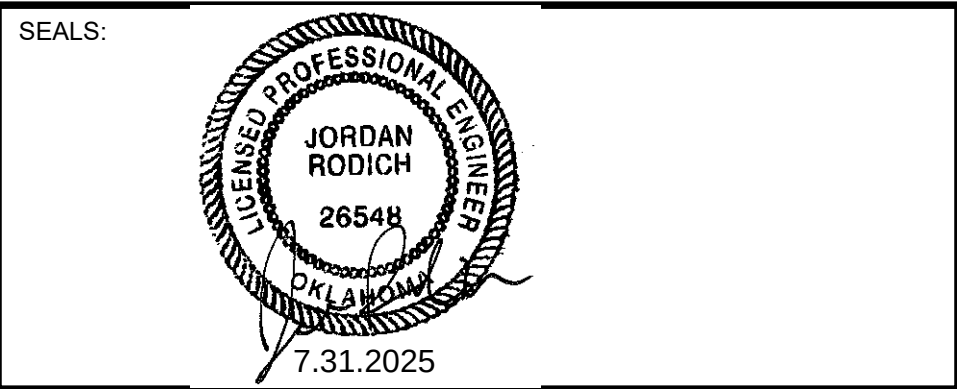


Know what's below.
Call before you dig.

CAUTION
NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THE LOCATION AND ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES.

A	100% CONSTRUCTION DOCUMENTS	08.01.25
#	REVISION	DATE



PROJECT NO.:	17-00901
FILE:	
ISSUE DATE:	08.01.25
SCALE:	AS NOTED
DRAWN BY:	JE
CHECKED BY:	JE
APPROVED BY:	JR

ARCHITECT:

GS HELMS + ASSOCIATES

ph: 918.298.7257 424 e. main st.
wb: gshelms.com jenkins, ok 74037



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PROJECT TITLE:

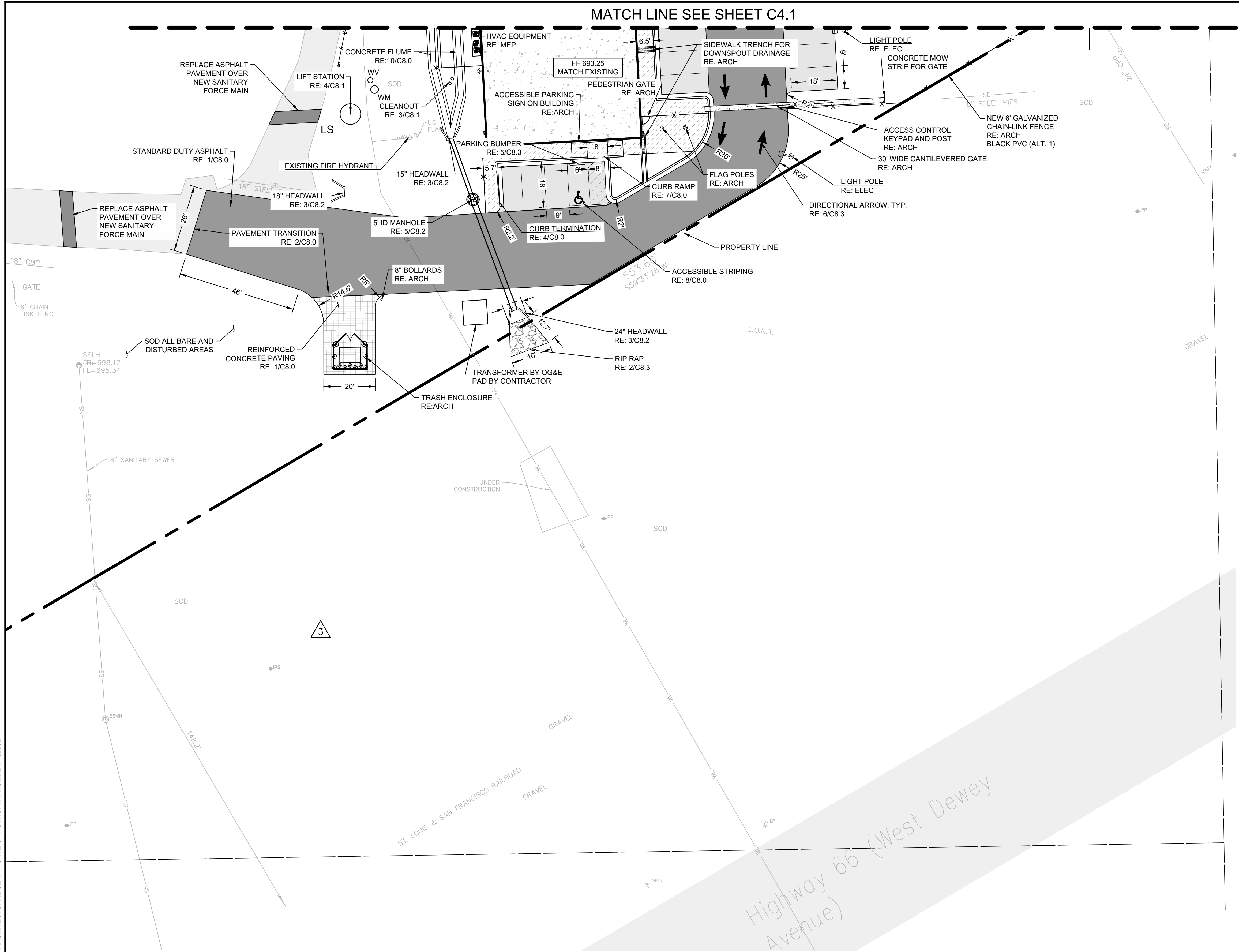
CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

SITE PLAN

SHEET NUMBER:

C4.1



RE: C4.0 FOR SITE & PAVING NOTES

LEGEND

- HEAVY DUTY ASPHALT PAVEMENT
RE: 1/C8.0
- STANDARD DUTY ASPHALT PAVEMENT
RE: 1/C8.0
- HEAVY DUTY CONCRETE PAVEMENT
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RE: 5/C8.0
- GRAVEL PAVEMENT
RE: 9/C8.0

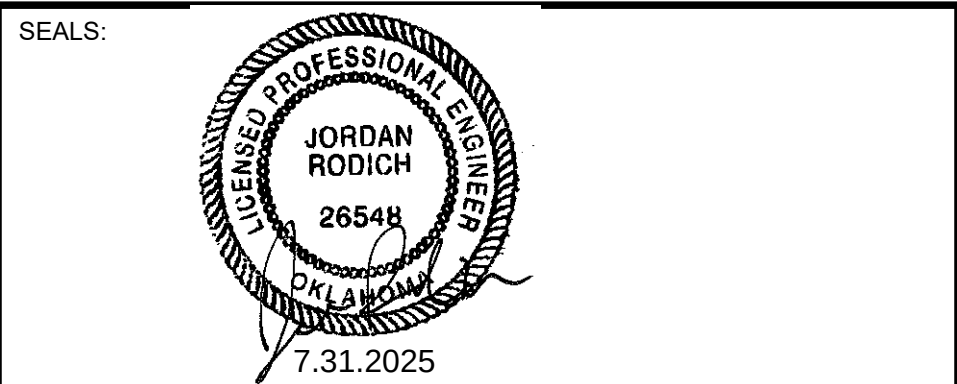


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PROJECT TITLE:

CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
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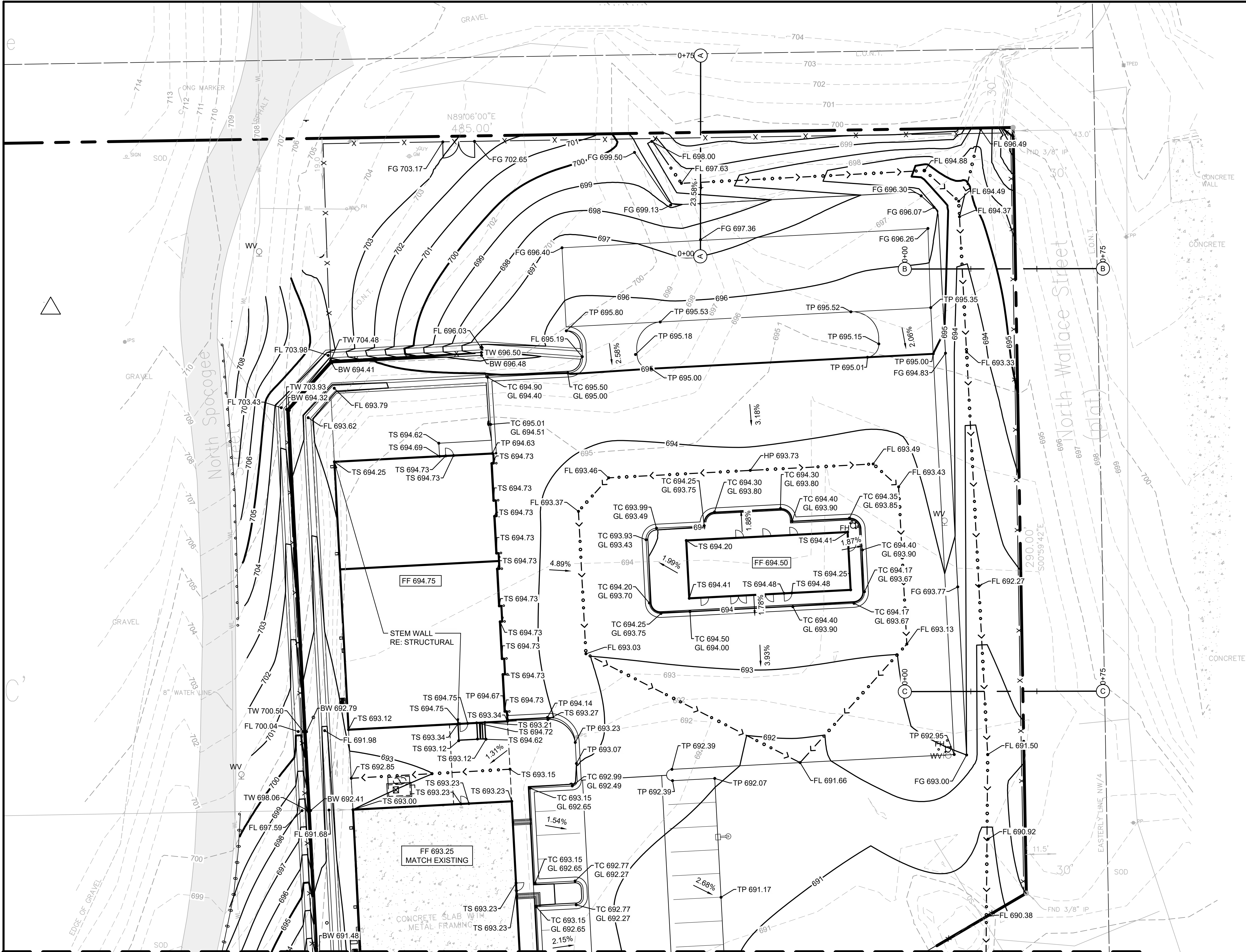
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SITE PLAN

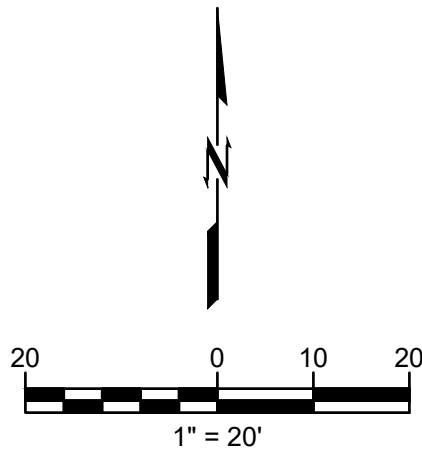
SHEET NUMBER:

C4.2

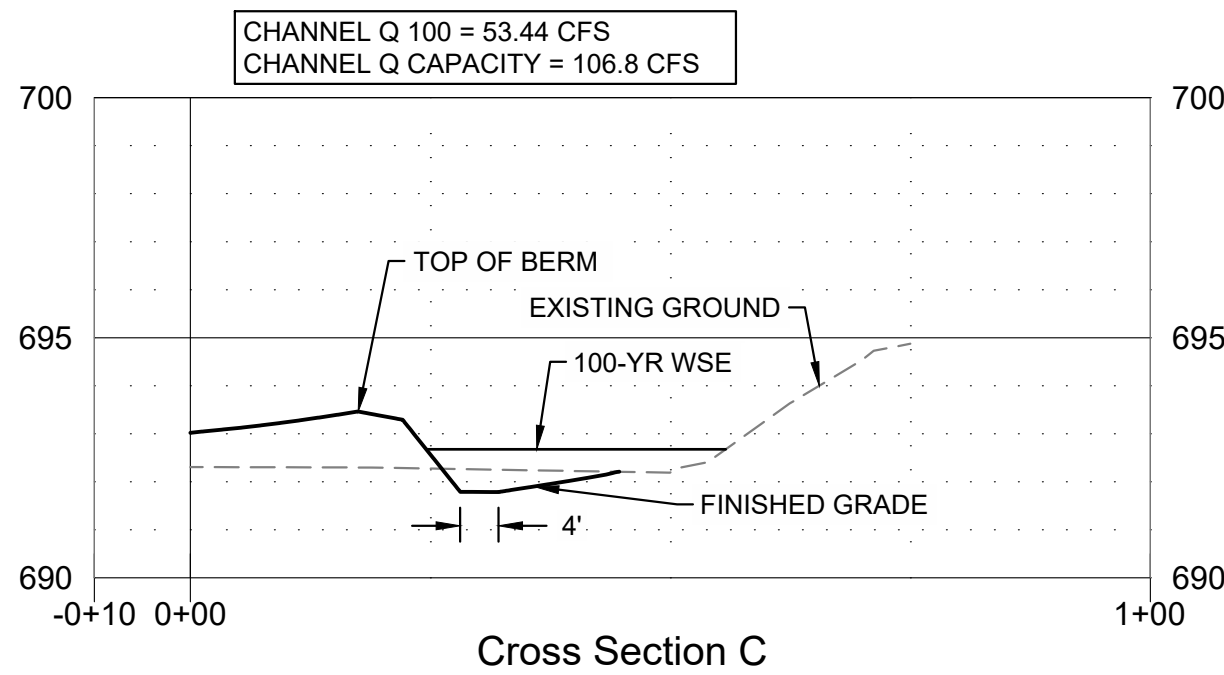
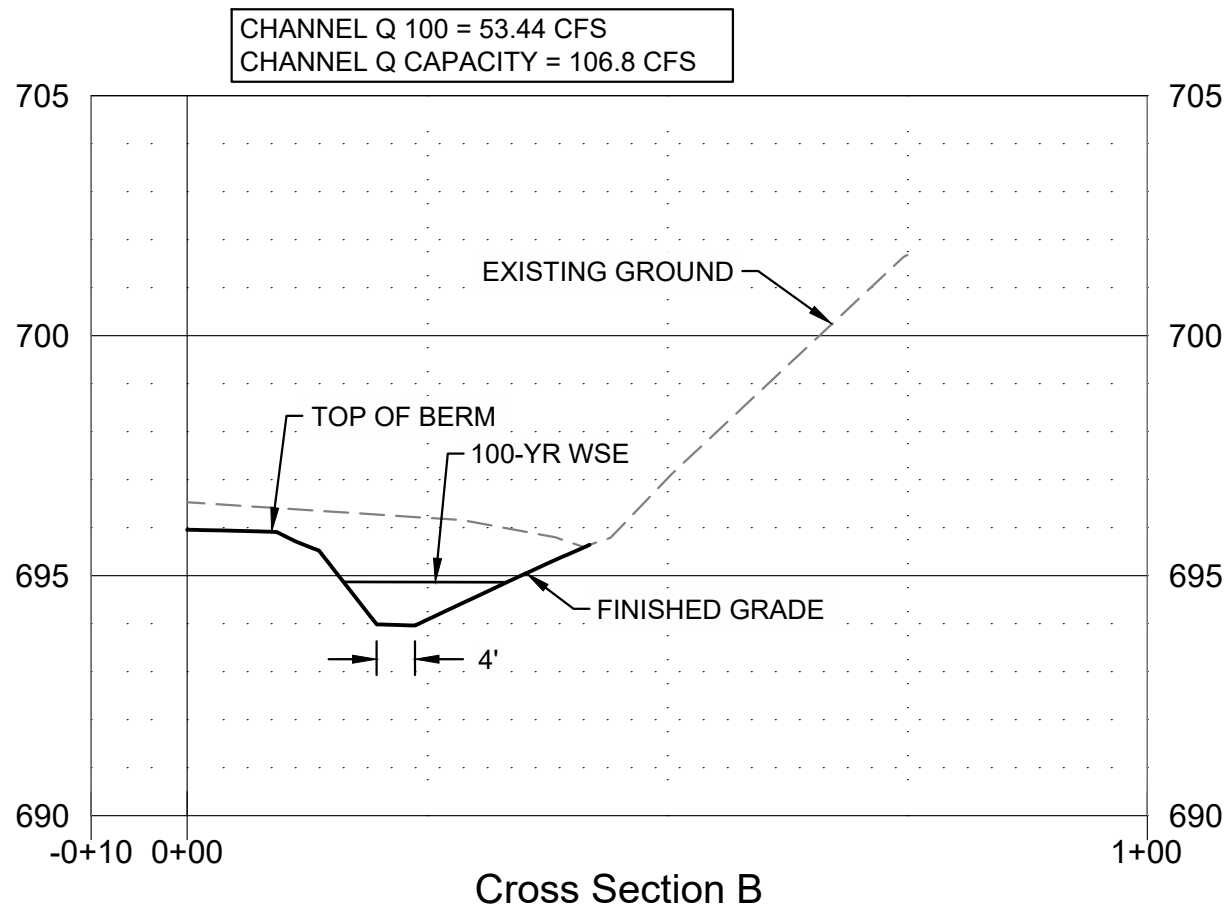
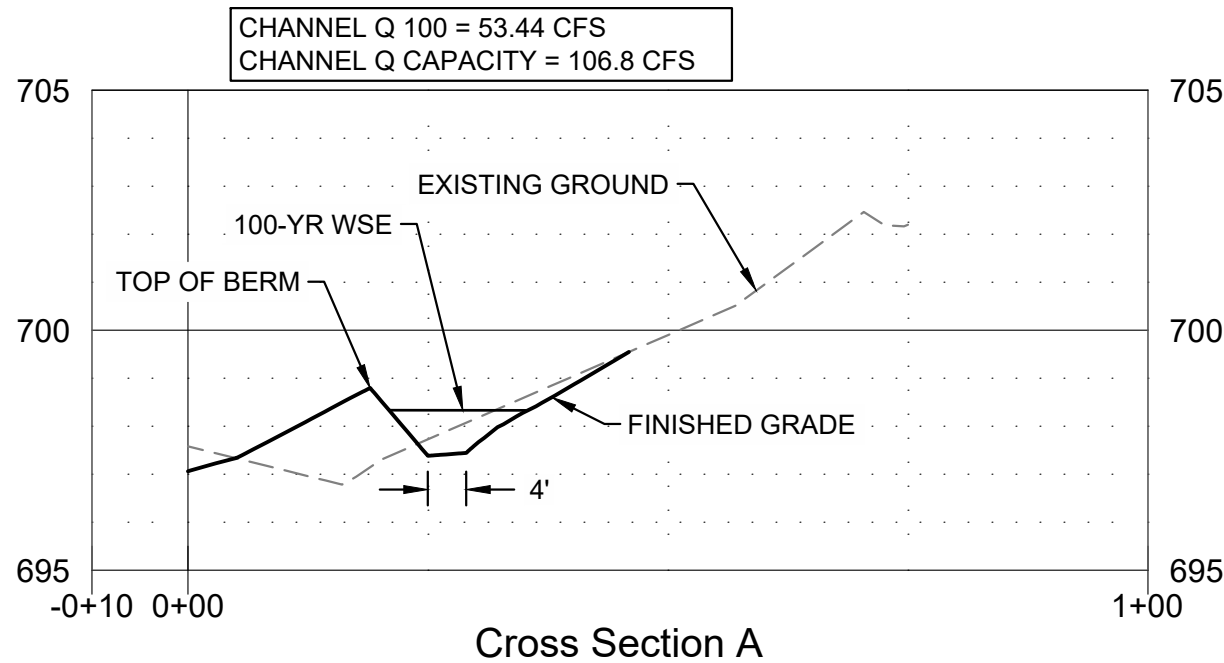
C5.0



RE: C5.0 FOR GRADING NOTES



- (M) MEASURED DATA
- (R) RECORD DATA
- BC BACK OF CURB
- BL BUILDING LINE
- CL CENTERLINE
- EG EXISTING GRADE
- FF FINISHED FLOOR
- FG FINISHED GRADE
- FL FLOWLINE
- GL GUTTER LINE
- HP HIGH POINT
- INV INVERT
- LF LINEAR FEET
- LP LOW POINT
- ME MATCH EXISTING
- RW RIGHT-OF-WAY
- SF SQUARE FEET
- SY SQUARE YARDS
- TBK TOP OF BANK
- TC TOP OF CURB
- TG TOP OF GRATE
- TOE TOE OF BANK
- TP TOP OF PAVEMENT
- TR TOP OF RIM
- TS TOP OF SIDEWALK
- TW TOP OF WALL

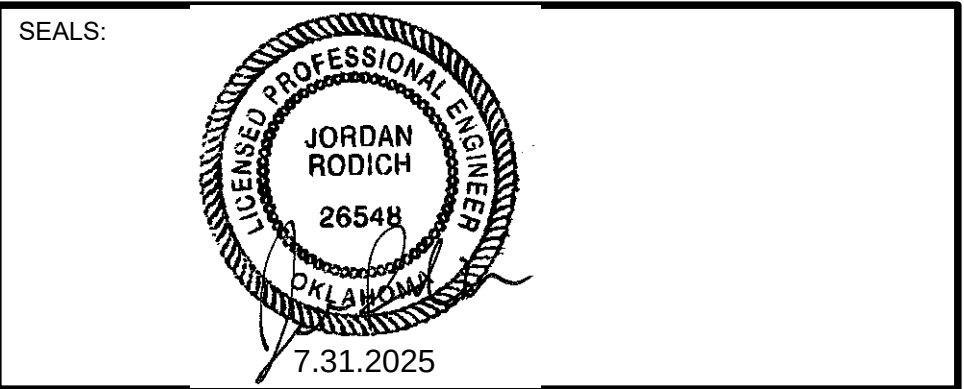


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MATCH LINE SEE SHEET C5.2

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jenks, ok 74037

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oklahoma: ca1460
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PROJECT TITLE:
CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

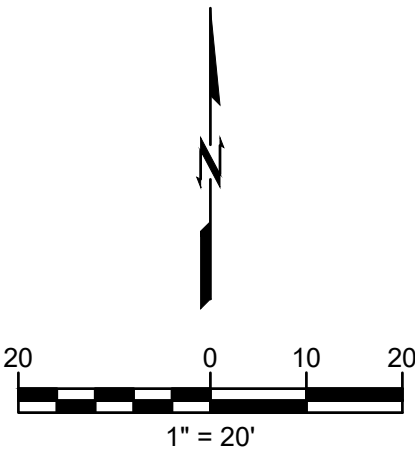
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GRADING PLAN

SHEET NUMBER:

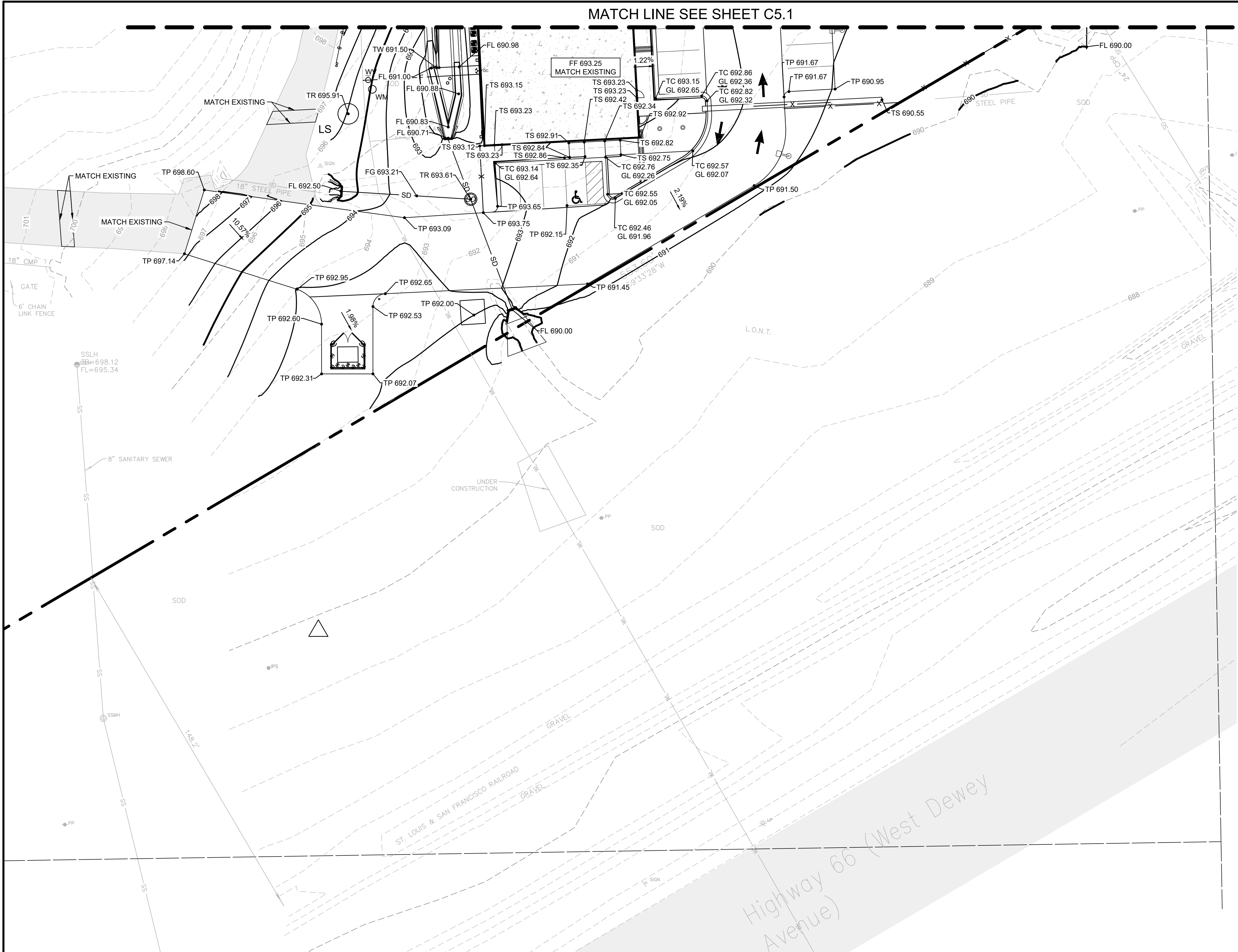
C5.1

MATCH LINE SEE SHEET C5.1



RE: C5.0 FOR GRADING NOTES

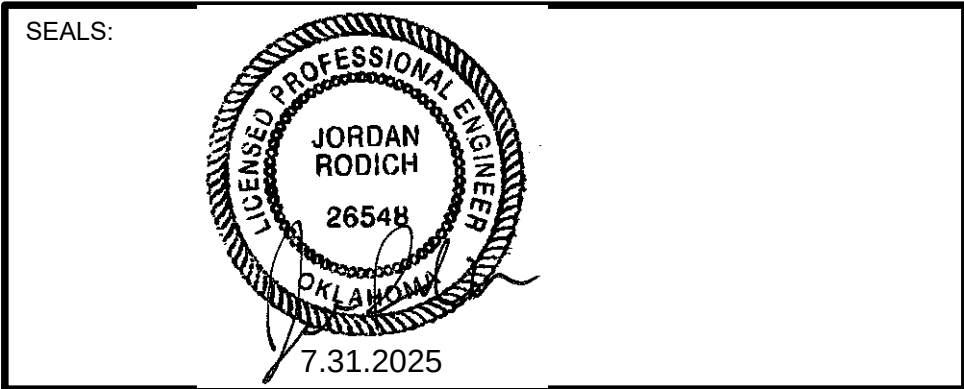
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(R) RECORD DATA
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CL CENTERLINE
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PROJECT TITLE:

CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

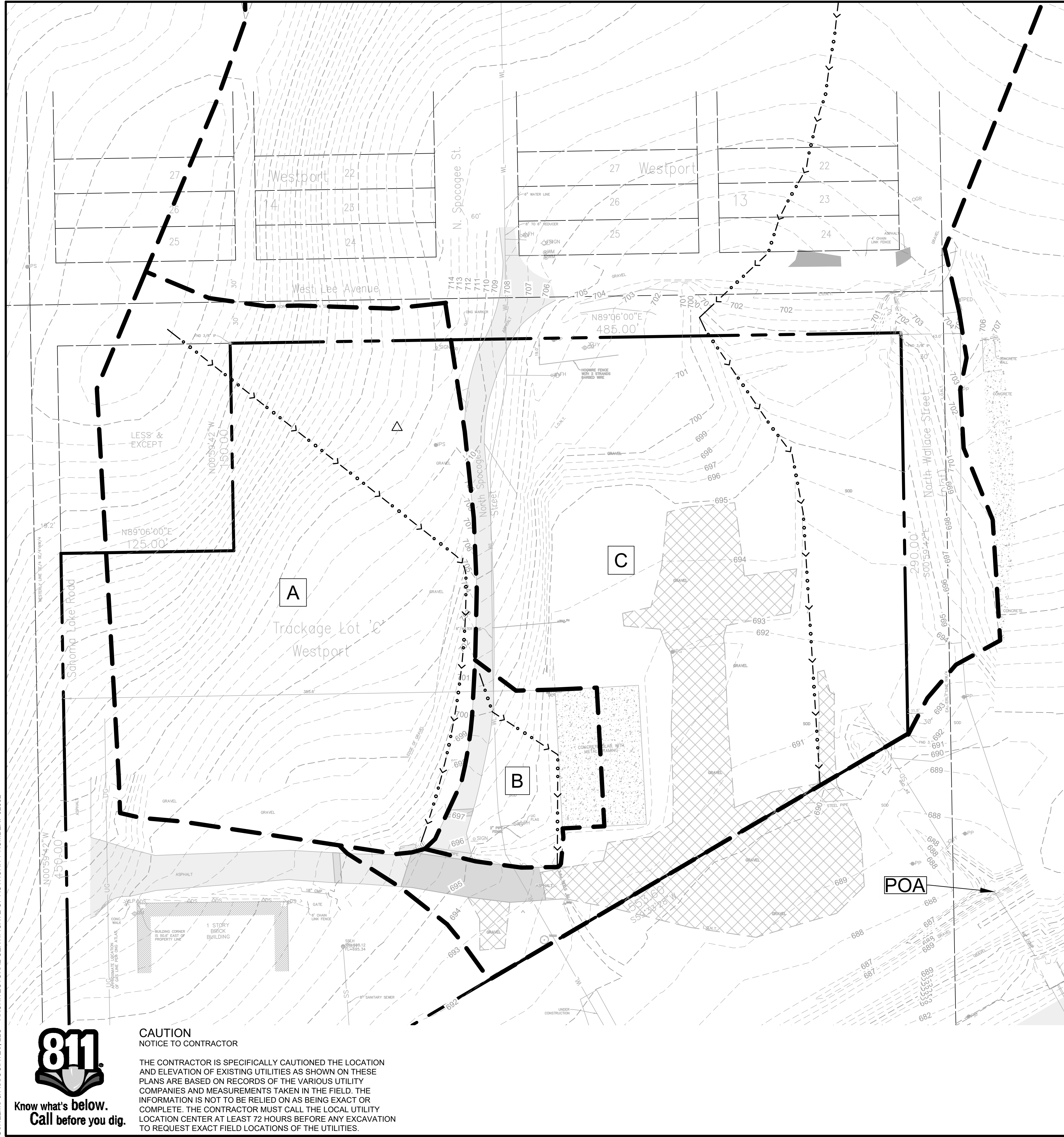
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GRADING PLAN

SHEET NUMBER:

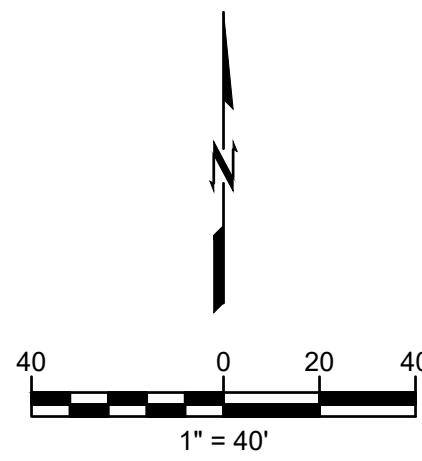
C5.2

GSHELMS & ASSOCIATES, LLC ARCHITECTURAL CERTIFICATE OF AUTHORITY NUMBER: 02332



**CAUTION
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LEGEND

- > DRAINAGE FLOW PATH
- - - DRAINAGE AREA BOUNDARY
- B** DRAINAGE AREA LABEL
- POA POINT OF ANALYSIS

EXISTING RUNOFF (RATIONAL)																
DRAINAGE AREA BASIN	DRAINAGE AREA (SF)	DRAINAGE AREA (ACRES)	PAVED AREA (SF)	GRAVEL AREA (SF)	GRASS AREA (SF)	"C" FACTOR	REACH GRASS (FEET)	SLOPE GRASS (%)	VELOCITY GRASS (FPS)	REACH PAVING (FEET)	SLOPE PAVING (%)	VELOCITY PAVING (FPS)	REACH GRAVEL (FEET)	SLOPE GRAVEL (%)	VELOCITY GRAVEL (FPS)	
A	99,374	2.28	24421	21485	53,468	0.62	120	15.0%	2.70	0	0.00%	0.00	360	5.0%	2.23	
B	12,599	0.29	5311	0	7,288	0.63	140	6.0%	1.71	25	5.00%	4.55	0	0.0%	0.00	
C	586,397	13.46	35276	107334	443,787	0.51	1020	8.0%	1.97	0	0.00%	0.00	360	3.0%	1.73	

GSHELMS & ASSOCIATES, LLC ARCHITECTURAL CERTIFICATE OF AUTHORITY NUMBER: 02332

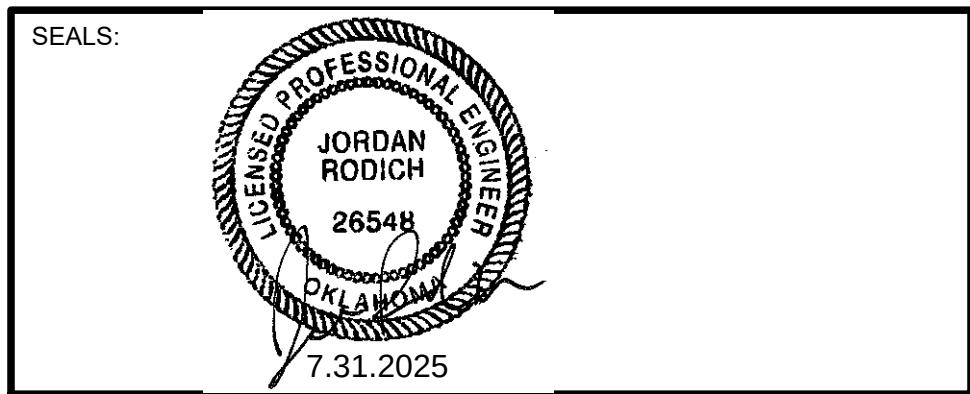


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ARCHITECT:

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wb: gshelms.com

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918.584.5858
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PROJECT TITLE:

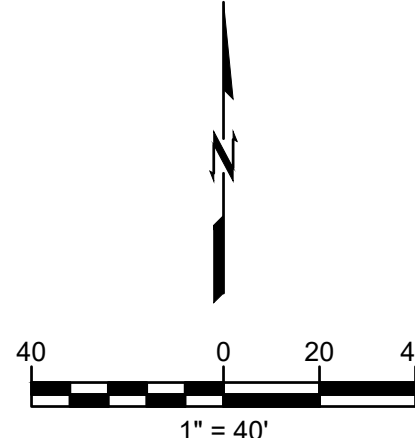
CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
TRAINING FACILITY**
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

PROPOSED DRAINAGE PLAN

SHEET NUMBER:

C5.4



LEGEND	
	DRAINAGE FLOW PATH
	DRAINAGE AREA BOUNDARY
	DRAINAGE AREA LABEL
	POINT OF ANALYSIS

PROPOSED RUNOFF (RATIONAL)																						
DRAINAGE AREA BASIN	DRAINAGE AREA (SF)	DRAINAGE AREA (ACRES)	PAVED AREA (SF)	GRAVEL AREA (SF)	GRASS AREA (SF)	"C" FACTOR	REACH GRASS (FEET)	SLOPE GRASS (%)	VELOCITY GRASS (FPS)	REACH PAVING (FEET)	SLOPE PAVING (%)	VELOCITY PAVING (FPS)	REACH GRAVEL (FEET)	SLOPE GRAVEL (%)	VELOCITY GRAVEL (FPS)	REACH GRASSED WATERWAY (FT)	SLOPE GRASSED WATERWAY (%)	VELOCITY GRASSED WATERWAY (FPS)	TOTAL Tc (MIN)	100 (IN/HR)	Q 100 (CFS)	
A	99,374	2.28	24,421	21,485	53,468	0.62	120	15.0%	2.70	0	0.00%	0.00	360	5.0%	2.23	0	0.00%	0.00	0.00	3.4	11.7	16.53
B	29,630	0.68	15,405	1,433	12,792	0.71	0	0.0%	0.00	345	1.20%	2.23	0	0.0%	0.00	0	0.00%	0.00	0.00	2.6	12.1	5.81
C	569,366	13.07	77,460	4,155	487,751	0.48	1020	8.0%	1.97	0	0.00%	0.00	0	0.0%	0.00	415	1.50%	1.98	12.1	8.6	53.44	

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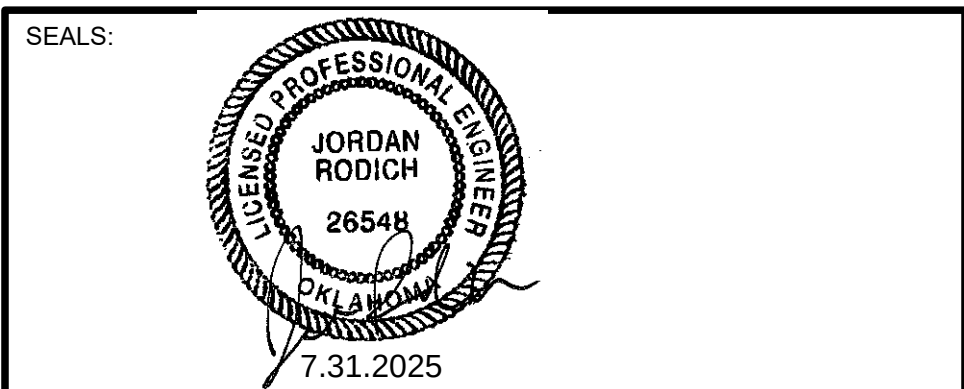


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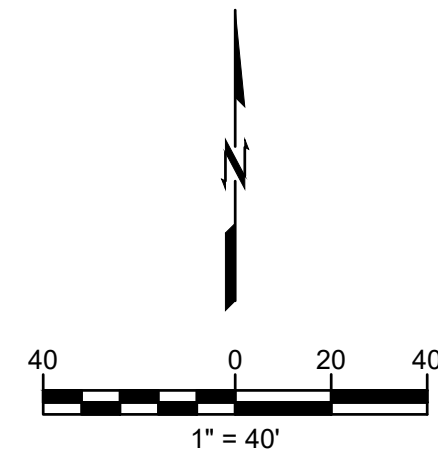
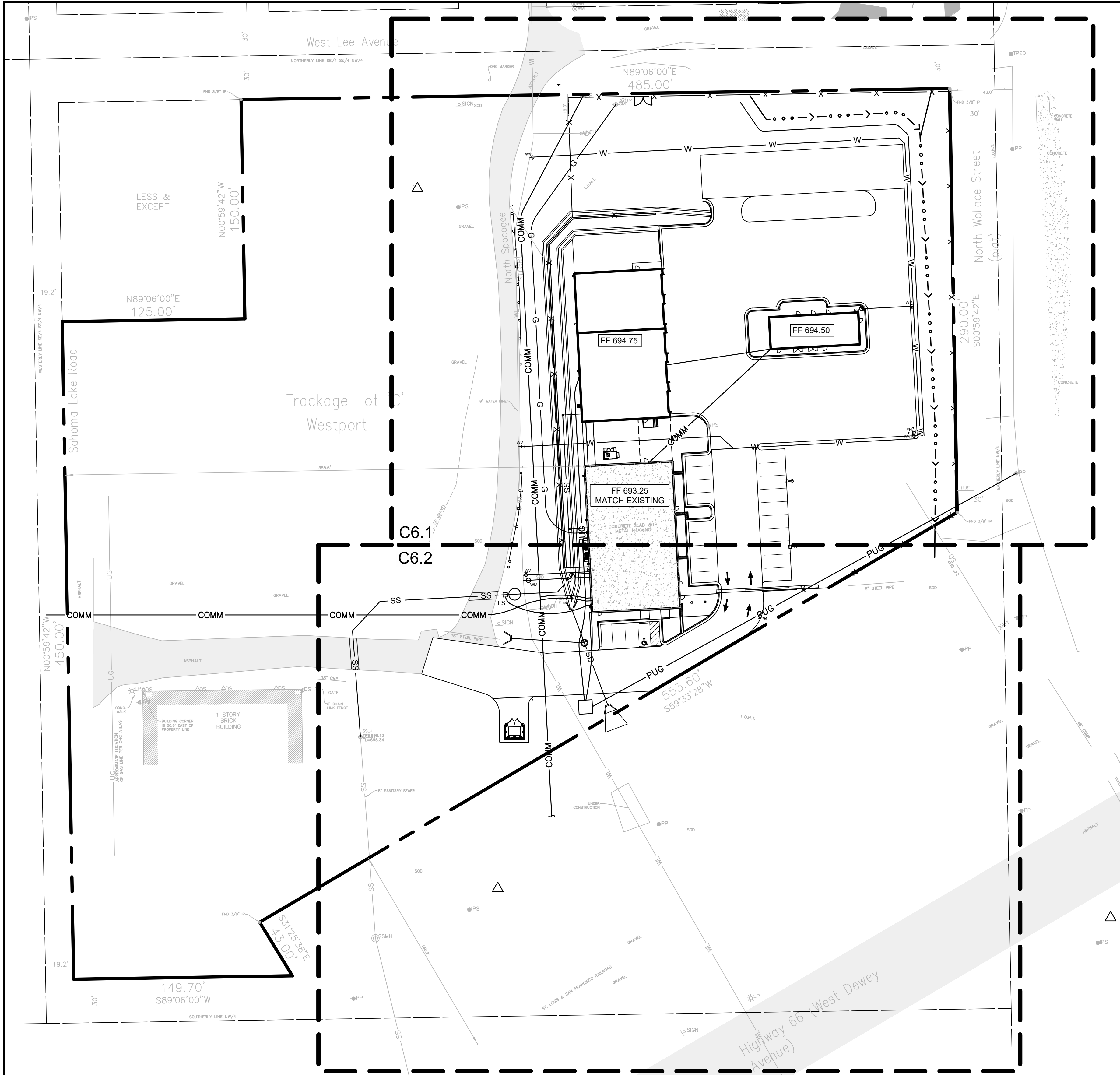
CITY OF SAPULPA, OK
**SAPULPA FIRE DEPARTMENT
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15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

UTILITY PLAN

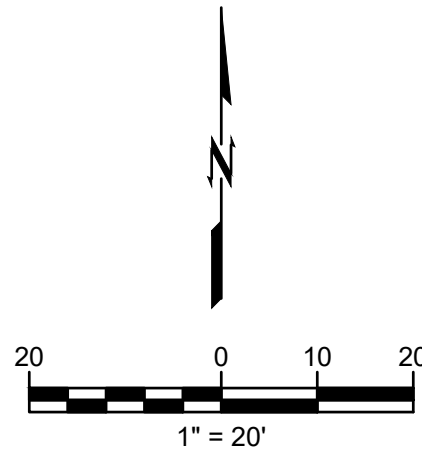
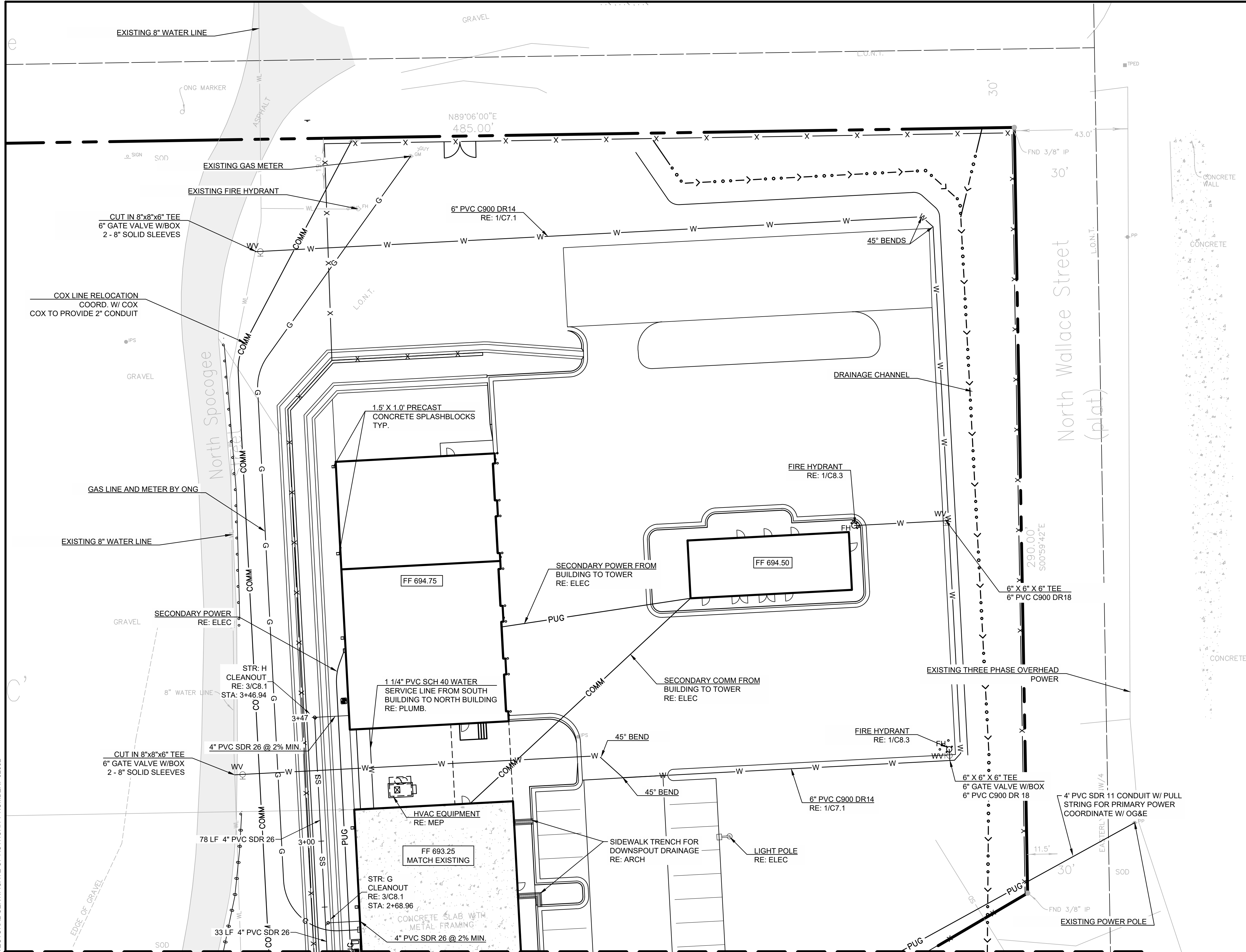
SHEET NUMBER:

C6.0



GENERAL UTILITY NOTES:

- PRIOR TO CONSTRUCTION, LOCATION OF SITE UTILITIES SHALL BE VERIFIED BY CONTRACTOR WITH THE PROPER UTILITY COMPANY PROVIDING SERVICE. SERVICE LINES SHOWN FOR COORDINATION AND REFERENCE ONLY. CONTRACTOR SHALL COORDINATE WITH ALL SERVICE PROVIDERS (TELECOMMUNICATIONS, ELECTRIC, GAS, ETC.) PRIOR TO INSTALLING SERVICE LINES OR APPURTENANCES. CONTRACTOR IS TO COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
- THIS PLAN DEPICTS THE INTENT OF PRIVATE AND FRANCHISE UTILITY ROUTINGS AS UNDERSTOOD DURING DESIGN PHASES OF THE PROJECT. IT IS THE OWNER/DEVELOPER'S RESPONSIBILITY TO NEGOTIATE ALL CONTRACTS FOR SERVICE WITH EACH INDIVIDUAL UTILITY COMPANY AND TO PROVIDE THE ENGINEER WITH ANY DOCUMENTS THAT MAY AFFECT THE LAYOUT.
- CONTRACTOR SHALL NOTIFY THE UTILITY AUTHORITIES' INSPECTORS BEFORE CONNECTING TO ANY EXISTING LINE IN ACCORDANCE WITH LOCAL REQUIREMENTS.
- CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH THE SPECIFICATIONS OF THE LOCAL AUTHORITIES REGARDING TO MATERIALS AND INSTALLATION OF THE WATER AND SEWER LINES.
- NOT ALL EXISTING UNDERGROUND UTILITIES MAY BE SHOWN ON THIS PLAN. THE EXACT LOCATIONS AND NOTIFICATIONS OF THE PROPER AGENCY ARE THE RESPONSIBILITY OF THE CONTRACTOR PRIOR TO CONSTRUCTION.
- RESTRAINED JOINTS SHALL BE PROVIDED ON 4" AND LARGER WATER LINES AT ALL BENDS TEES AND FIRE HYDRANTS FOR A MINIMUM 2 JOINTS BOTH SIDES OF FITTING PER AWWA MINIMUM STANDARDS.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING PLANS FOR PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS. TERMINATE SERVICE PIPING 5' FROM BUILDING WALL UNTIL BUILDING PIPING SYSTEMS ARE INSTALLED. TERMINATE PIPING WITH VALVE AND CAP PLUG OR FLANGE AS REQUIRED FOR PIPING MATERIAL. MAKE CONNECTIONS TO BUILDING PIPING SYSTEMS WHEN THOSE SYSTEMS ARE INSTALLED.
- REFER TO PLUMBING AND/OR FIRE PROTECTION SHEETS FOR FIRE LINE LEAD-IN LOCATION AND DETAIL. CONTRACTOR SHALL UTILIZE AWWA AND FACTORY MUTUAL TEST AND CERTIFICATIONS FOR ALL UNDERGROUND FIRE PROTECTION LINES AS A MINIMUM. LOCAL OR STATE AUTHORITIES MAY REQUIRE MORE STRINGENT TESTING WHICH SHALL BE PROVIDED BY THE GC IF REQUIRED.
- FIRE LINE BACKFLOW PREVENTER (DOUBLE CHECK ASSEMBLY) SHALL BE LOCATED INSIDE THE BUILDING.
- ALL PIPING SHALL BE INSTALLED WITH A MINIMUM OF 30" OF COVER, UNLESS NOTED OTHERWISE. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS. UTILITY TRENCH DETAIL RE: 1/C8.1. STORM TRENCH DETAIL RE: 2/C8.1.
- REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING FOR CONTINUATION OF UTILITIES AT BUILDING.
- THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF ALL CONDUITS (INCLUDING IRRIGATION SLEEVES) PRIOR TO PAVING WHETHER OR NOT SHOWN ON CIVIL PLANS. THE CONTRACTOR SHALL INSTALL ALL CONDUITS WITH A PULL STRING. ALL CONDUIT SHALL BE SCH. 40 PVC, UNLESS NOTED OTHERWISE.
- CONSTRUCT CLAY TRENCH PLUG THAT EXTENDS AT LEAST 5 FEET OUT FROM THE FACE OF THE BUILDING EXTERIOR. THE PLUG MATERIAL SHALL CONSIST OF CLAY COMPACTED AT A WATER CONTENT AT OR ABOVE THE SOIL'S OPTIMUM WATER CONTENT. THE CLAY FILL SHALL BE PLACED TO COMPLETELY SURROUND THE UTILITY LINE AND BE COMPACTED TO AT LEAST 95% STANDARD PROCTOR DENSITY.
- IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE THE EXISTING STRUCTURE AS NECESSARY.
- ALL STORM PIPE ENTERING CONCRETE STRUCTURES SHALL BE GROUTED WITH NON SHRINK GROUT TO ASSURE CONNECTION AT STRUCTURE IS WATER TIGHT.
- PROVIDE SLEEVE WITH LINK-SEAL (OR APPROVED EQUAL) AT GRADE BEAM PENETRATION LOCATIONS (RE: STRUCTURAL FOR DETAIL).
- CONTRACTOR SHALL REFER TO ELECTRICAL SITE PLAN OR PHOTOMETRIC PLAN (BY OTHERS) FOR ALL SITE LIGHTING CONSTRUCTION DETAILS, REQUIREMENTS, AND FINAL POLE LOCATIONS. POLE LOCATIONS ARE SHOWN ON THIS SHEET FOR REFERENCE ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE ALL NECESSARY ADJUSTMENTS TO POLE LOCATIONS AS NECESSARY TO AVOID OBSTRUCTIONS (I.E. UNDERGROUND UTILITIES, SIDEWALKS, ETC.). CONTRACTOR SHALL POT HOLE EACH LOCATION WHERE A NEW LIGHT POLE IS TO BE PLACED PRIOR TO CONSTRUCTION TO VERIFY THERE ARE NO CONFLICTS WITH EXISTING UTILITIES. IF DAMAGES OCCUR TO EXISTING UTILITIES THEY WILL REPLACE OR REPAIR AT THEIR OWN EXPENSE. POLE LOCATIONS MAY NOT BE ADJUSTED WITHOUT PRIOR APPROVAL FROM THE ENGINEERS SINCE A CHANGE IN LOCATION CAN IMPACT THE INTENDED PHOTOMETRIC DESIGN.
- CONTRACTOR SHALL COORDINATE THE CONSTRUCTION OF ANY PROPOSED SIGN(S) AND INSTALLATION OF ANY SECURITY CAMERAS WITH OWNER'S CONSTRUCTION MANAGER. COORDINATE WITH ELECTRICAL SITE PLAN TO PROVIDE ALL CONDUIT NEEDED FOR DATA AND/OR POWER TO SITE SIGN(S), SECURITY CAMERAS, AND LIGHT POLES.



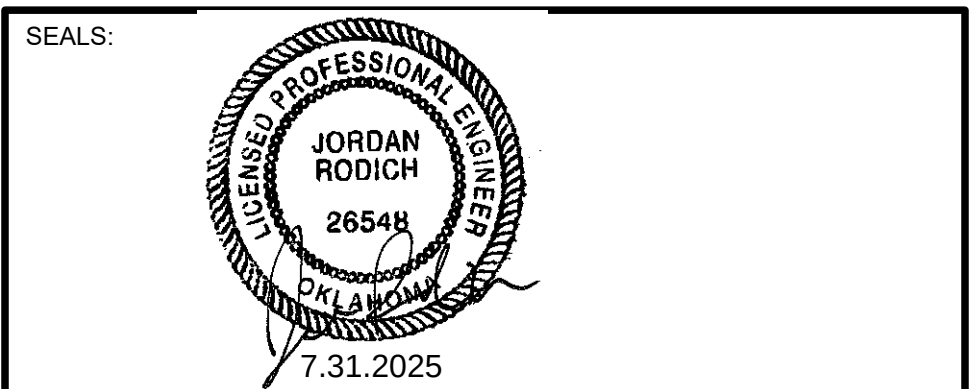
RE: C6.0 FOR UTILTIY NOTES



CAUTION
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APPROVED BY:	JR

ARCHITECT:

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15 SAHOMA LAKE ROAD SAPULPA, OK 74066

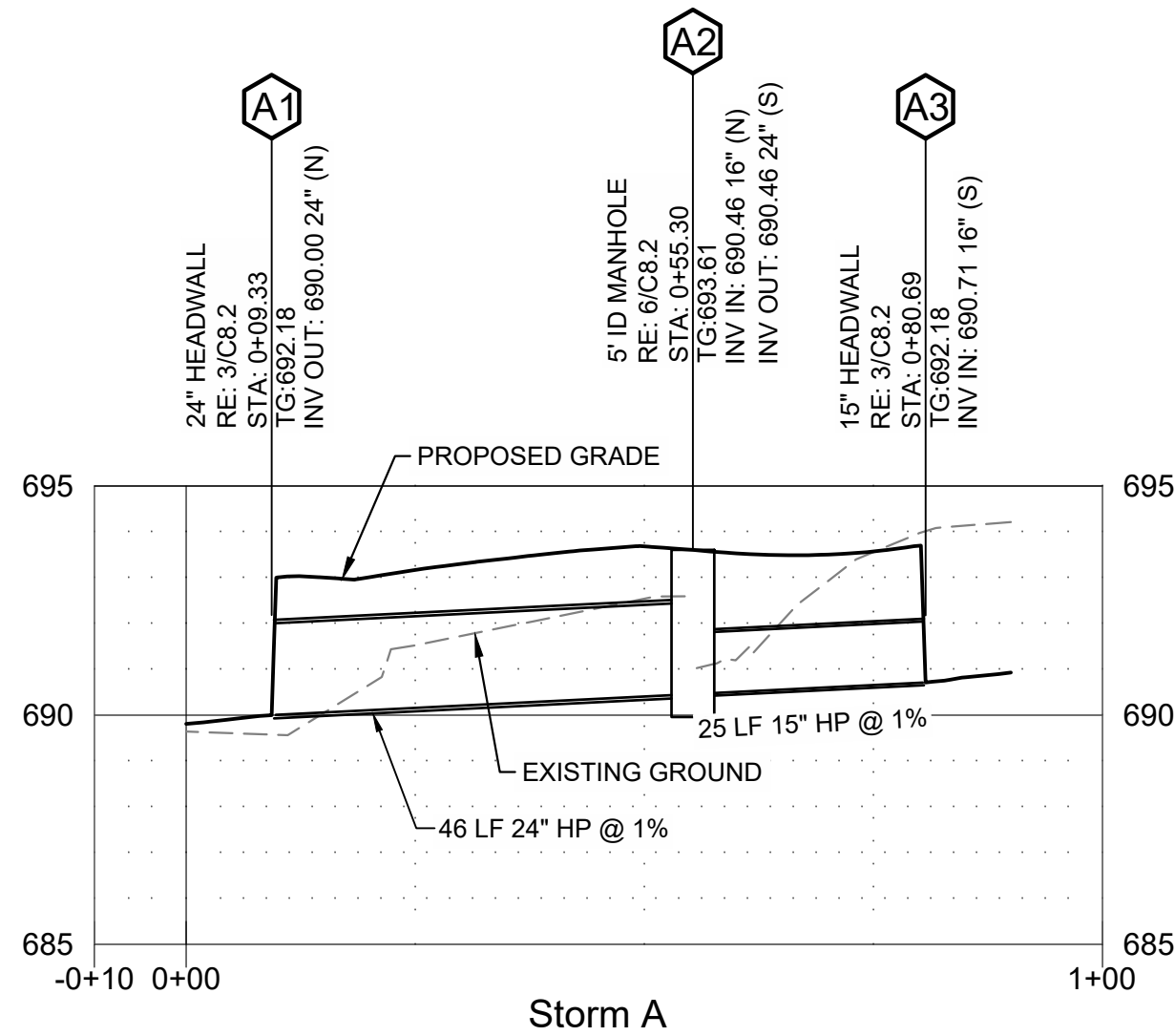
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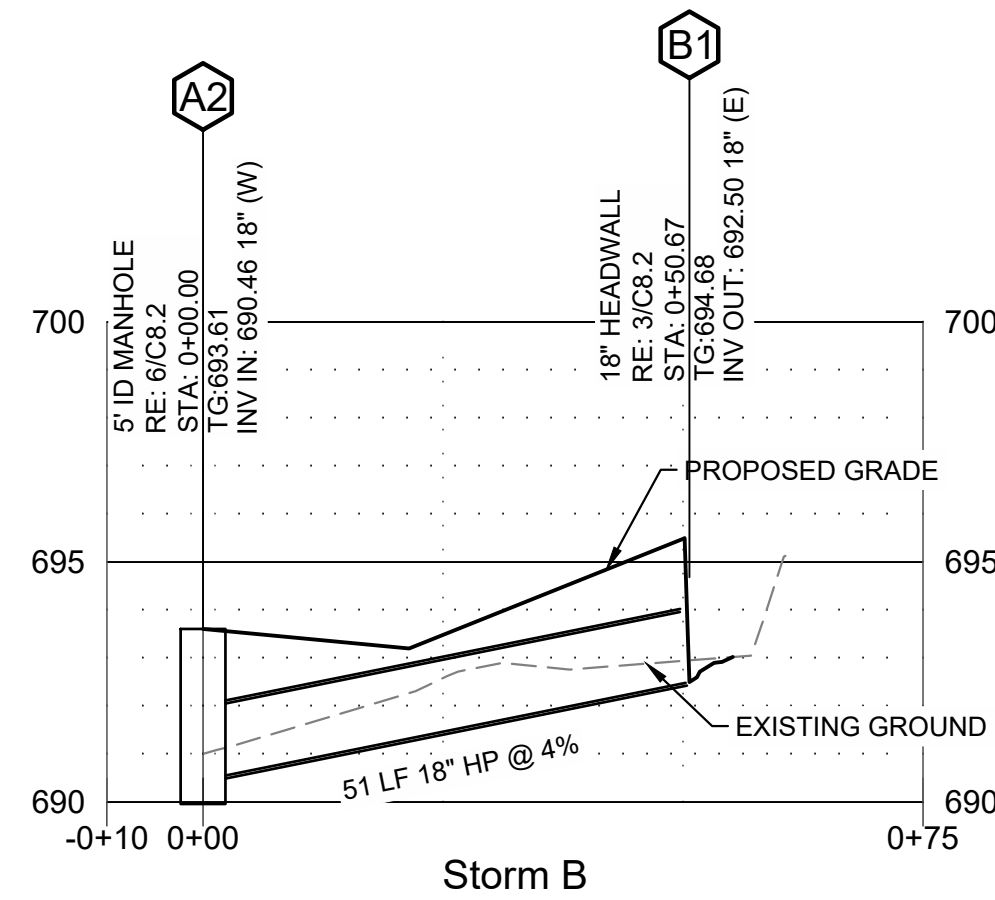
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C6.1

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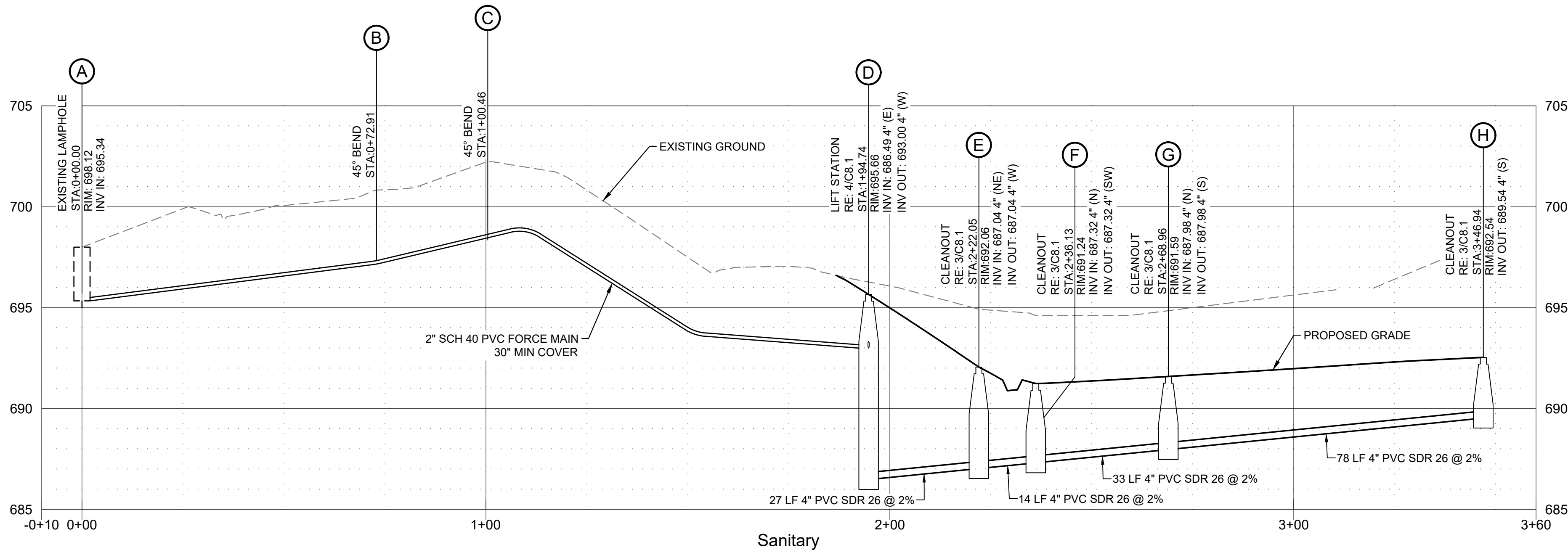
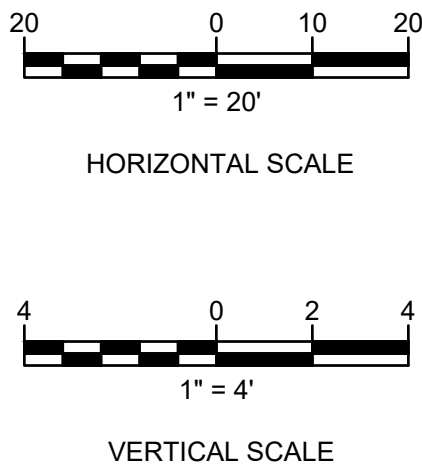


1 STORM A
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'



2 STORM B
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'

PIPE DESIGN TABLE (RATIONAL)															
Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (ft)	Slope (Calculated) (%)	Section Type	Material	Manning's n	Diameter (in)	Flow (cfs)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)
A1-A2	A2	690.46	A1	690.00	46.0	1.0	Circle	HP	0.013	24	22.34	22.62	692.15	691.62	693.12
A2-A3	A3	690.70	A2	690.46	25.0	1.0	Circle	HP	0.013	15	5.81	6.33	692.35	692.15	692.70
A2-B1	B1	692.50	A2	690.46	51.0	4.0	Circle	HP	0.013	18	16.53	21.01	693.93	692.15	695.34



3 SANITARY
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'



Know what's below.
Call before you dig.

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SEALS:



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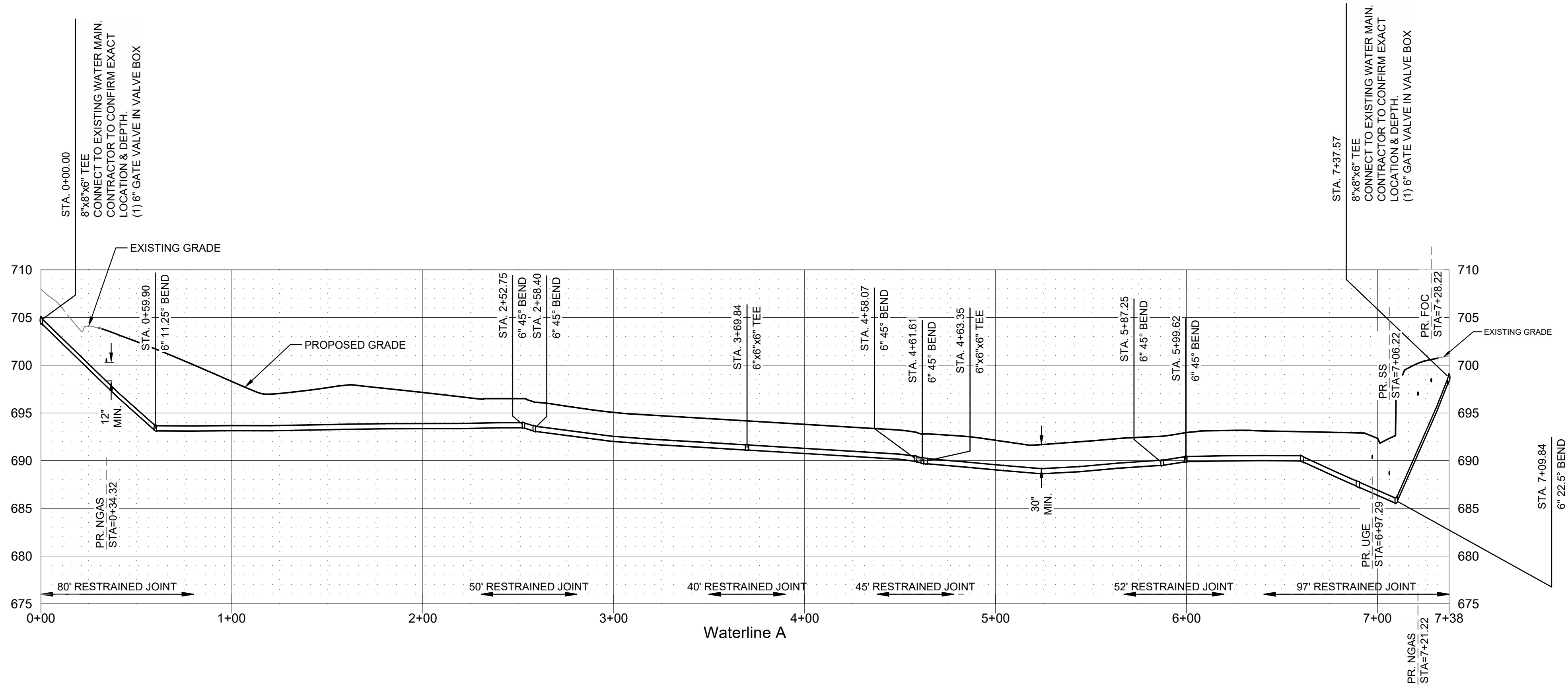
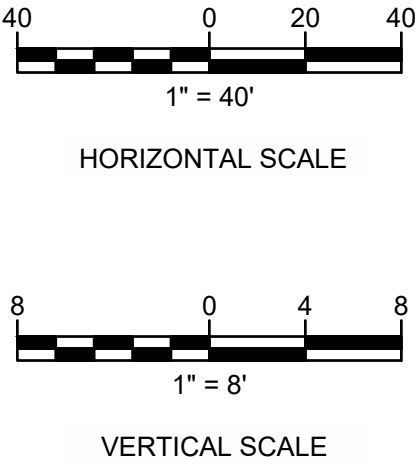
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SAPULPA FIRE DEPARTMENT
TRAINING FACILITY
15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

UTILITY PROFILES

SHEET NUMBER:

C7.0



1 WATERLINE A

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=8'

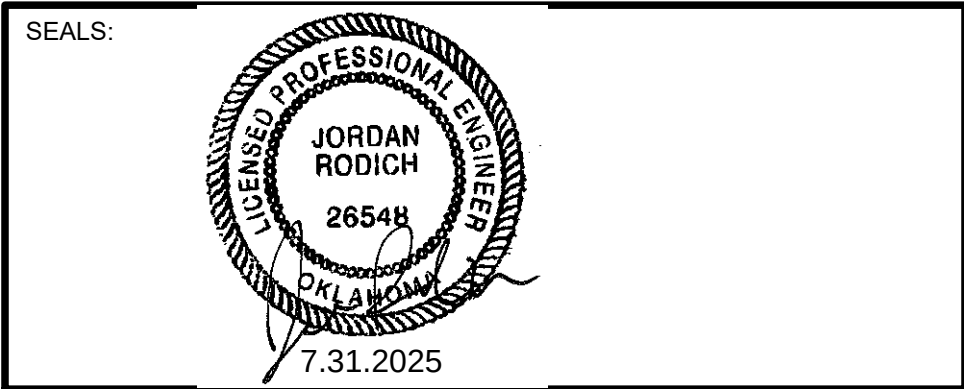


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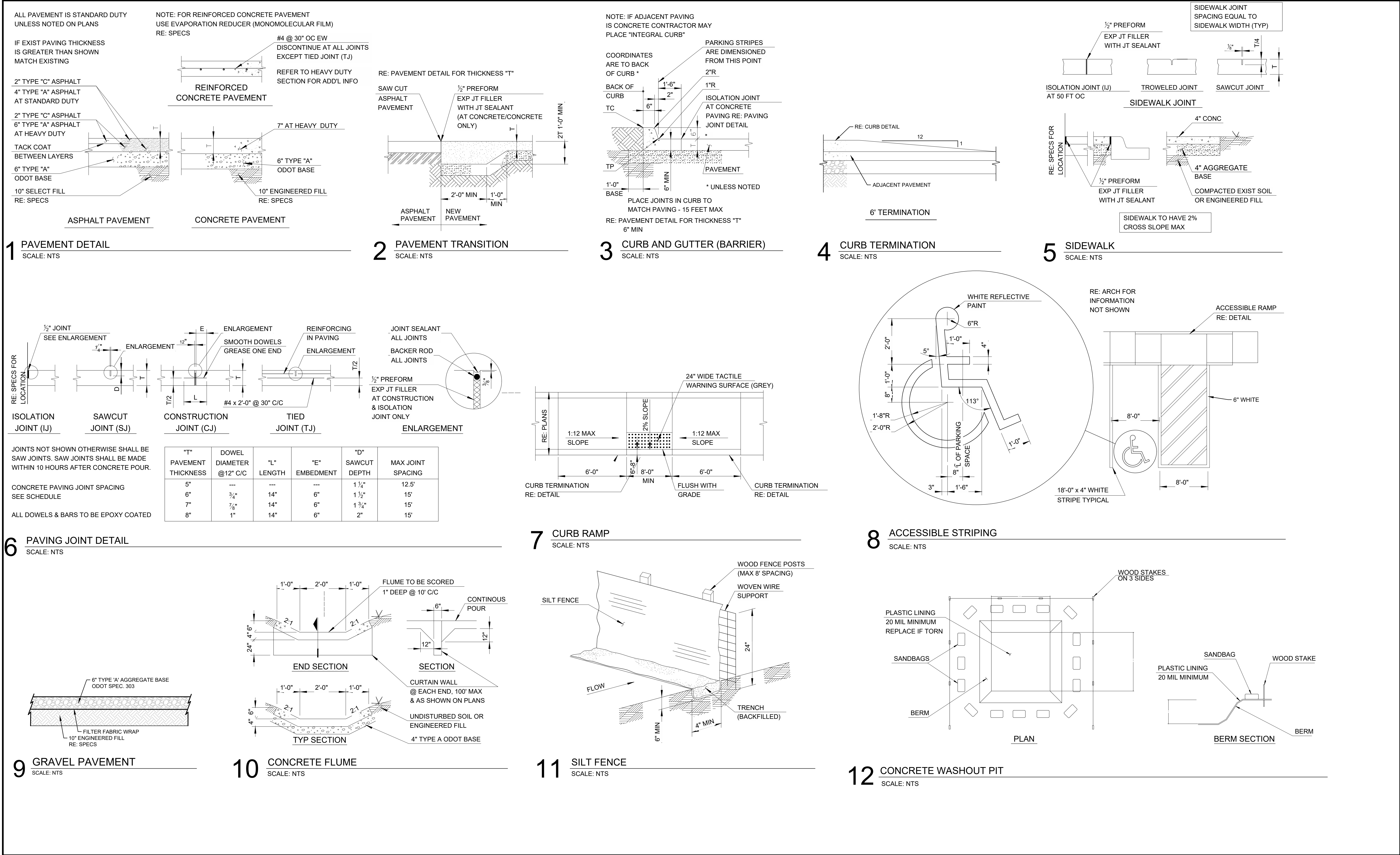
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15 SAHOMA LAKE ROAD | SAPULPA, OK 74066

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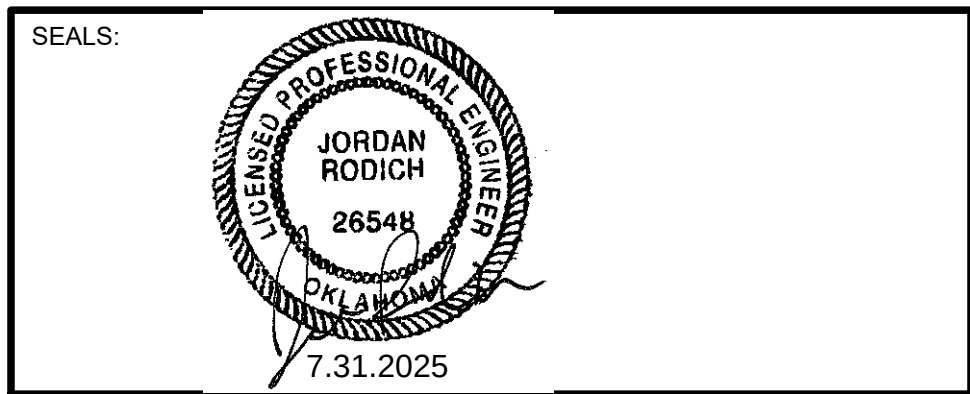
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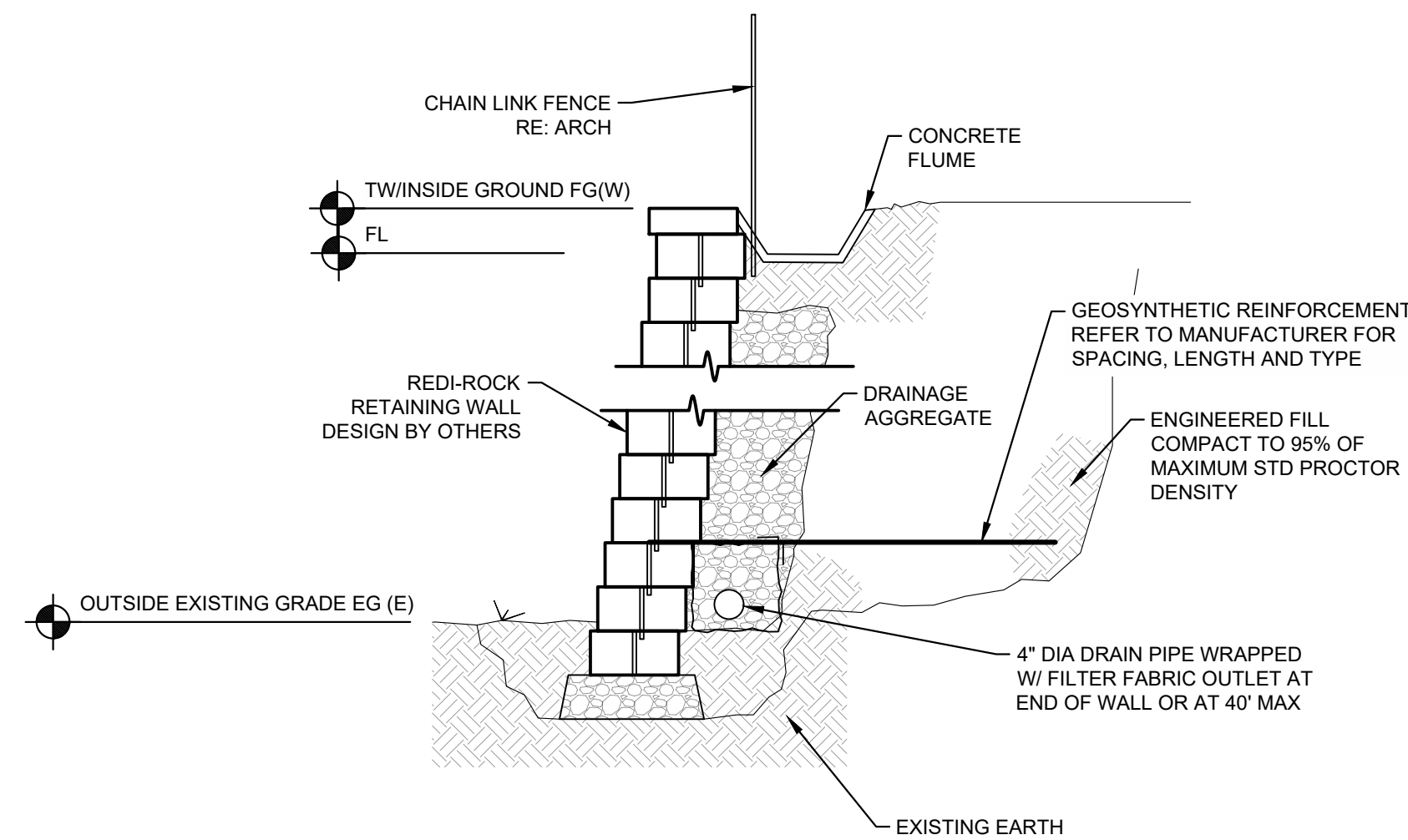
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DETAILS

SHEET NUMBER:

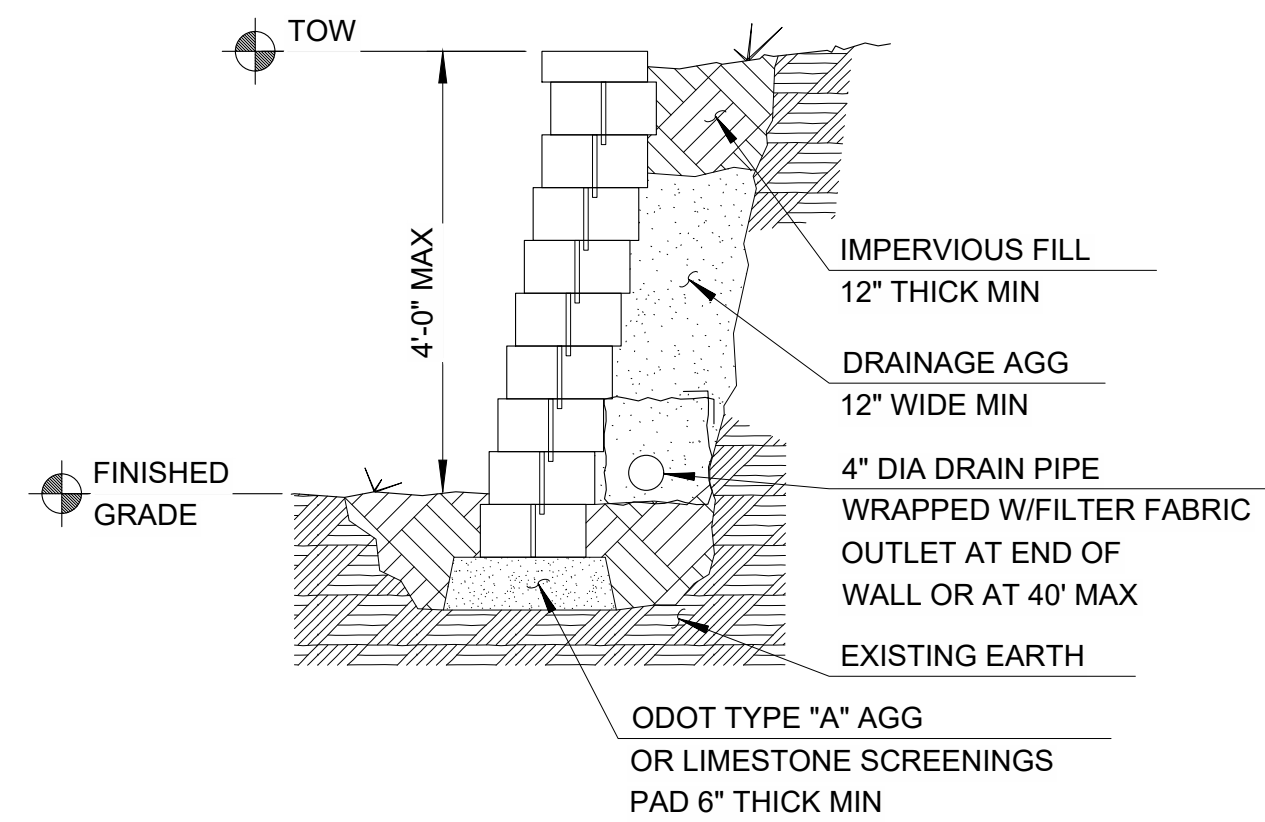
C8.0

NOTE: MODULAR BLOCK RETAINING WALL SHALL BE DESIGNED BY MANUFACTURER OR APPROVED EQUAL.
(DETAIL SHOWN FOR INFORMATION ONLY)
RETAINING WALL SHALL BE DESIGNED, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF OKLAHOMA

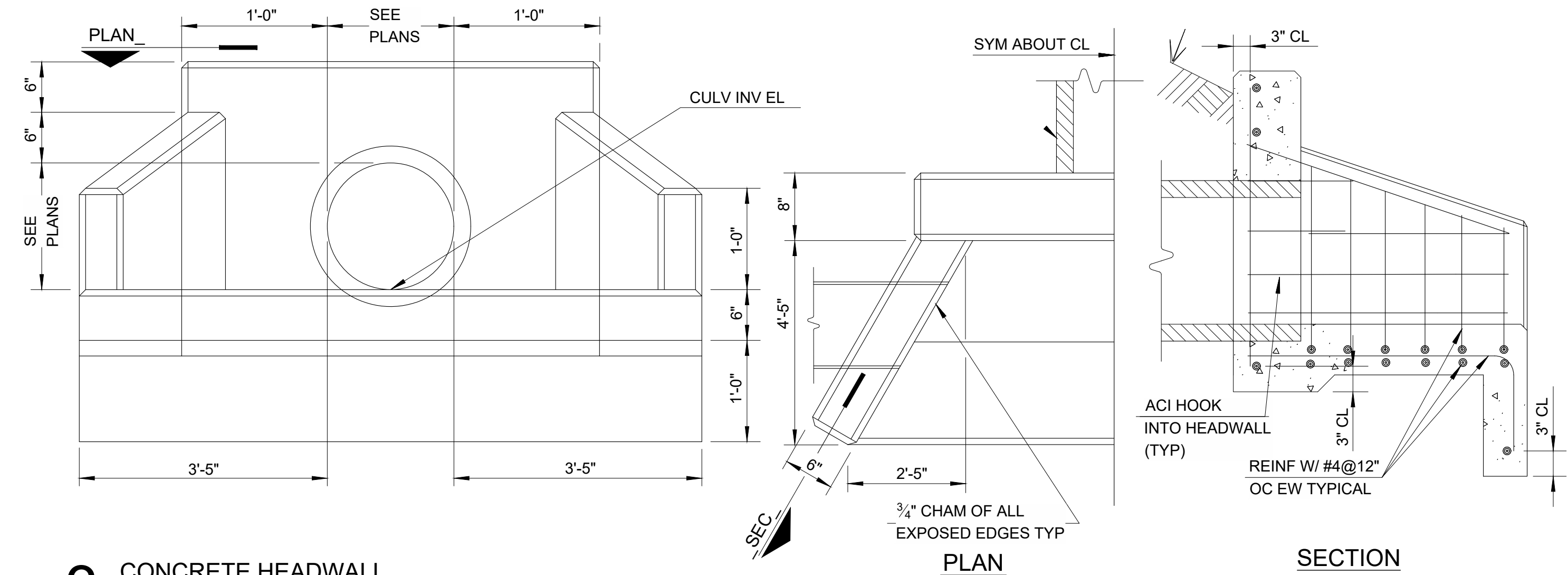


1 REINFORCED MODULAR BLOCK RETAINING WALL W/ FLUME
SCALE: NTS

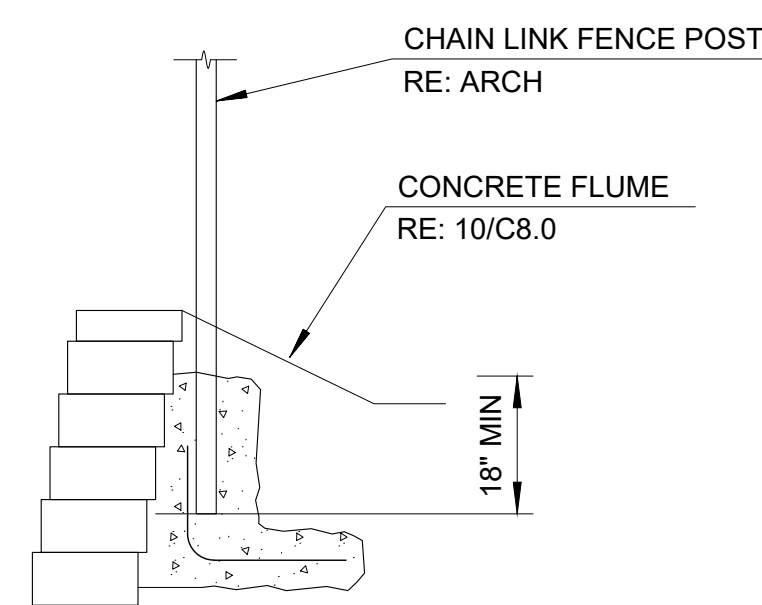
NOTE: MODULAR BLOCK RETAINING WALL SHALL BE DESIGNED BY MANUFACTURER VERSALOK OR APPROVED EQUAL.
(DETAIL SHOWN FOR INFORMATION ONLY)
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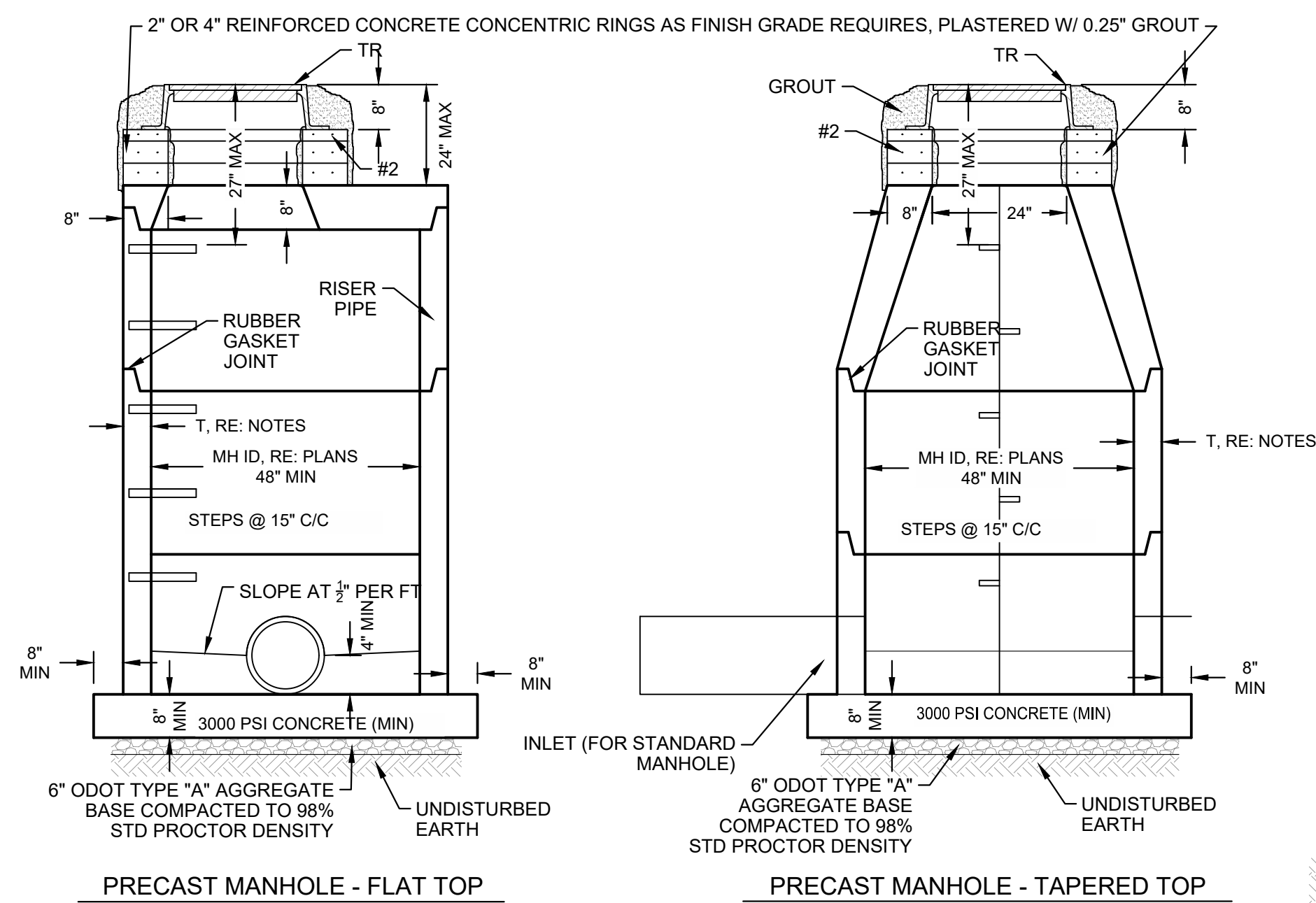
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SCALE: NTS



3 CONCRETE HEADWALL
SCALE: NTS

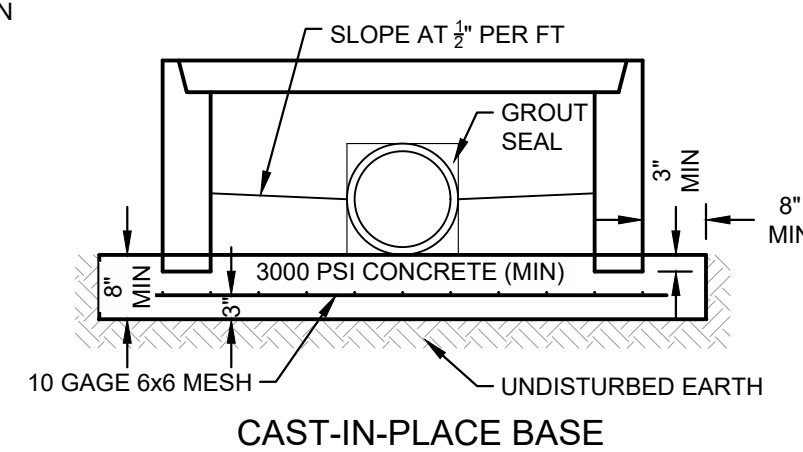


4 FLUSH POST DETAIL
SCALE: NTS

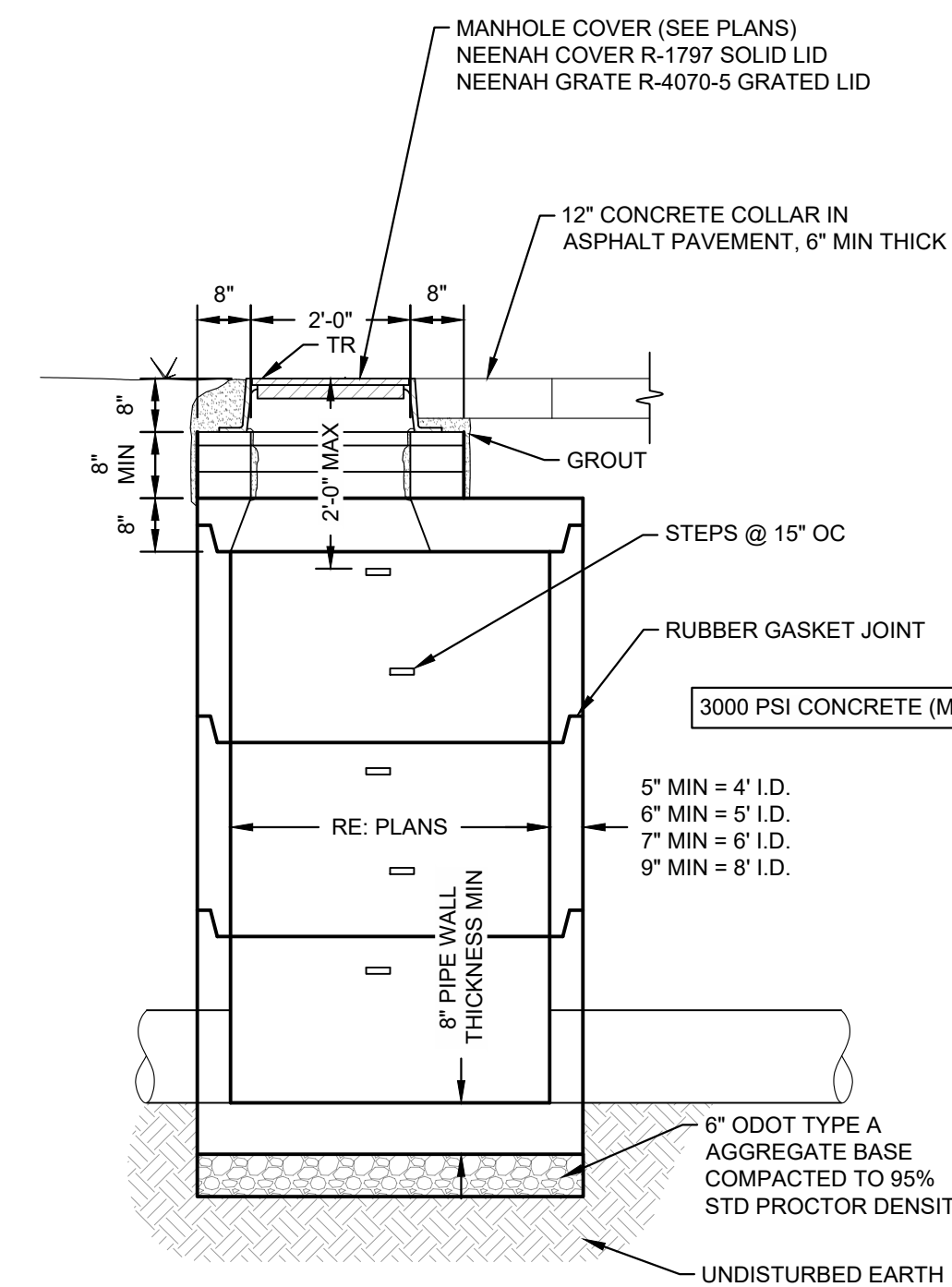


5 SANITARY SEWER MANHOLE
SCALE: NTS

WHEN LOCATED IN ASPHALT, INCLUDE A 12" WIDE CONCRETE COLLAR, MIN 6" THICK
WHERE INLET PIPE IS 24" OR MORE ABOVE MANHOLE FLOWLINE, DROP INLET REQUIRED
100% OF THE INTERIOR (TOP, BOTTOM, AND SIDES) OF ALL MANHOLES SHALL BE THOROUGHLY COATED WITH KOP-COAT BITUMASTIC 300-M OR APPROVED EQUAL. FINAL DRY MILS THICKNESS SHALL BE A MINIMUM OF 12 MILS.
CONFORM TO CURRENT ASTM C478
WHEN CAST-IN-PLACE BASE IS USED, THE PRECAST BOTTOM SECTION SHALL BE EMBEDDED A MINIMUM IF 3" INTO THE BASE
WRAP RISER AND JOINTS WITH POLYWRAP PRIOR TO PLACING FILL
WALL THICKNESS, T, MIN 5".
4" ID = 5" T
5" ID = 6" T
8" ID = 6" T

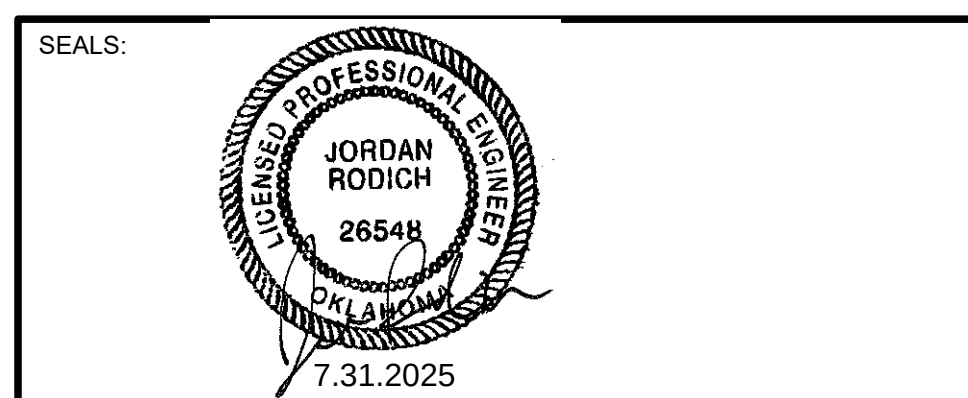


6 STORM MANHOLE
SCALE: NTS



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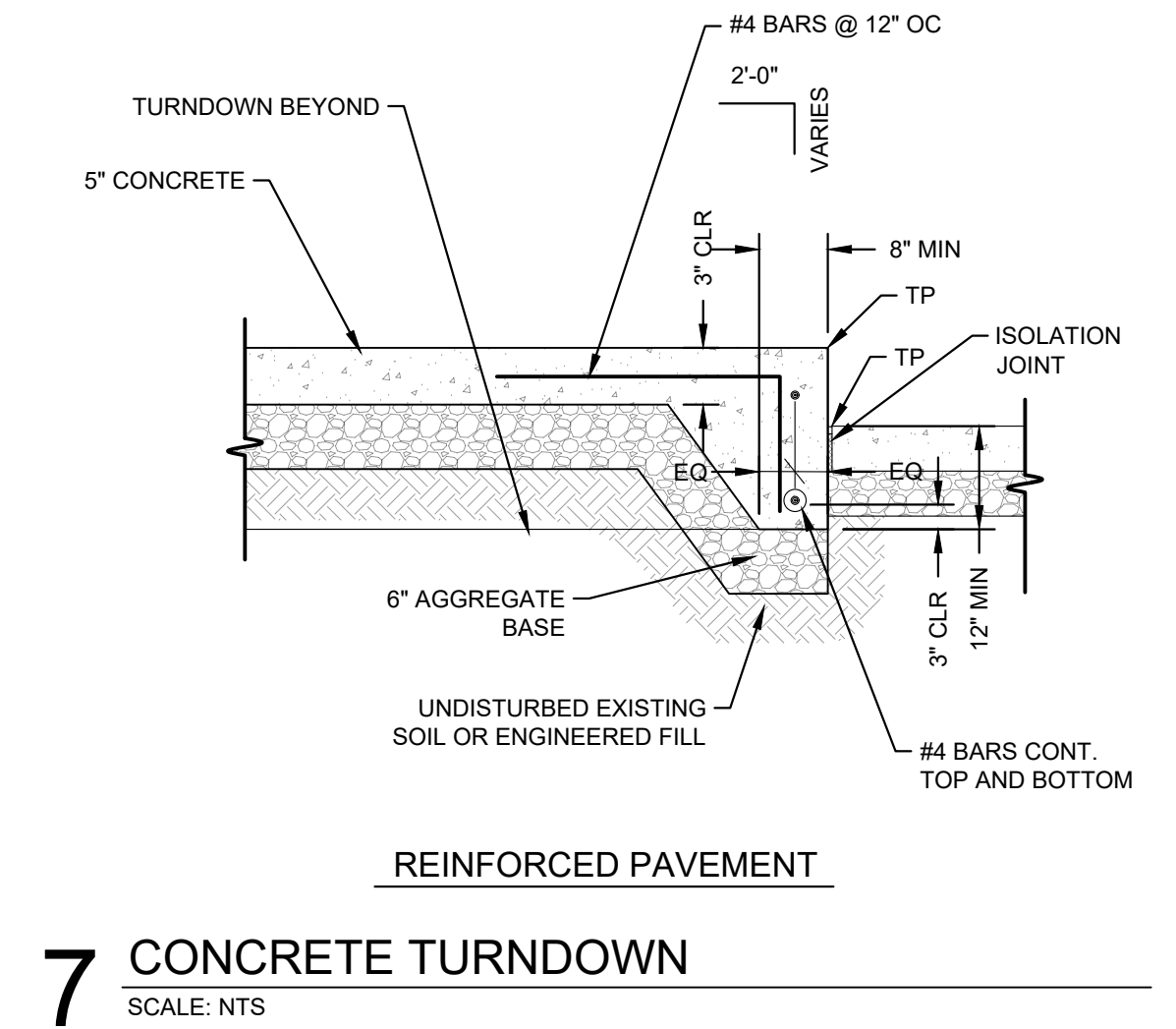
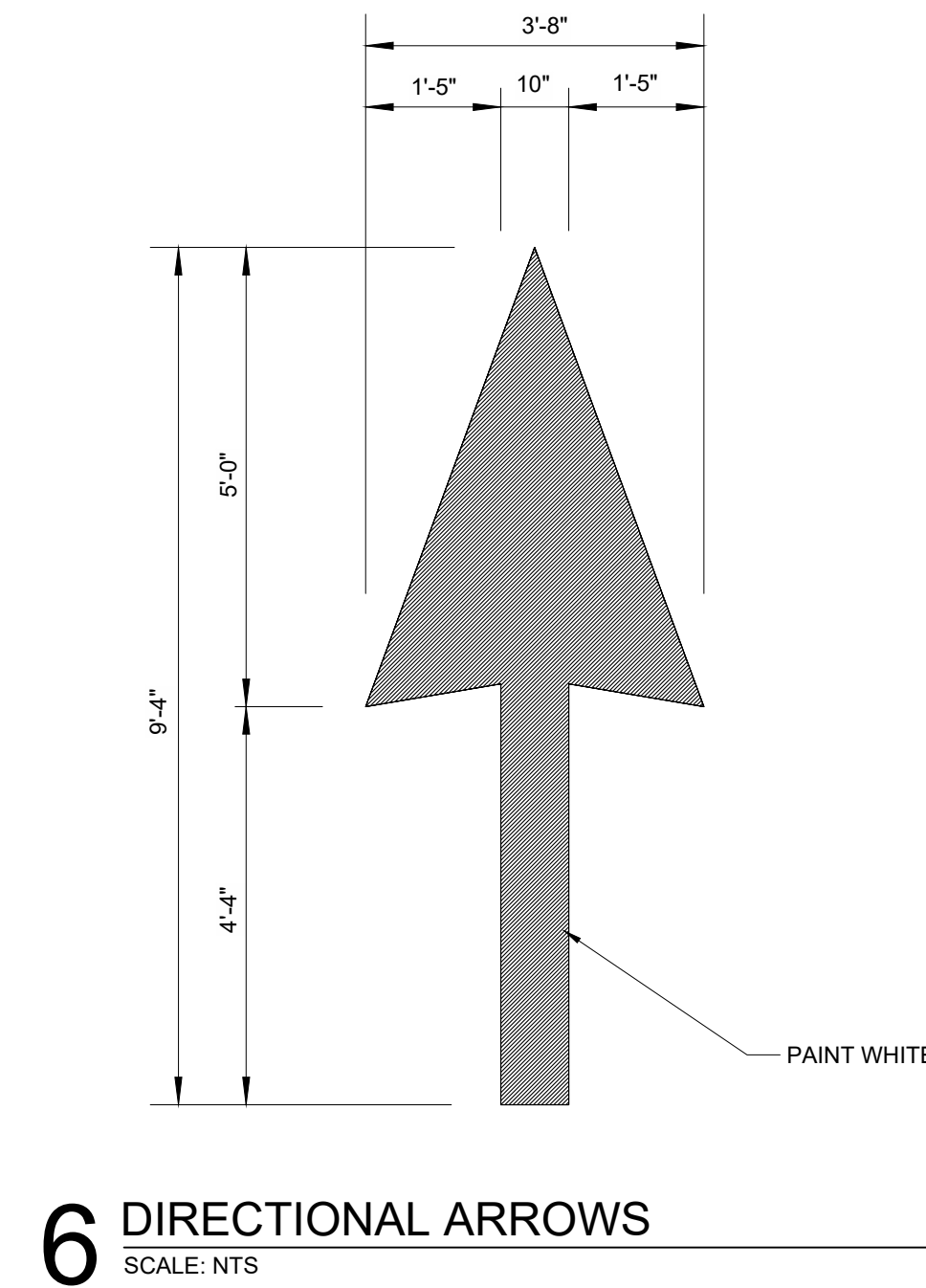
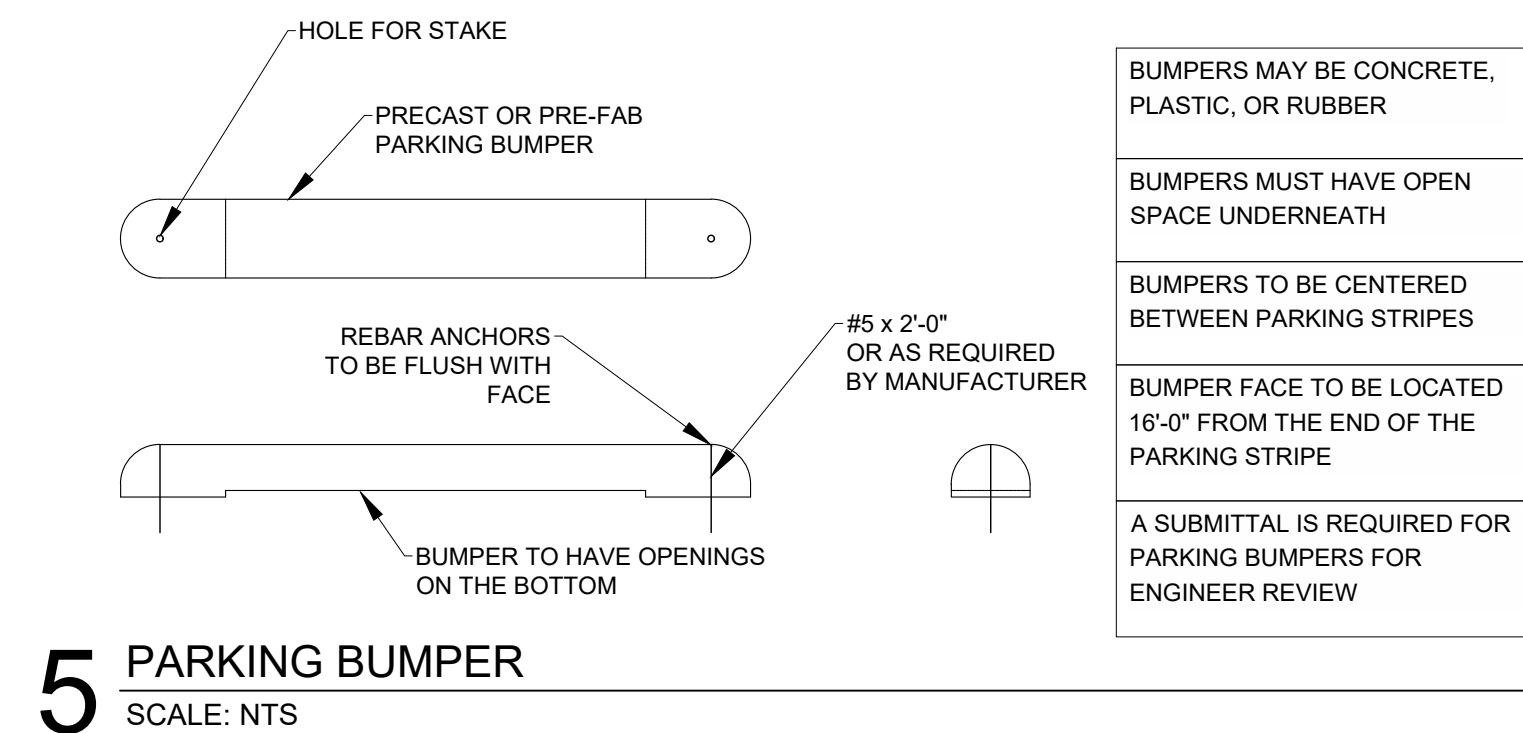
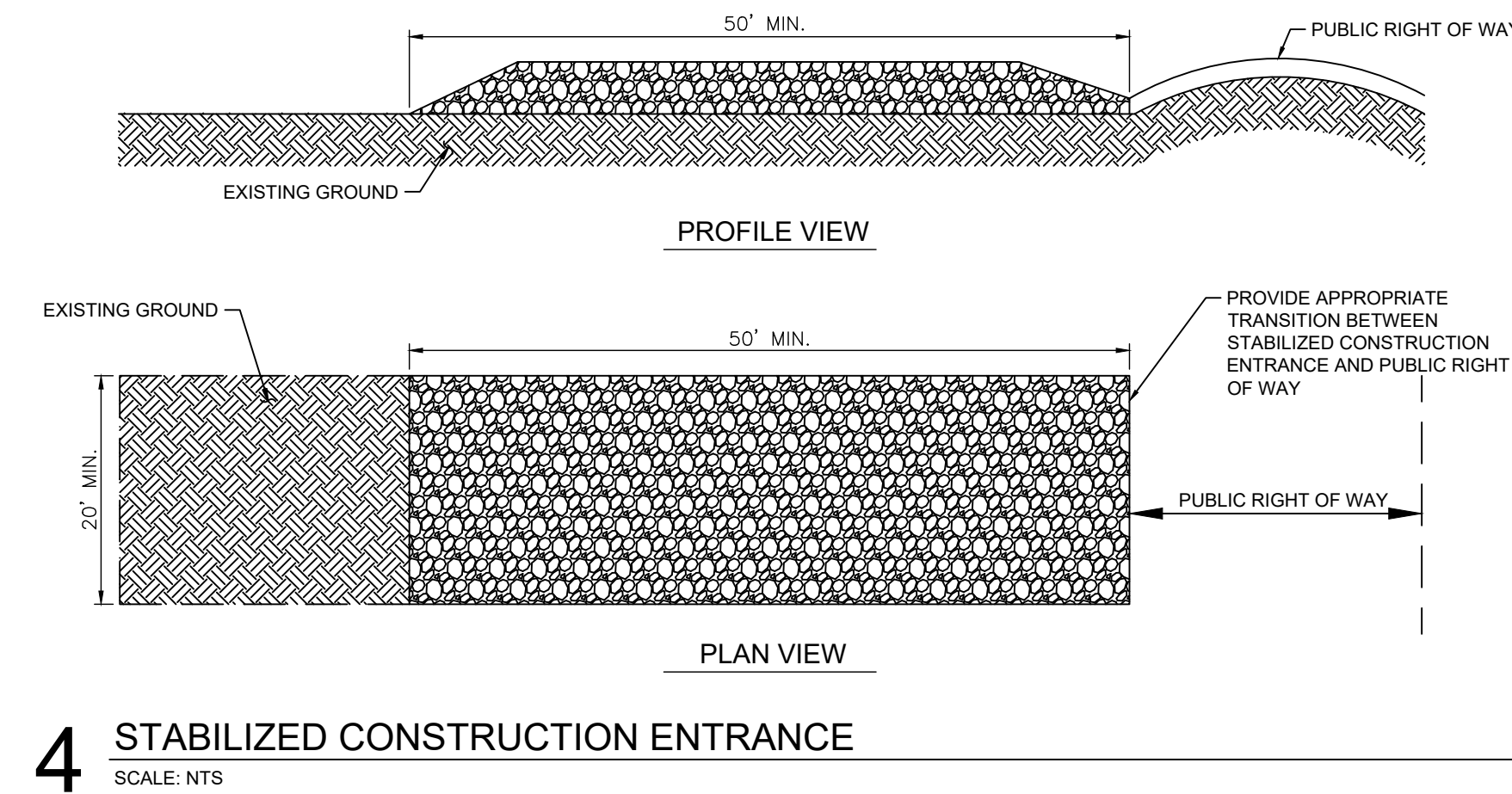
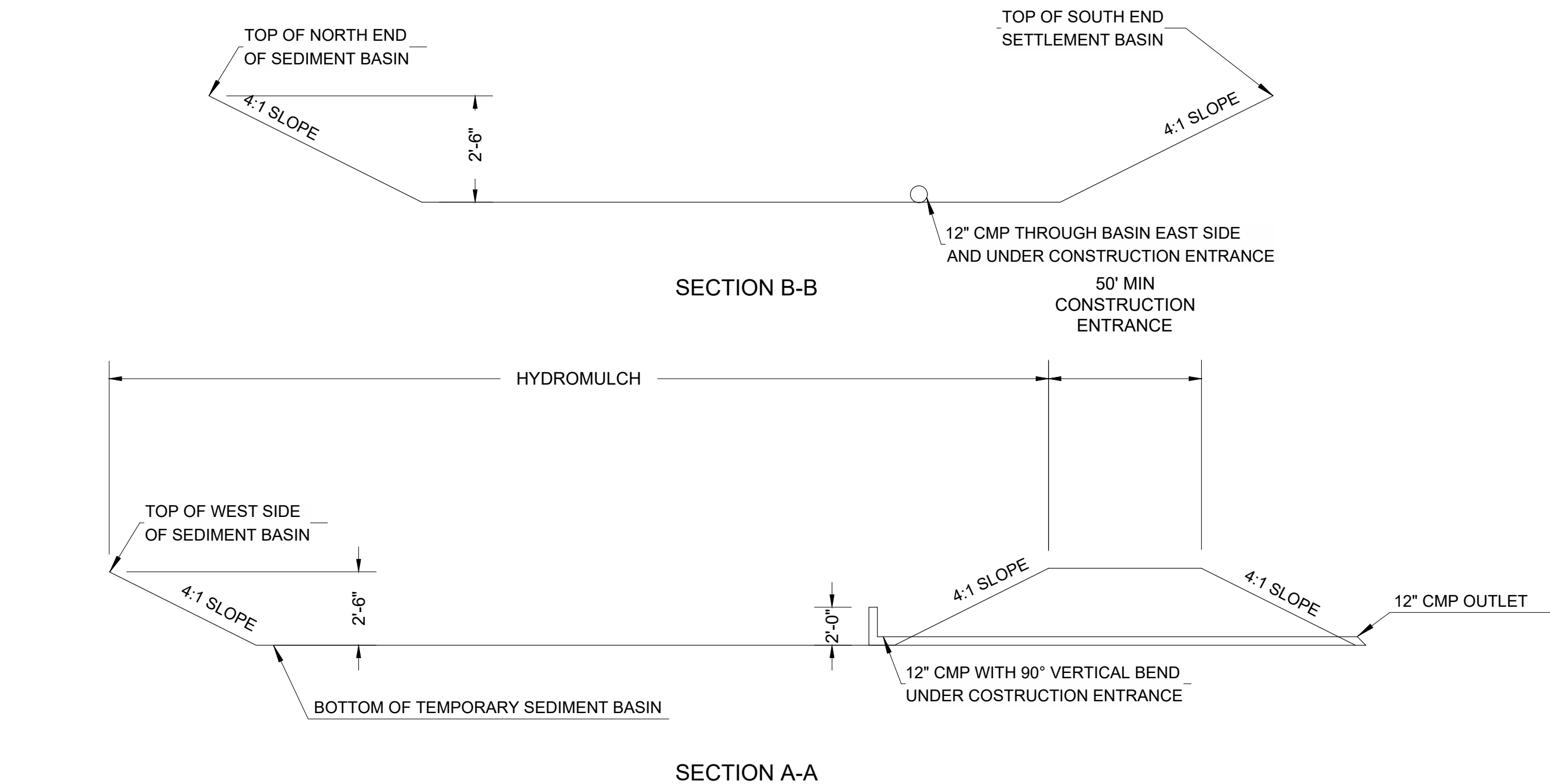
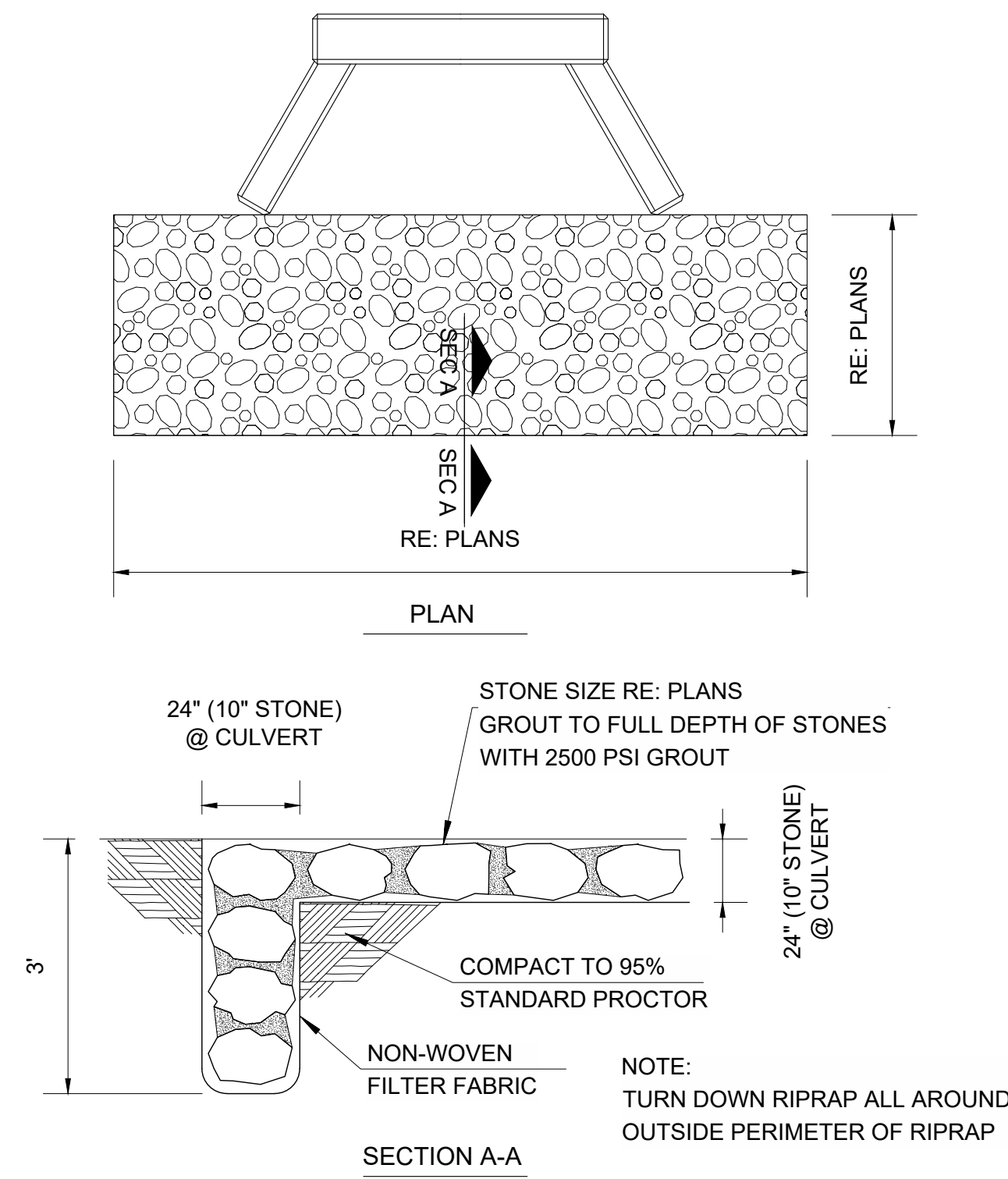
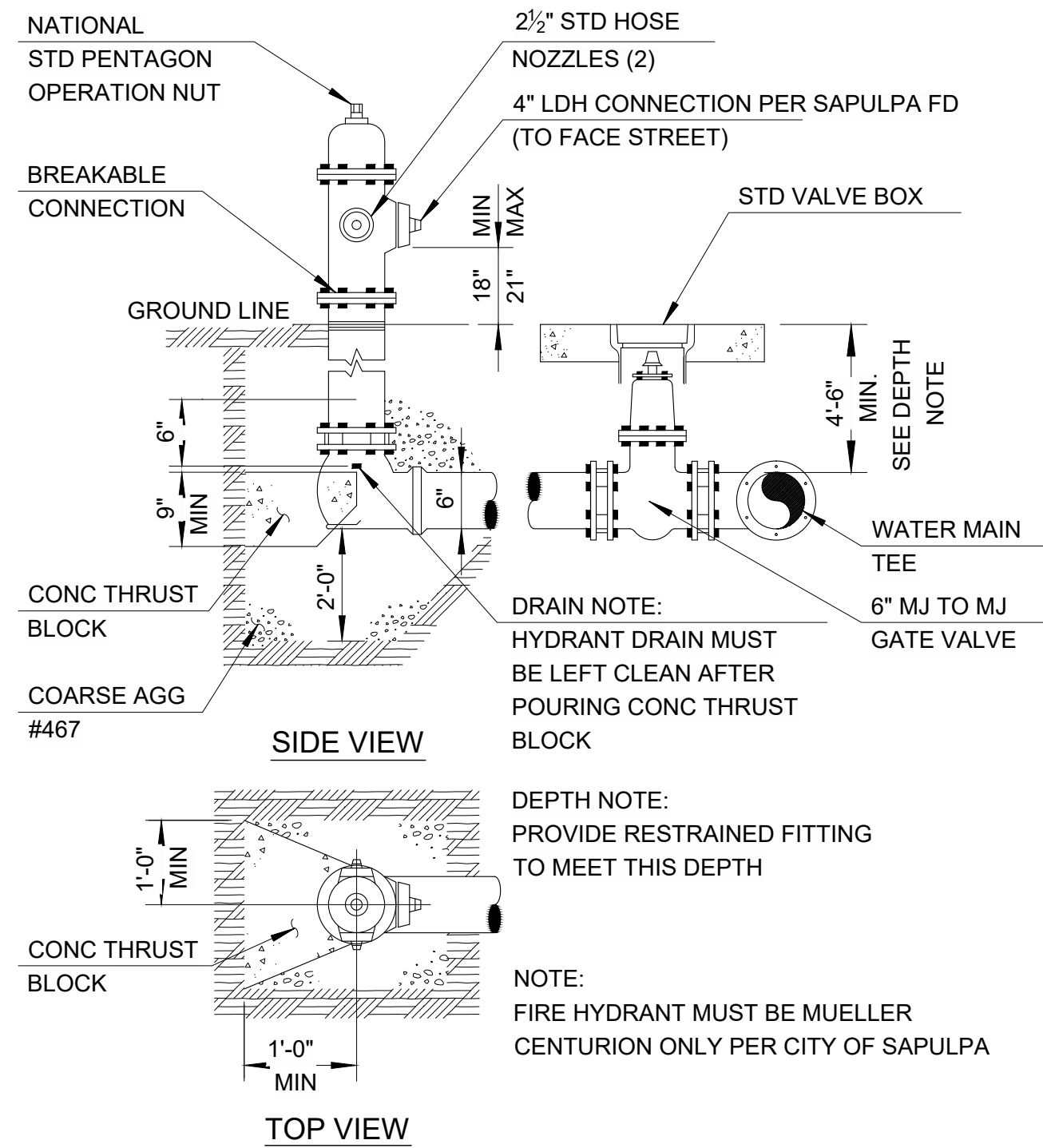
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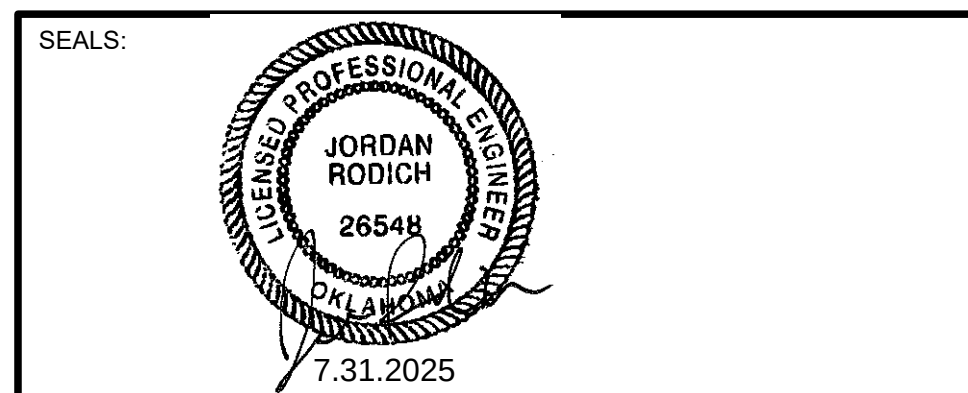
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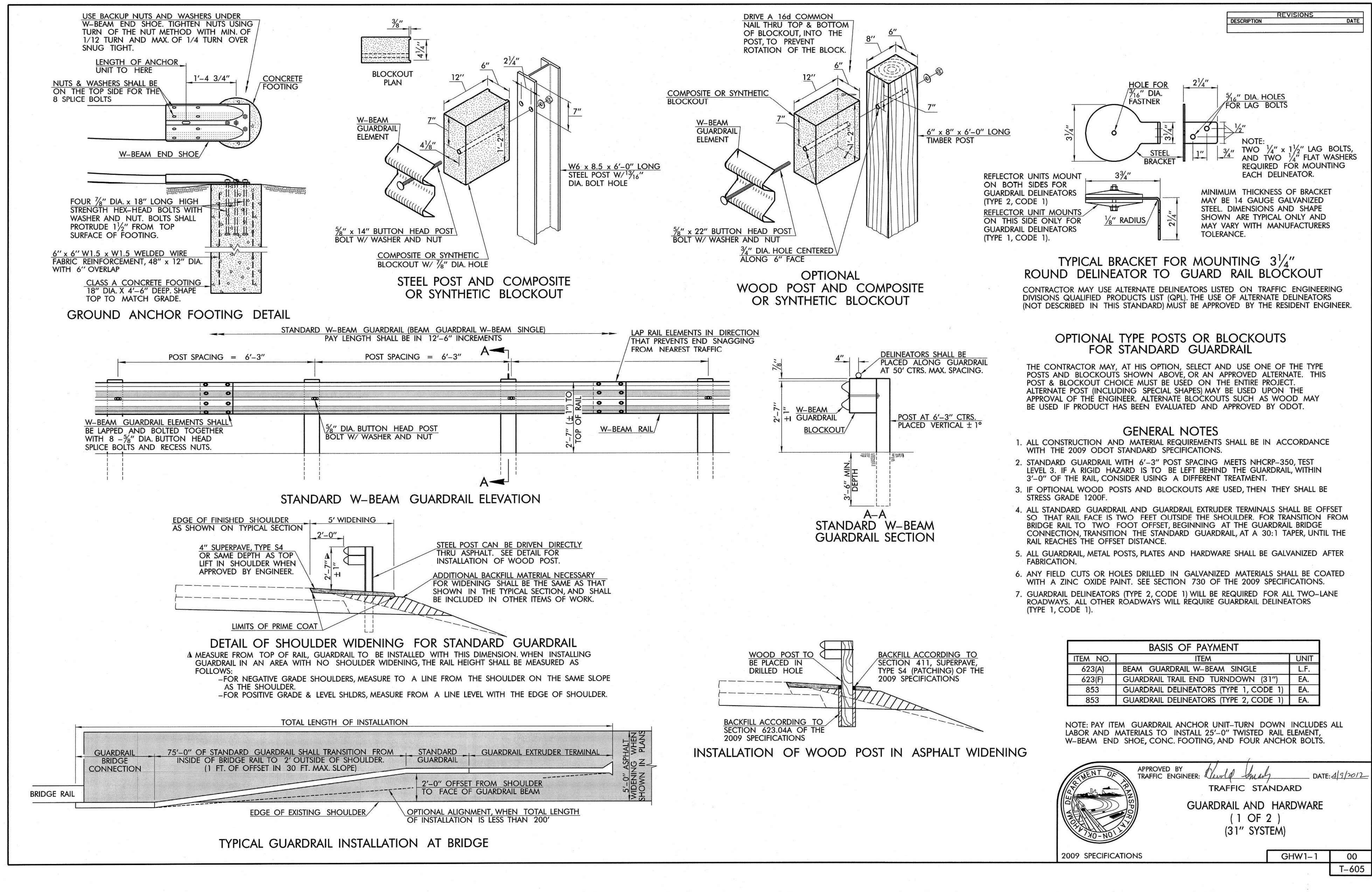
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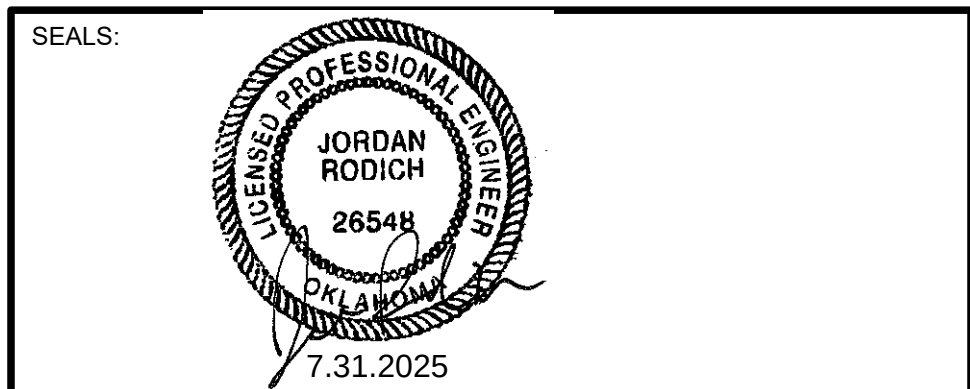
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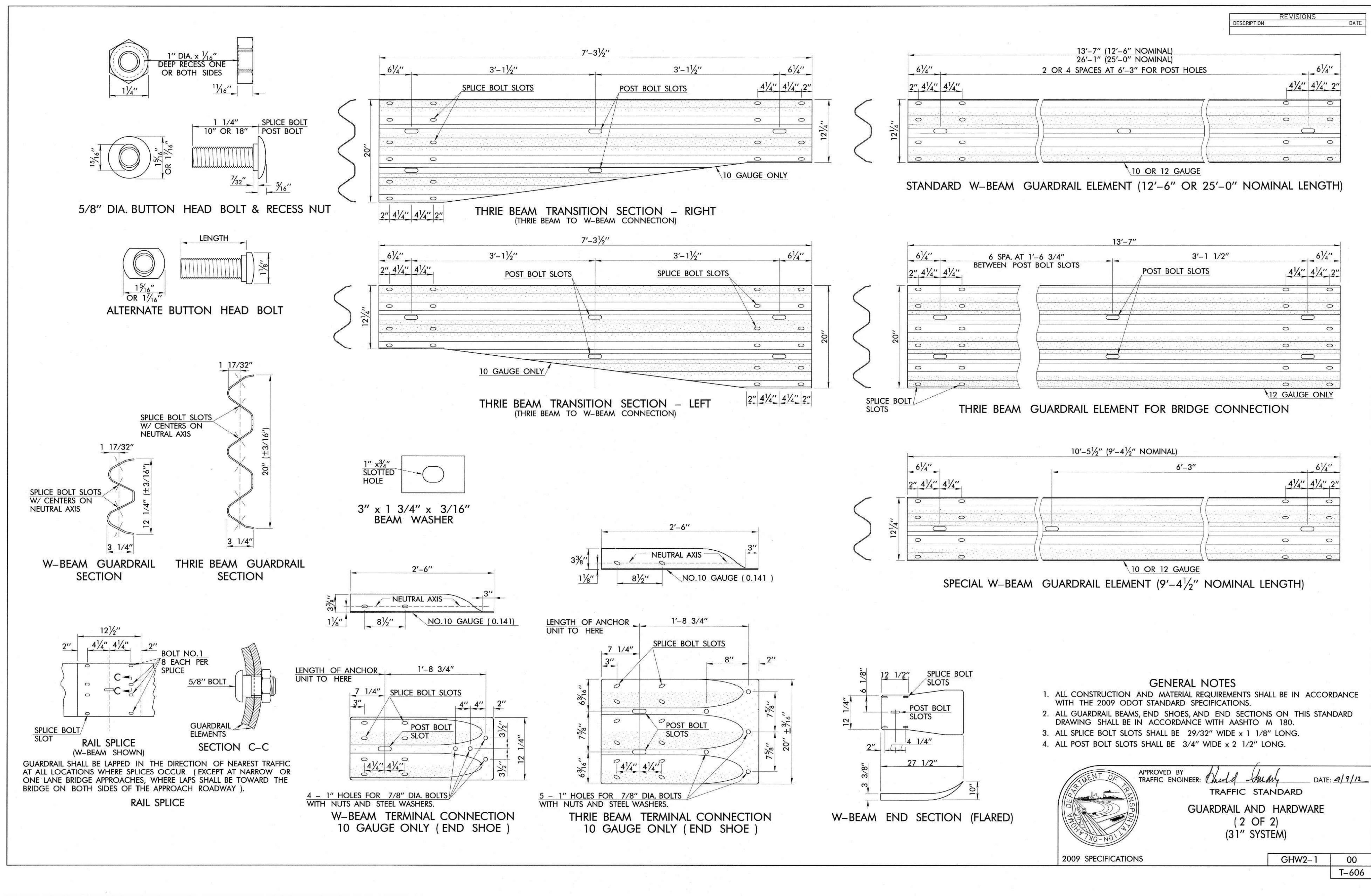
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**SAPULPA FIRE DEPARTMENT
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15 SAHOMA LAKE ROAD SAPULPA, OK 74066

SHEET TITLE:

DETAILS

SHEET NUMBER:

C8.4



Attachment C

(not included in bound SWP3 – operator to keep separate hard copy of the OKR10 on site)

GENERAL PERMIT OKR10

**FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES
WITHIN THE STATE OF OKLAHOMA**

**OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY DIVISION**

September 18, 2017



Stormwater General Permit for Construction Activities within the State of Oklahoma

Permit No. OKR10

Authorization to Discharge Under the Oklahoma Pollutant Discharge Elimination System (OPDES) Act

In compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 *et. seq.*) and the provisions in 40 Code of Federal Regulations (CFR) § 122.26, adopted and incorporated by reference in Oklahoma Administrative Code (OAC) 252:606-1-3(b)(3)(L), and under the OPDES Act, 27A O.S. 2-6-201 *et seq.*, as amended, except as provided in Part 1.2.2 of this permit, Operators of stormwater discharges from construction activities (as defined in Part 8 of this permit), located in an area specified in Part 1.1, are authorized to discharge in accordance with the conditions and requirements set forth herein. Only those Operators of stormwater discharges from construction activities in the general permit area who submit a Notice of Intent (NOI) and receive an authorization to discharge in accordance with Part 2 of this permit are authorized under this permit.

This permit is a reissuance by the Oklahoma Department of Environmental Quality (DEQ) and shall become effective on October 18, 2017. This Permit replaces the Permit issued on September 11, 2012. This permit and the authorizations issued under the permit shall expire at midnight, October 17, 2022.

Signed and issued this 18th day of September, 2017


for Shellie R. Chard, Director
Water Quality Division


Micheal Jordan, P.E, Engineering Manager
Water Quality Division

**GENERAL PERMIT OKR10 FOR STORMWATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES WITHIN THE STATE OF OKLAHOMA**

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Part 1 Coverage Under This Permit

1.1 Permitting Authority

Under the Environmental Protection Agency (EPA)'s approval of the OPDES program, DEQ has had stormwater permitting and enforcement responsibility for large and small construction activities since November 19, 1996, except for construction activities associated with oil & gas extraction and agricultural activity, or those construction activities located on Indian Country Lands.

1.1.1 Area of Coverage where EPA or Another Agency is the Permitting Authority:

- A. Any Construction Activity on Indian Country Lands in Oklahoma;
- B. Construction activity associated with oil and gas extraction under the Standard Industrial Classification (SIC) Group 13, (Note: The DEQ has authority over the natural gas liquid extraction plants identified under SIC code 1321, and service company base operating stations identified under SIC code 1389. Any construction activities associated with facilities identified under SIC codes 1321 and 1389 are required to be covered under this permit); Pipelines under SIC Group 46, except pipelines within certain facilities regulated by DEQ; Natural gas transmission under SIC Group 492, except that the DEQ has jurisdiction over natural gas liquid extraction plants; and
- C. Construction activities associated with Agricultural production and services under SIC Groups 01, 02 and 07; Forestry under SIC Group 08; Fishing, hunting and trapping under SIC Group 09, except DEQ shall have jurisdiction over industry group number 092 (fish hatcheries and preserves).

1.1.2 EPA & Oklahoma Department of Agriculture, Food & Forestry (ODAFF) are the Permitting Authorities:

- A. If you¹ desire an authorization to discharge stormwater from a construction activity associated with oil and gas extraction under the SIC Group 13, or pipelines under SIC Group 46, or natural gas transmission under SIC Group 492, you must apply for a permit through the EPA National Pollutant Discharge Elimination System (NPDES) eReporting Tool for its Construction General Permit (CGP); and
- B. If you are looking for permit coverage from construction activities associated with Agricultural and Forestry, Fishing production and services under SIC Groups 01, 02, 07, 08 and 09, you must contact ODAFF at (405)522-5493 and ask for AgPDES programs.

1.2 Authorized Discharges

1.2.1 Authorized Discharges

- A. Permittees are authorized to discharge pollutants in stormwater runoff associated with construction activities as defined in 40 CFR § 122.26 (b)(14)(x) for construction sites of 5 or more acres, and 40 CFR §122.26 (b)(15)(i) for construction sites of more than one acre but less than 5 acres, including the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb land equal to or greater than one acre, and those construction site discharges designated by DEQ as needing a stormwater permit under 40 CFR §122.26 (a)(1)(v), or under 122.26 (a)(9) and 122.26 (g)(1)(i). Discharges identified under Part 1.2.2 are excluded from coverage. Any discharge authorized by a different OPDES permit may be commingled with discharges authorized by this permit.

¹ Terms like "you and/or "your" are used in this permit to refer to the party or parties that are facility, site or project owners/operators, applicants, Permittees, etc.

- B. This permit also authorizes stormwater discharges from construction support activities (e.g., concrete or asphalt batch plants², equipment staging yards, material storage areas, excavated material disposal areas, and borrow areas) provided:
1. The support activity is directly related to a construction site that is required to have this permit coverage for discharges of stormwater associated with construction activity;
 2. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports;
 3. Appropriate controls and measures are identified in a Stormwater Pollution Prevention Plan (SWP3) covering the discharges from the support activity areas; and
 4. The support activity is not located within the watershed of an Outstanding Resource Water (as defined in Part 8.25 and Addendum E of this permit).
- C. The following allowable non-stormwater discharges associated with construction activity are authorized by this permit:
1. Fire hydrant flushing;
 2. Waters used to wash vehicles and equipment where soaps, solvents or detergents are not used;
 3. Water used to control dust;
 4. Potable water, including uncontaminated waterline flushing;
 5. Routine external building wash-down that does not use soaps, solvents and/or detergents and/or building wash-down from external surfaces that does not contain leachable hazardous substances (e.g., paint or caulk containing polychlorinated biphenyls (PCBs));
 6. Pavement washing waters, provided spills or leaks of toxic or hazardous substances, have not occurred (unless all spilled material has been removed) and where soaps, solvents and detergents are not used;
 7. Uncontaminated air conditioning or compressor condensate;
 8. Uncontaminated ground water or spring water;
 9. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water;
 10. Landscape irrigation;
 11. Discharge or flows from emergency firefighting activities will be allowed. Measures shall be taken by the permittee or site/facility, as soon as practicable, to reduce any such pollutant releases to avoid or minimize the impacts on water quality and to ensure public health and safety;
 12. Uncontaminated flows from excavation dewatering activities will be allowed if operational and structural controls are used to reduce any pollutant releases in order to avoid or minimize the impacts on water quality (see Part 3.3.1.M of this permit). These controls must be included in your SWP3.
- D. This permit authorizes stormwater discharges associated with any construction activities from the facilities that are currently regulated under OPDES Act, such as Natural Gas Liquid Extraction Plans (SIC code 1321) and Oil and Gas Field Services for Company Base Operating Stations (SIC code 1389).

1.2.2 Limitations on Coverage

- A. *Post Construction Discharges*: This permit does not authorize stormwater discharges that originate from the site after construction activities have been completed and the site, including any temporary support activity site, has undergone final stabilization and has an approved NOT. Industrial post-construction stormwater discharges may need to be covered by a separate OPDES permit.
- B. *Discharges Mixed with Non-Stormwater*: This permit does not authorize discharges that are mixed with sources of non-stormwater, other than those discharges that are identified in Part 1.2.1.C and are in compliance with Part 4.3.15 of this permit.

² Discharges subject to a numeric effluent limitation guideline in Part 3.4 “Numeric Limitation and Sampling Requirements” and Addendum F “Additional Requirements for Concrete and Asphalt Batch Plants” of this permit.

- C. *Discharges Covered by Another Permit*: This permit does not authorize stormwater discharges associated with construction and/or construction support activity that have been covered under an individual permit or which require coverage under an alternative general permit in accordance with Part 6.11, except stormwater discharges from concrete and asphalt batch plants specified in Part 1.2.1.B of this permit.
- D. *Discharges Threatening Water Quality*: This permit does not authorize stormwater discharges from construction sites that DEQ determines will cause, or have reasonable potential to cause or contribute to violations of water quality standards, including anti-degradation policy. Where such determinations have been made, DEQ may notify the operator(s) that an individual permit application is necessary in accordance with Part 6.11. However, DEQ may authorize coverage under this permit after appropriate controls and implementation procedures designed to bring the discharges into compliance with water quality standards have been included in the SWP3.
- E. *Discharges Not Protective of Listed Endangered Species*: This permit does not authorize stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities that are not protective of Federal and State listed endangered and threatened species or designated critical habitat. See Part 10 for more information.
 - 1. For the purposes of complying with Part 1.2.1.B, stormwater discharge-related activities (as defined in Part 8.34 of this permit) include:
 - a. Activities that cause, contribute to, or result in point source stormwater pollutant discharges, including but are not limited to excavation, site development, grading, and other land disturbing activities; and
 - b. Measures to control stormwater including the siting, construction, and operation of Best Management Practices (BMPs) to control, reduce, or prevent stormwater pollution.
 - 2. Coverage under this permit is available only if the applicant certifies that it meets at least one of the criteria in paragraphs a, b, c, d, or e below. Failure to continue to meet one of these criteria during the term of the permit will render an applicant ineligible for coverage under this permit.
 - a. The proposed construction site or land disturbing activity is not located within any of the corridors of the Federal or State identified Aquatic Resources of Concern (ARC), and further investigation is not required.
 - b. The proposed construction site or land disturbing activity is located within a corridor of a Federal or State identified ARC. Operators must implement an SWP3 that specifies the measures to be employed to protect the endangered or threatened species or their critical habitat (see Parts 3.5.2 and 10.2 Step 2).
 - c. If one of those eligibility criteria under part 1.2.2.E.2.b, d, or e cannot be met, applicants may use Addendum H of this permit to evaluate alternatives of buffer requirements and select equivalent sediment controls or contact DEQ for further consultation; or
 - d. The applicant's federally approved construction activities are authorized by the appropriate Federal or State agency and that authorization addresses the Endangered Species Act Section 7 consultation for the stormwater discharge or stormwater discharge-related activities. Applicants selecting option d must include documentation from U.S. Fish and Wildlife Service (USFWS) or a qualified biologist that demonstrates Section 7 consultation has been completed. The SWP3 must comply with any conditions resulting from that consultation.
 - e. The applicant's stormwater discharges and stormwater discharge-related activities were already addressed in another operator's certification of eligibility under Part 1.2.2.E.2.b, c, or d. that included the applicant's project area. By certifying eligibility under Part 1.2.2.E.2.e, the applicant agrees to comply with applicable measures or controls upon which the other operator's certification under Part 1.2.2.E.2.b, c, or d. was based.
 - 3. The applicant must comply with any applicable terms, conditions, or other requirements developed in the process of meeting the requirements of Part 1.2.2.E.2.b, c, d, or e above to remain eligible for coverage under this permit. Such terms and conditions must be incorporated in the applicant's SWP3.

4. This permit does not authorize any stormwater discharges where the discharges or stormwater discharge-related activities cause a prohibited “take” (as defined in Part 8.35) of endangered or threatened species.
 5. This permit does not authorize any stormwater discharges where the discharges or stormwater discharge-related activities are likely to jeopardize the continued existence of any species that are listed or proposed to be listed as endangered or threatened or result in the adverse modification or destruction of habitat that is designated or proposed to be designated as critical.
- F. *New Sources or New Discharges*: New sources or new discharges of constituents of concern to impaired waters are not authorized by this permit unless otherwise allowable under OAC 252:606 and applicable state law. Impaired waters are those that do not meet applicable water quality standards and are listed on the Clean Water Act Section 303(d) list. Pollutants of concern are those constituents for which the waterbody is listed as impaired. The 303(d) list of Impaired Waters can be found in Appendix C of Oklahoma’s Integrated Report on the DEQ web site at http://www.deq.state.ok.us/WQDnew/305b_303d/index.html, or the DEQ GIS Map and Data Viewer at <http://deq.maps.arcgis.com/home/index.html>.
- G. *Discharges to Total Maximum Daily Load (TMDL) Watersheds*: Discharges of pollutants of concern to impaired waterbodies for which there is an approved TMDL or a watershed plan incorporated in Oklahoma’s Water Quality Management Plan in lieu of a TMDL are not eligible for coverage under this permit unless they are consistent with the approved TMDL or watershed plan or local compliance plan. Applicants must comply with the requirements in Part 4.1.5 of this permit.

1.3 Obtaining Authorization

- 1.3.1 In order for stormwater discharges from construction activities to be authorized under this permit, an operator must:
- A. Meet the authorized discharge requirements in Part 1.2 of this permit;
 - B. Except as provided in Part 2.1.4 of this permit, prior to NOI submittal, develop a SWP3 covering either the entire site or all portions of the site where they are operators (as defined in Part 8.23) according to the requirements in this permit. A “joint” SWP3 may be developed and implemented as a cooperative effort where there is more than one operator at a site. You are required to submit a copy of your complete SWP3 to DEQ for review if your discharges meet the special conditions listed in Part 2.4 of the permit. If your discharges do not meet the special conditions listed in Part 2.4 of the permit, you are not required to submit a copy of the SWP3 when you submit your NOI. However, you may be required to submit an SWP3 for review upon request by DEQ.
 - C. Submit a Notice of Intent (NOI) available in Addendum B of this permit. Only one NOI need be submitted to cover all of the Operator’s activities on a common plan of development or sale (e.g., you do not need to submit a separate NOI for each separate lot in a residential subdivision or for two separate buildings being constructed at a manufacturing facility, provided the SWP3 covers each area for which you are an operator). The SWP3 must be implemented upon commencement of construction activities.
 - D. Pay the applicable application fee and annual permit fee established in OAC 252:606 OPDES Standards. An invoice of the permit fee due will be sent to you if the fee is not included with the NOI or upon your request.
 - E. Receive an authorization from DEQ. The fee must be received before the Operator’s authorization can be issued.
- 1.3.2 Any new operator on site, including those who replace an operator who has previously obtained permit coverage, must submit an NOI to obtain permit coverage.
- 1.3.3 Once authorization is issued by DEQ, you are authorized to discharge stormwater from construction activities under the terms and conditions of this permit. DEQ may deny coverage under this permit and requires submittal of an application for an individual OPDES permit based on a review of the NOI or other information (see Part 6.11 of this permit).

1.4 Terminating Coverage

- 1.4.1 Permittees wishing to terminate coverage under this permit must submit a Notice of Termination (NOT) available in Addendum C of the permit. The permittee's authorization to discharge under this permit will be terminated when DEQ's termination letter has been issued. (see Part 2.2 of the Permit)
- 1.4.2 All permittees must submit an NOT within 30 days after one or more of the following conditions have been met:
- A. Final stabilization (as defined in Part 8.31 of this Permit) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);
 - B. For residential subdivision only: final stabilization has been completed and the ownership of all lots has been transferred to new owners and the permittee is no longer responsible for the construction activities for the subdivision. A Notification of Change of Ownership (NCO) has been signed, and included in the SWP3 (see also Parts 2.2 of this Permit); and
 - C. When another operator has assumed control according to Part 6.7.3 over all areas of the site that have not been finally stabilized. The NOT must be submitted with the new operator's NOI;
- 1.4.3 DEQ will review NOTs for completeness and accuracy and inspect the site for which the NOT was submitted within 30 days of receipt of the NOT.

Upon completing the inspection, DEQ will notify the permittee of any needed changes to the site conditions, or that the site has met the termination requirements under this permit. Only one NOT Form can be submitted to DEQ within a 90-day period. Additional compliance inspections may occur within this 90-day period at the discretion of DEQ.

Part 2 NOI and NOT Requirements

2.1 NOI Requirements

2.1.1 Operators

Parties defined as operators (as defined in Part 8.23 of this Permit) due to their operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications and/or operators with day-to-day operational control over construction activities at a project, must ensure that they are in compliance with all permit conditions, including their SWP3s and receive authorization from DEQ prior to the commencement of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities).

2.1.2 Operator changed

For stormwater discharges from construction projects where the operator changes, including instances where an operator is added after an NOI has been submitted under Part 2.1.1 of this permit, the new operator must submit an NOI at least 2 days before assuming operational control over site specifications or commencing work on-site.

2.1.3 Late NOIs

Operators are not prohibited from submitting late NOIs. When a late NOI is submitted, authorization is only for discharges that occur after permit coverage is granted. DEQ reserves the right to take appropriate enforcement action for any unpermitted activities that may have occurred between the time construction commenced and authorization of future discharges is granted.

2.1.4 Operators of on-going construction projects

Operators of on-going construction projects as of the effective date of this permit that received authorization for stormwater discharges under the CGP OKR10 issued on September 13, 2012, must:

- A. Submit an NOI within 90 days of the effective date of this permit. If the permittee is eligible to submit an NOT (e.g., construction is finished and final stabilization has been achieved) before the 90th day, a new NOI is not required to be submitted. Operators must remain in compliance with the requirements of the CGP OKR10, issued on September 13, 2012, until a new authorization is received or an NOT is submitted;
- B. Update the SWP3 to comply and implement with the requirements of this permit prior to NOI submittal within 90 days after the effective date of this permit; and
- C. Pay the applicable application fee and annual permit fee established in OAC 252:606 (also see Part 1.3.1.D of this permit).

2.1.5 Operators without the permitting coverage under the CGP issued on September 13, 2012

Operators of on-going construction projects as of the effective date of this permit that did not receive authorization to discharge under the CGP issued on September 13, 2012, who wish to discharge under this permit, must submit an NOI and obtain authorization under this permit. Prior to NOI submittal, an SWP3 must be developed and implemented to comply with the requirements of this permit. However, DEQ reserves the right to take appropriate enforcement action for any unpermitted activities that may have occurred between the time construction commenced and authorization of future discharges is granted.

2.1.6 Contents of NOI

The NOI form shall include the following information:

- A. Indication of whether this is a new application or modification or renewal of your NOI, including your authorization number if this is a modification or renewal;
- B. Provide the legal name, mailing address, and phone number of the company/firm, public organization, or any other entity operator filing the NOI for permit coverage;
- C. Provide name, title, phone number and email address for the Operator's point of contact;
- D. Provide the site/project's official name, phone number and street address or general location information (e.g., intersection of State Highway 61 and 34);
- E. Provide the name, title, phone number, and email address for the site/project's point of contact;
- F. Indicate the purpose of the project (i.e. residential subdivision, commercial building, road and/or bridges, wind farm, etc.);
- G. Provide Latitude and Longitude of the construction project or site at the center of the site (or latitude and longitude at the starting and ending points if it is a linear construction site). Latitude and longitude can be obtained from DEQ, and USGS's websites or other mapping tools;
- H. Provide estimated construction project starting date and ending date. The dates must be provided in MM-DD-YYYY where MM is the month, DD is the date and YYYY is the year;
- I. Provide total area of construction site and estimated area to be disturbed in acres;
- J. Provide total impervious area (pre-construction) and total impervious area construction completed (post-construction) in acres;
- K. Provide post-construction runoff coefficient of the site. Operator may use recommended runoff coefficients in Addendum I of this permit. Average coefficients for composites area may be calculated on an area weighted basis from $C = \frac{\sum C_i A_i}{\sum A_i}$ where C_i is the coefficient applicable to the area A_i ;
- L. Describe the nature of fill material and existing data describing soils (i.e., coarse-grained soils: gravels, sands, or fine-grained soils: silts and clays, silts and clays, and highly organic soils etc.) Operator may use soil classification chart in Attachment A of Addendum H to determine the types of the soils on the site;
- M. Indicate whether this site/project is part of common plan of development or sale;
- N. Based on the instructions in Part 10 and Addendum A of this permit, operators must determine whether the construction site or land disturbing activity is within the specified corridor of a Federal or State ARC by selecting a, b, c, d, or e of Part 1.2.2.E.2;

- O. Indicate whether the site/project discharges stormwater to a Municipal Separate Storm Sewer System (MS4);
- P. Identify all the receiving waterbodies from the sites that discharge stormwater, including names of the waterbodies;
- Q. Indicate whether the receiving waterbodies are included on DEQ's 303(d) list of impaired waterbodies, including the pollutant(s) for which the waterbody is impaired;
- R. Indicate whether the stormwater discharges drain to a waterbody or watershed with an approved or established TMDLs, or watershed plan, or local compliance plan. Additional site specific requirements may be applicable if the site is located in such waterbody or watershed;
- S. Indicate whether the SWP3 has been prepared and is available on site;
- T. Indicate whether this operator is registered with the Secretary of State of Oklahoma;
- U. Describe the proposed measures, including BMPs, to control pollutants in stormwater discharges during construction, including a brief description of applicable erosion and sediment control requirements; and
- V. Describe the proposed measures to control pollutants in stormwater discharges that will occur after construction operations have been completed, including a brief description of applicable erosion and sediment control requirements.

2.1.7 Modification of an NOI

After issuance of an authorization, an amended NOI shall be submitted by a permittee if circumstances change (e.g. the area to be disturbed has increased from 20 acres to 40 acres). However, an amended NOI should not be submitted if the area to be disturbed has decreased (e.g., changed from 40 acres to 20 acres). The amended NOI shall include the facility's assigned permit number and a description of the requested change.

The original authorization number will be retained. DEQ will provide an acknowledgement by mail or email that the amended NOI has been received and processed. Permittees must update their SWP3s to reflect the modification.

2.2 NOT Requirements

Permittees must submit a completed NOT that is signed in accordance with Part 6.7 of this permit when one or more of the conditions contained in Part 1.4.2 of this permit have been met at a construction site. The permittee must use the NOT form found in Addendum C of this permit.

2.2.1 Contents of NOT

- A. Identify the OKR10 permit number for the stormwater discharge on the site;
- B. Indicate whether the construction activities on the site have been terminated and final stabilization has been completed or the permittee is no longer an operator at the site;
- C. Provide the legal name, mailing address, phone number and email address of the operator submitting the NOT;
- D. Provide the legal name of the site or project and address (or a description of the general location if no street address is available) of the construction site;
- E. Provide latitude and longitude of the construction site (at center of the site). Latitude and longitude can be obtained online at DEQ's, and/or USGS's websites and/or from other mapping tools;
- F. Include a copy of the updated site map showing all completed and final plans and projects (i.e., aerial images or general site maps with project extents marked, including stabilized areas of concrete or asphalt batch plants, equipment staging yards, stockpile, borrow areas, wash-out areas, previously disturbed areas, etc.); and
- G. Provide a copy of NCO (see Part 2.2.3 of this permit) for each new owner/operator to whom you have sold a portion of the site. Where indicated on your NOT and NCO forms, you must include the new

owner/operator's contact information, including their name, street address, phone number and email address. Each new owner/operator is also required to prepare and submit an NOI to DEQ for review. If applicable, you must submit all NCOs to DEQ prior to submittal of the NOT or submit the NOT along with all NCOs that have been prepared during the ownership transition.

2.2.2 Elimination of Stormwater Discharged

Elimination of stormwater discharges associated with construction activity means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized (as defined in Part 8.31 of this permit) and temporary erosion and sediment control measures have been removed, or that all stormwater discharges associated with construction activities from the identified site that are authorized by this permit have otherwise been eliminated from the portion of the construction site where the operator had control.

2.2.3 Notification of Change of Ownership (NCO)

The permittee shall not terminate their permit coverage until the new owners/operators of the individual lots within the larger common plan of development or sale are notified of their permitting requirements. The permittee must sign a NCO in Addendum J of this permit. The signed NCO shall be documented in the permittee's SWP3 and submitted to DEQ in accordance with Part 2.2.1.G of this permit.

2.3 Where to Submit

All NOI, NOTs, and other documents required by this permit must be signed in accordance with Part 6.7, and sent to the following address: Stormwater Unit of Environmental Complaints and Local Services (ECLS), Department of Environmental Quality (DEQ), 707 North Robinson Ave., P.O. Box 1677, Oklahoma City, OK 73101-1677, or Fax to (405) 702-6226, or email to ECLS-StormwaterPermitting@deq.ok.gov.

2.4 SWP3 Submittal

You must submit a copy of your SWP3 along with your signed NOI if any of the following conditions apply:

- 2.4.1 Any area of your construction site or support activity is located within the watershed of an Outstanding Resource Water (as defined in Part 8.25 and Addendum E of this permit);
- 2.4.2 Any area of your construction site or support activity is located within an ARC area identified in Addendum A of this permit;
- 2.4.3 The area which is subject to approved TMDL or watershed plan or local compliance plan. For example, construction activities authorized after EPA approval of the TMDL which are located in the Lake Thunderbird watershed and required to (1) comply with any additional pollutant prevention of discharge monitoring requirements established by the local MS4 municipalities; (2) submit to the DEQ all Stormwater Pollution Prevention Plans (SWP3) for sites of 5 acres or larger.
- 2.4.4 The area to be disturbed in your construction site is 40 acres or more.

2.5 Electronic Reporting Deadline

Commencing December 21, 2020, NOI/SWP3 and other documents must be electronically submitted to DEQ. Instructions on how to access and use the appropriate electronic reporting tool will be made available on DEQ's website prior to the December 21, 2020 compliance deadline.

Part 3 Special Conditions and Effluent Limitations

3.1 Non-Stormwater Discharges

- 3.1.1. Except as provided in Parts 1.2.1.B and C or 1.3.2 and 3.1.2 or 3.1.3, all discharges covered by this permit shall be composed entirely of stormwater associated with construction activity;

- 3.1.2 Discharges of material other than stormwater that are in compliance with an OPDES permit (other than this permit) issued for that discharge may be discharged or mixed with discharges authorized by this permit.
- 3.1.3 The non-stormwater discharges listed in Part 1.2.1.C of the permit are authorized by this permit provided the non-stormwater component of the discharge is in compliance with Part 3.15 of this permit.
- 3.1.4 This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

3.2 Releases in Excess of Reportable Quantities

The discharge of hazardous substances or oil in the stormwater discharge(s) from a facility shall be prevented or minimized in accordance with the applicable SWP3 for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR Parts 110, 117 and 302.

Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Parts 110, 117 or 302, occurs during a 24 hour period:

3.2.1 Reporting a Reportable Spill

The permittee is required to notify the National Response Center (NRC) at 800-424-8802 in accordance with the requirements of 40 CFR Parts 110, 117 and 302, and the DEQ Hotline at 800-522-0206 as soon as the discharge is discovered.

3.2.2 SWP3 Requirements

The SWP3 required under this permit must be modified within 14 calendar days of knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

3.3 Non-Numeric Technology Based Effluent Limitations

The stormwater control requirements in this part are the non-numeric technology-based effluent limitations that apply to all discharges from construction sites eligible for coverage under this permit. These requirements apply the national effluent limitations guidelines and new source performance standards found at 40 CFR Part 450.21

3.3.1 Erosion and Sediment Control Requirements

You must design, install and maintain effective erosion and sediment controls that minimize the discharge of pollutants from construction activities. To meet this requirement, you must comply with the following requirements:

- *Area of Disturbance.* You are required to minimize the amount of soil exposed during construction activities. You are also subject to the deadlines for temporarily and/or permanently stabilizing exposed portions of your site pursuant to Part 3.3.2 of this permit.
- *Design Requirements.* You must address the following factors in designing your stormwater controls:
 - i. The expected amount, frequency, intensity, and duration of precipitation;
 - ii. Stormwater volume and velocity must be controlled to minimize soil erosion and pollutant discharges;
 - iii. The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control both peak flowrates and total stormwater volume to minimize channel and streambank erosion and scour in the immediate vicinity of outlets; and
 - iv. Soil characteristics, including the range of soil particle sizes expected to be present on the site.

You must also meet the following requirements of erosion and sediment controls:

- A. *Direct discharges from your stormwater controls to vegetated areas.* Direct discharges from your stormwater controls to vegetated areas of your site to increase sediment removal and maximize stormwater

infiltration to reduce pollutant discharges, including any natural buffers established under Parts 1.2.2.E and 3.3.1.B, unless infeasible. Use velocity dissipation devices if necessary to prevent erosion when directing stormwater to vegetated areas.

- B. *Provide and Maintain Natural Buffers and Equivalent Erosion and Sediment Controls.* When any waters of the State are located on or immediately adjacent to the site, you must maintain at least 50 feet of natural buffer zone, as measured from the top of the bank to disturbed portions of your site, from any named or unnamed receiving streams, creeks, rivers, lakes or other water bodies unless 100 feet of natural buffer is required by Part 1.2.2.E. There are exceptions from this requirement for water crossings, limited water access, and stream restoration authorized under a CWA Section 404 permit. Where no natural buffer exists due to preexisting development disturbances (e.g., structures, impervious surfaces) that occurred prior to the initiation of planning for the current development of the site, you are not required to comply with the requirements in this part, unless you will remove portions of the preexisting development (for exceptions also see Part H.3 of Addendum H).

Where some natural buffer exists but portions of the area within 50 feet of the surface water are occupied by preexisting development disturbances, you may refer to Addendum H for sediment control alternatives. Additionally, this requirement is not intended to interfere with any other ordinance, or regulation, statute or other provision of the law.

- C. *Install Perimeter Controls.* Install sediment controls along those perimeter areas of your site that will receive stormwater from earth-disturbing activities. Examples of perimeter controls include, but are not limited to filter berms, silt fences, fiber rolls, compost socks, silt dikes, vegetative strips and temporary diversion dikes.

For linear construction sites where perimeter controls are infeasible (e.g., due to a limited or restricted rights-of-way), you must maximize the use of other controls as necessary to minimize pollutant discharges to perimeter areas of the site and document in your SWP3 why it is impracticable in other areas of the project.

Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.

- D. *Minimize Sediment Track-Out.* You must minimize the sediment track-out onto streets, other paved areas, and sidewalks from vehicles exiting your construction site. To comply with this requirement, you must:
1. Restrict vehicle use to properly designated exit points
 2. Use appropriate stabilization techniques at all points that exit onto paved roads. Example of appropriate stabilization techniques include, but are not limited to, use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.
 3. Stabilization is not required for exit points at linear utility construction sites if other controls at the exit point are provided to minimize sediment track-out. Example of other exit controls include, but are not limited to, preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas;
 4. Implement additional track-out controls as necessary to ensure that sediment removal occurs prior to vehicle exit; examples of additional track-out controls include, but are not limited to, use of wheel washing, rumble strips, and rattle plates and
 5. Where sediment has been tracked-out from your site onto the surface of paved street, sidewalks or other paved areas outside of your site, you must remove the deposited sediment by the end of the same work day in which the track-out occurs or by the end of the next work day if track-out occurs on a non-work day. You must remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance (unless it is connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface waters of the State.
- E. *Control Discharges from Stockpiled Sediment or Soil.* For any stockpiles or land clearing debris composed in whole of sediment or soil, you must comply with the following requirements:

1. Locate the piles outside of any natural buffers established under Parts 1.2.2.E or 3.3.1.B and physically separated from any stormwater conveyances, drain inlets, and area where stormwater flow is concentrated;
 2. Install a sediment barrier along all downgradient perimeter areas. Examples of sediment barriers include, but are not limited to, berms, dikes, fiber rolls, silt fences, sandbags, and gravel bags;
 3. Provide cover or appropriate temporary stabilization to avoid direct contact with precipitation or to minimize sediment discharge in accordance with Part 3.3.2 of this permit. Examples of cover include tarps, blown straw and hydro-seeding;
 4. Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water; and
 5. Unless infeasible, contain and securely protect from wind.
- F. *Minimize Dust.* In order to avoid pollutants from being discharged into surface waters, to the extent feasible, you must minimize the generation of dust through the appropriate application of water or other dust suppression techniques.
- G. *Minimize the Disturbance of Steep Slopes.* You must minimize the disturbance of steep slopes (i.e., slopes of 40% or greater). If it is not feasible to avoid disturbance of steep slopes, you must:
1. Divert concentrated or channelized flows of stormwater away from and around areas of disturbance on steep slopes;
 2. Use specialized erosion and sediment controls for steep slopes, such as temporary and permanent seeding with soil binders, erosion control blankets, surface roughening, reducing the continuous slope length with terracing or diversions, gradient terraces, interceptor dikes and swales, grass-lined channels, pipe slope drains, subsurface drains, level spreaders, check dams, seep berms, and triangular silt dikes; and
 3. Use stabilization practices designed to be used on steep slopes. You must comply with the stabilization requirements as required in Part 3.3.2 of this permit.
- H. *Preserve Topsoil.* You must preserve native topsoil on your site, unless infeasible; you must stockpile and reuse it in areas that will be stabilized with vegetation if applicable.
- I. *Minimize Soil Compaction.* In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed, you must either:
1. Restrict vehicle and equipment use in these locations to avoid soil compaction; or
 2. Prior to seeding or planting areas of exposed soil that have been compacted, use techniques that condition the soils to support vegetative growth, if necessary.
- J. *Protect Storm Drain Inlets.* If you discharge to any storm drain inlet that carries stormwater flow from your site directly to surface water (and it is not first directed to a sediment basin, sediment trap, or similarly effective control), and you have the authority to access the storm drain inlet, you must comply with the following requirements:
1. Install inlet protection measures that remove sediment from your discharge prior to entry into the storm drain inlet.
 2. Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, you must remove the deposited sediment by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.
- K. *Constructed Stormwater Conveyance Channels.* Design channels to avoid unstabilized areas on the site and to reduce erosion, unless infeasible, and minimize erosion of channels and their embankments, outlets, adjacent streambanks, slopes, and downstream waters during discharge conditions through the use of erosion

controls and velocity dissipation devices within and along the length of any constructed stormwater conveyance channel, and at any outlet to provide a non-erosive flow velocity. Examples of velocity dissipation devices include, but are not limited to, silt dikes, check dams, gravel bags, sediment traps, riprap, and grouted riprap at outlets.

L. *Installed sediment basins.* If you install a sediment basin, you must comply with the following:

1. Provide storage for either the calculated volume of runoff from a 2-year, 24-hour storm, or 3,600 cubic feet per acre drained;
2. When discharging from the sediment basin and impoundment, utilize outlet structures that withdraw water from the surface of the sediment basins in order to minimize the discharge of pollutants, unless infeasible;
3. Prevent erosion of the sediment basin using stabilization controls (e.g., erosion control blankets), and the inlet/outlet using erosion controls and velocity dissipation devices;
4. Sediment basins must be situated outside of surface waters and any natural buffers established under Parts 1.2.2.E and 3.3.1.B and
5. Remove accumulated sediment to maintain at least 1/2 the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

M. *Dewatering Practices.* You are prohibited from discharging groundwater or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation associated with a construction activity, unless such waters are first effectively managed by appropriate controls. Examples of appropriate controls include, but are not limited to, sediment basins or sediment traps, 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 sediment. Appropriate controls to use downstream of dewatering controls to minimize erosion include, but are not limited to, vegetated buffers, check dams, riprap, and grouted riprap at outlets. Uncontaminated clear dewatering water can be discharged without being routed to a control. You must also meet the following requirements for dewatering activities:

1. Do not discharge visible floating solids or foam;
2. Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering wastewater is found to contain these materials;
3. To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. In no case will surface waters be considered part of the treatment area;
4. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 3.3.1.K;
5. With backwash water, either haul away for disposal or return it to the beginning of the treatment process; and
6. Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

3.3.2 Stabilization Requirements

Implement and maintain stabilization measures to minimize erosion from exposed portions of your site in accordance with Part 3.3.2.A of this part.

A. *Stabilization Deadlines*

1. Initiate the installation of stabilization measures immediately in any disturbed areas where construction activities have permanently ceased on any portion of the site or will be temporarily inactive for 14 or more calendar days on any portion of the site.

The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the

next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

2. Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization measures has been initiated, or 7 calendar days if you discharge to an impaired water, or ORW, or ARC (see Part 3.3.2.A.2.c.):
 - a. For vegetative stabilization, all activities necessary to initially seed or plant the area to be stabilized; and/or
 - b. For non-vegetative stabilization, the installation or application of all such non-vegetative measures to provide effective cover.
 - c. If you discharge to an impaired water, or Outstanding Resource Water (ORW), or ARC, you are required to complete the stabilization activities specified in Parts 3.3.2.A.2.a and b within 7 calendar days after the temporarily or permanent cessation of earth-disturbing activities.

B. Stabilization Criteria

1. If you use vegetative cover to stabilize an exposed portion of your site for temporary and final stabilization (also see Part 8.31 Definitions of Temporary and Final Stabilization), you must comply with one of the following criteria:
 - a. Established uniform perennial vegetation (i.e., evenly distributed without large bare areas³), that provides 70% or more of the cover that is provided by vegetation native to local undisturbed areas. When background vegetation covered less than 100% of the ground prior to commencing earth-disturbing activities, the 70% coverage criteria is adjusted as in following example: if vegetation covered 50% of the ground prior to construction, then the requirement would be to provide a total vegetative cover at final stabilization of 70% of 50% ($0.70 \times 0.50 = 0.35$), or 35% of the site.
 - b. Immediately after seeding or planting the area to be stabilized, to the extent necessary to prevent erosion on the seeded or planted area, you must select, design, and install non-vegetative stabilization measures to provide effective cover to the area while vegetation is becoming established. Examples of non-vegetative stabilization measures include, but are not limited to riprap and gravel.
2. If you are using non-vegetative controls (e.g., hydro-mulch, erosion control blankets, riprap, geotextiles, and gabions) to stabilize exposed portions of your site, or if you are using such controls to temporarily protect areas that are being seeded and planted, you must provide effective non-vegetative cover to stabilize such exposed portions of your site.

3.3.3 Pollution Prevention Requirements

You are required to design, install, implement and maintain effective pollution prevention measures in order to minimize or prevent the discharge of pollutants. To meet this requirement, you must:

- Eliminate certain pollutant discharges from your site (see Part 3.3.3.A of this part);
- Properly maintain all pollution prevention controls (see Part 3.3.3.B of this part); and
- Comply with pollution prevention standards for pollutant-generating activities that occur at your site (see Part 3.3.3.B of this part).

A. *Prohibited Discharges.* You are prohibited from discharging the following from your construction site:

1. Wastewater from the washout of concrete, unless managed by an appropriate control as described in Part 3.3.3.B.4;
2. Wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials, unless managed by an appropriate control as described in Part 3.3.3.B.4;

³ Large bare area is defined as an area with 10 ft² or more with no perennial vegetative cover established

3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
 4. Soaps, detergents or solvents used in vehicle and equipment washing; and
 5. Toxic or hazardous substances from a spill or other release.
- B. *Maintenance Requirements.* You must ensure that all pollution prevention controls installed in accordance with this part remain in effective operating condition and are protected from activities that would reduce their effectiveness. You must inspect all pollutant-generating activities and pollution prevention controls in accordance with your inspection frequency requirements (see Part 4.3.13.B) and document your findings in accordance with Part 4.3.13.E. If you find that controls need to be replaced, repaired, or maintained, you must make the necessary repairs or modifications in accordance with the following:
1. General Maintenance Requirements: You must initiate work to fix the problem immediately after discovering the problem, and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance.
 2. Washing of Equipment or Vehicles
 - a. You must provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of washing prior to discharges. Examples of “effective means” include, but are not limited to, locating activities away from waters of the State and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls;
 - b. Ensure there is no discharge of soaps, detergents, or solvents in equipment and vehicle wash water. For storage of soaps, detergents or solvents, you must provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these materials from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas.
 3. Storage, Handling, and Disposal of Construction Products, Materials and Wastes. You must minimize the exposure to precipitation and stormwater of any of the products, materials, or wastes specified below that are present at your site by complying with the requirements in this Part. To ensure you meet this requirement, you must:
 - a. For building products: In storage areas, provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these products from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas.
 - b. For pesticides, herbicides, insecticides, fertilizers, and landscape materials:
 - (1) In storage areas, provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these chemicals from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas; and
 - (2) Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label.
 - c. For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:
 - (1) To comply with the prohibition in Part 3.3.3.A.3 store chemicals in water-tight containers, and provide either cover (e.g., plastic sheeting or temporary roofs) to prevent these containers from coming into contact with rainwater, or a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., spill kits), or provide secondary containment (e.g., spill berms, decks, spill containment pallets); and
 - (2) Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

- d. For hazardous or toxic waste (e.g., paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids):
 - (1) Separate hazardous or toxic waste from construction and domestic waste;
 - (2) Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, or local requirements;
 - (3) Store all containers that will be stored outside within appropriately-sized secondary containment (e.g., spill berms, decks, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in covered areas or having a spill kit available on site);
 - (4) Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended methods of disposal and in compliance with federal, state, and local requirements; and
 - (5) Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.
 - e. For construction and domestic waste (e.g., packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, and other trash or building materials): Provide waste containers (e.g., dumpster or trash receptacle) of sufficient size and number to contain construction and domestic wastes. In addition, you must:
 - (1) Keep waste container lids closed during precipitation event when not in use, when there is a significant chance of precipitation (forecasted), and/or the site is inactive or work is not in progress. Waste containers must be covered at the end of daily work shifts and when workers are not present. For waste containers that do not have lids and could leak, provide either (a) cover (e.g., a tarp, plastic sheeting, temporary roof) to minimize exposure of wastes to precipitation, or (b) a similarly effective means designed to minimize the discharge of pollutants (e.g., secondary containment);
 - (2) On work days, clean up and dispose of waste in designated waste containers; and
 - (3) Clean up immediately if containers overflow.
 - f. For sanitary waste: Position portable toilets so that they are secure and will not be tipped or knocked over and located away from water of the State and stormwater inlets or conveyances.
4. Washing of Applicators and Containers Used for Paint, Concrete, or Other Materials. To comply with the prohibition in Parts 3.3.3.A.1 and 2, you must provide an effective means of eliminating the discharge of water from the washout and cleanout of stucco, paint, concrete, form release oils, curing compounds, and other construction materials. To comply with this requirement, you must:
- a. Direct all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation;
 - b. Handle washout or cleanout wastes as follows:
 - (1) Do not dump liquid wastes in storm sewers;
 - (2) Dispose of liquid wastes in accordance with applicable requirements in Part 3.3.3.B.3; and
 - (3) Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 3.3.3.B.3;
 - (4) Clean up immediately if there is an overflow or if a discharge occurs outside of the leak-proof container or pit; and

- c. Locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.
- C. *Emergency Spill Notification.* You are prohibited from discharging toxic or hazardous substances from a spill or other release, consistent with Part 3.3.3.A.5 of this part. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Parts 110, 117, or 302 occurs during a 24-hour period, you must notify the NRC at (800) 424-8802 or, in the areas of Oklahoma, call the DEQ's Hotline at (800)522-0206 as soon as you have knowledge of the discharge. You must also, within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. Local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.
- D. *Fertilizer Discharge Restrictions.* You are required to minimize discharges of fertilizers containing nitrogen or phosphorus. To meet this requirement, you must comply with the following requirements:
 1. Apply at a rate and in amounts consistent with manufacturer's specifications, or document departures from the manufacturer's specifications;
 2. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
 3. Avoid applying before heavy rains that could cause excess nutrients to be discharged;
 4. Never apply to frozen ground;
 5. Never apply to stormwater conveyance channels with standing or flowing water; and
 6. Follow all other federal, state, tribal and local requirements regarding fertilizer application.

3.4 Numeric Technology-Based Effluent Limitation

3.4.1. Numeric Effluent Limitation and Monitoring Requirements for Asphalt Batch Plants

If you have discharges of stormwater from asphalt batch plants, you must comply with the limitations and monitoring requirements required in Addendum F of this permit. The numeric effluent limitations in following Table 3.1 apply to stormwater discharges associated with any activities for asphalt batch plants, not for concrete batch plants.

TABLE 3.1 NUMERIC EFFLUENT LIMITATIONS FOR ASPHALT BATCH PLANTS

Parameter	Limitation	Monitoring Frequency	Sample Type
Total Suspended Solids (TSS)	23 mg/l, daily max. 15 mg/l, 30-day avg.	1/year	Grab
Oil and Grease	15 mg/l, daily max. 10 mg/l, 30-day avg.	1/year	Grab
pH	6.5-9.0 s.u.	1/year	Grab

If the project lasts less than one year, you must collect at least one sample. Also you must comply with quarterly visual monitoring and annual numeric effluent limitation monitoring and document those results as specified in your SWP3 (see Addendum F of this permit).

Monitoring for compliance with the above numeric effluent limitations must be conducted in accordance with test procedures approved under 40 CFR Part 136, and samples must be analyzed by an accredited laboratory in accordance with OAC 252:301. Where more than one test procedure is approved for the analysis of a pollutant or pollutant parameter, the test procedure must be sufficiently sensitive to meet the minimum quantification levels (MQLs) established in OAC 252:690 or, where an MQL has not been established in OAC 252:690, to quantify the amount of pollutant present at or below the level of the above numeric effluent limitations.

3.5 Water Quality-Based Effluent Limitations

Your stormwater discharges must be controlled as necessary to meet applicable water quality standards. Operators seeking coverage under this permit shall not cause or have the reasonable potential to cause or contribute to a violation of a water quality standard. Where a discharge is already authorized under this permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable water quality standard, DEQ will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future discharges do not cause, have the reasonable potential to cause, or contribute to the violation of a water quality standard and document these actions in the SWP3. If violations remain or re-occur, then coverage under this permit may be terminated by DEQ, and an alternative general permit or individual permit may be issued. Compliance with this requirement does not preclude any enforcement activity as provided by the Clean Water Act (CWA) for the underlying violation. If such violation is determined, DEQ may require you to:

- Develop a supplemental BMP action plan describing SWP3 modifications in accordance with Part 4.1.4 to address adequately the identified water quality concerns;
- Submit valid and verifiable data and information that are representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or
- Cease discharges of pollutants from construction activity and submit an alternative general permit or individual permit application.

3.5.1 Discharges to Waters Identified as Impaired Waters

If you discharge to impaired water that is impaired for Sediment and/or Turbidity within 1 mile, you are required to comply with the additional requirements in this part.

- A. *Identify whether you discharge to one or more waterbodies impaired for sediment and/or turbidity.* If you discharge to impaired waters, you must indicate so in your NOI and comply with the following requirements in Parts 3.5.1.B, C, and D of this part. If you indicate in your NOI that you do not discharge to impaired water, DEQ may determine, based on additional information, that you are considered to be discharging to an impaired water. If this is the case, you will be notified of DEQ's determination, and be provided with an opportunity to comply with additional requirements as a condition of your permit coverage, consistent with Part 3.5.1.
- B. *Site inspection requirements.* You are required to comply with the following modified inspection requirements:

You must conduct site inspections once every 7 calendar days at a minimum, and within 24 hours of a storm event of 0.5 inches or greater or within 24 hours of a discharge caused by snowmelt;
- C. *Corrective actions.* If the inspection or visual examination results indicate any permit violations, you must implement the corrective actions required in Part 4.3.14. However, a violation would result if you fail to implement the required corrective actions. If you are subject to the numeric limit in Part 3.4 (Table 3.1 for asphalt batch plant) you must implement the monitoring requirement according to Addendum F of this permit. If your sample results indicate that you have exceeded the numeric limit, you must implement the corrective actions according to Part 4.3.14.
- D. *Stabilization requirements.* You are required to comply with the following modified stabilization requirements:

You are required to comply with the stabilization requirements as specified in Parts 3.3.2.A.1 and 2 within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities.

3.5.2 Discharges to waters identified as an ORW or ARC

If you discharge to waters identified as ORW (see Addendum E of this permit) or your sites are located within areas identified as an ARC and you are relying on option b in Part 1.2.2.E.2 (see Part 10 and Addendum A of this permit), you must implement inspections, corrective actions and stabilization requirements provided in Part 3.5.1 above. Also you must comply with the following additional requirements:

- A. In order to minimize sediment discharges, if any ORW or ARC is located on or immediately adjacent to your site, you must ensure that a vegetated buffer zone of at least 100 feet is retained or successfully established/planted between the area disturbed and all perennial or intermittent streams. A vegetated buffer zone of at least 50 feet must be retained or successfully established/planted between the areas disturbed during construction and all ephemeral streams or drainages. If the nature of the construction activity or the construction site makes a buffer impossible, you must provide equivalent controls. See Addendum H of this permit for information to assist you in developing equivalent controls.
- B. For drainage locations serving 5 or more acres disturbed at one time, a temporary (or permanent) sediment basin and/or sediment traps shall be used to minimize sediment discharges within the areas of the ORW or ARC. You may use the information in Parts 3.3.1.L and 4.3.11.A.4 to assist you in complying with this requirement.

For common drainage locations that serve an area with 5 or more acres disturbed at one time, a temporary (or permanent) sediment basin(s) that provides overall storage for a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin(s) providing overall storage of 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from off-site areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin(s).

In determining whether installing a sediment basin(s) is attainable, you may consider factors such as site soils, slope, available area on site, etc. In any event, you must consider public safety, especially as it relates to children, as a design factor for the sediment basin(s) and alternative sediment controls shall be used where site limitations would preclude a safe design. For drainage locations that serve 5 or more disturbed acres at one time and where a temporary sediment basin(s) or equivalent controls are not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin(s) nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down-slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. DEQ encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

- C. For any portion of the site that discharges to an ORW or ARC, instead of the inspection frequency specified in Part 4.3.13.B, you must conduct inspections within 7 calendar days and within 24 hours of the occurrence of a storm event of 0.5 inches or greater.
- D. For initiating and completing stabilization, you are required to complete the stabilization activities within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities.

3.6 Responsibilities of Operators

Permittees may meet one or both of the operational control components in the definition of “operator” found in Part 8.23 of this permit. Either Parts 3.6.1 or 2 or both will apply depending on the type of operational controls exerted by an individual permittee.

3.6.1 Operational Control over Construction Plans and Specifications

If you have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g., developer, owner, or operator), you must ensure that:

- A. The project specifications meet the minimum requirements of Part 4 and all other applicable permit conditions of this permit;
- B. The SWP3 indicates the areas of the project where you have operational control over project specifications (including the ability to make modifications in specifications), and ensure all other permittees implementing portions of the SWP3 who may be impacted by any changes to the plan are notified of such modifications in a timely manner; and

- C. The SWP3 for portions of the project where you are the operator indicates the name and DEQ permit number for parties with day-to-day operational control of those activities necessary to ensure compliance with the SWP3 or other permit conditions. If these parties have not been identified at the time the SWP3 is initially developed, the permittee with operational control over project specifications shall be considered to be the responsible party until such time as the authority is transferred to another party (e.g., general contractor) and the plan updated.

3.6.2 Operational Control over Day-to-Day Activities

If you have operational control over day-to-day activities, you must ensure that:

- A. The SWP3 for portions of the project where you are the operator meets the minimum requirements of Part 4 of this permit and identifies the parties responsible for implementation of control measures;
- B. The SWP3 indicates areas of the project where you have operational control over day-to-day activities; and.
- C. The SWP3 for portions of the project where you are the operator indicates the names and their permit numbers of the parties with operational control over project specifications (including the ability to make modifications in specifications).

3.6.3 Responsibilities of Operators at a Larger Common Plan of Development

The criteria within the definition of “Operator” allow for more than one entity to be active at a construction site that is considered a larger common plan of development. For example, the developer and one or more builders may be engaged in construction activity within a residential subdivision at the same time, and any or all may be considered operators as defined by this permit. Where it is determined to be more efficient or desirable, this permit allows for all construction activities at a larger common plan of development to be covered by a single permit and the SWP3 held by a “Primary Operator”, usually the developer.

For the purposes of this provision, “Primary Operator” for a construction project that has more than one operator means an operator who has chosen to obtain coverage under this permit for all discharges from all earth-disturbing activities at a construction site that is considered to be a larger common plan of development even if such discharges originate from portions of the site operated by another entity, such as a builder or utility contractor.

For the purposes of this provision, “Secondary Operator” for a construction project that has more than one operator means an operator who has elected to have the discharges from earth-disturbing activities on a portion of a larger common plan of development to which he/she has operational control covered by the permit and SWP3 held by the Primary Operator rather than obtaining separate permit coverage for those discharges. If an operator who may be considered a Secondary Operator under this provision elects not to have their discharges from earth-disturbing activities covered by the Primary Operator’s permit, this operator must obtain separate permit coverage.

- A. *Responsibilities of the Primary Operator.* The Primary Operator is ultimately responsible for the runoff from the perimeter of the development. Regardless of the reason for the runoff, the Primary Operator is responsible for ensuring sufficient overall controls for the development. The Primary Operator is responsible for obtaining permit coverage for the development and for developing and maintaining an SWP3 for the development. The Primary Operator shall identify all Secondary Operators in the SWP3 and identify the specific areas of the development where they will be active. The Primary Operator shall ensure that Secondary Operators are aware of all SWP3 requirements, BMPs and other control measures that apply to their operations. Contractor Certifications (Part 4.4 of this permit) or similar written instruments should be used to document this notification. The Primary Operator shall not terminate permit coverage until at least one of the following conditions has been met:
 1. All construction, including landscaping and lot development, has been completed, and final stabilization has been achieved.
 2. All lots are sold and developed, and there are no temporary common controls for subdivision outfalls, i.e. sediment basins, large sediment traps, check dams, etc.

3. All construction activity by the Primary Operator is completed, final stabilization has been achieved on all areas under the control of the Primary Operator, and the remaining undeveloped lots have been sold to other new operator(s) and NCOs (see Part 2.2.3 of this permit) for the new operator(s) have been prepared and signed, or to operators that have obtained separate permit coverage.

B. Responsibilities of Secondary Operators

Secondary Operators must be thoroughly familiar with and adhere to provisions of the permit, the NOI, the SWP3 and all BMPs and control measures which apply to their areas of activity. Secondary Operators must notify the Primary Operator prior to beginning any earth-disturbing activity and execute any written notification required by the Primary Operator. Secondary Operators must avoid damaging or interfering with the effectiveness of any control measure on the construction site or notify the Primary Operator if such occurs.

3.6.4 Responsibilities of the Operator of Utility Installation

If you have operational control over utility installation (e.g., telephone, electric, gas, cable TV, etc.), your activities must be covered under an SWP3, either a “joint SWP3” for the larger common plan of development or sale, or your own SWP3. You are responsible for maintenance of the SWP3 on the areas disturbed by your activities. You must ensure the protection of endangered species, implementation of BMPs, and final stabilization requirements. This applies to utility companies and their subcontractors. If you are a contractor and do not meet the definition of “Operator” (see Part 23 of this permit), you are not required to submit an NOI for the Permit coverage. You may be covered as specified under Part 3.6.3, by a “contractor certification” or similar arrangement (see Addendum D of this permit).

Part 4 Stormwater Pollution Prevention Plans (SWP3)

4.1 General Requirements

- 4.1.1 An SWP3 must be prepared according to the requirements in Part 4 prior to submission of an NOI. The SWP3 must be kept up-to-date throughout coverage under this permit.

If a SWP3 was prepared under the 2012 permit, operator must review and update the SWP3 to ensure that requirements of this permit are addressed prior to submitting an NOI for coverage under this permit.

- 4.1.2 SWP3s shall be prepared in accordance with good engineering practices. Use of a licensed professional engineer (PE) for SWP3 preparation is not required by the permit. However, if any part of the SWP3 involves the practice of engineering⁴, then those engineering practices and designs are required to be prepared by a licensed professional engineer. The SWP3 shall identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the construction site. The SWP3 shall describe and ensure the implementation of practices that will be used to reduce the pollutants in stormwater discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of this permit.
- 4.1.3 When developing SWP3s, applicants must follow the procedures in Part 10 of this permit to determine whether listed endangered or threatened species or critical habitat would be affected by the applicant's stormwater discharges or stormwater discharge-related activities. Any information on whether listed species or critical habitats are found in proximity to the construction site must be included in the SWP3. Any terms

⁴ Statutes and Rules of Oklahoma State Board of Licensure for Professional Engineers & Land Surveyors, Section 472.2 “Definitions” states “practice of engineering means any service or creative work, the adequate performance of which requires engineering education, training and experience in the application of special knowledge of the mathematical, physical and engineering sciences to such services or creative work as consultation, investigation, evaluation, planning and design of engineering works and systems, planning the engineering use of land and water, teaching of advanced engineering subjects or courses related thereto, engineering research, engineering surveys, engineering studies, and the inspection or review of construction for the purposes of assuring compliance with drawings and specifications; any of which embraces such services or work, either public or private, in connection with any utilities, structures, buildings, machines, equipment, processes, work systems, projects, and industrial or consumer products or equipment of a mechanical, electrical, chemical, environmental, hydraulic, pneumatic or thermal nature, insofar as they involve safeguarding life, health or property, and including such other professional services as may be necessary to the design review and integration of a multidiscipline work, planning, progress and completion of any engineering services.”

or conditions that are imposed under the eligibility requirements of Parts 1.2.2.E, 3.5.2 and 10 of this permit to protect listed species or critical habitat from stormwater discharges or stormwater discharge-related activity must be incorporated into the SWP3. Permittees must implement the applicable provisions of the SWP3 required under this part as a condition of this permit.

- 4.1.4 If your construction site discharges into a receiving water (within 1 mile) which has been listed on the Clean Water Act 303(d) list of impaired waters, and your discharges contain the pollutant(s) for which the waterbody is impaired, you must document in your SWP3 how the BMPs and other controls selected for your site will control the discharge of the pollutant(s) of concern. If Part 3.5.1 applies to your discharge, you must include in your SWP3 the additional requirements specified in that part.

The 303(d) list of Impaired Waters in Oklahoma can be found in Appendix C of the Integrated Report on the DEQ's webpage at http://www.deq.state.ok.us/WQDnew/305b_303d/index.html, or the DEQ GIS Map and Data Viewer at <http://deq.maps.arcgis.com/home/index.html>

- 4.1.5 If a TMDL or watershed plan or local compliance plan has been approved for the waterbody, you must also describe how your SWP3 is consistent with any TMDL or watershed plan or local compliance plan applicable to your discharge. Permittees must incorporate any limitations, conditions, or requirements applicable to their discharges into the SWP3 to ensure that the waste load allocations (WLAs) or load allocations (LAs) and/or the TMDL's associated implementation plan will be met within any timeframe established in the TMDL report or watershed plan. Monitoring and reporting of the discharges may also be required as appropriate to ensure compliance with the TMDL or watershed plan.

Approved TMDL reports or watershed plans can be downloaded from DEQ's website at <http://www.deq.state.ok.us/wqdnew/tmdl/index.html>

- 4.1.6 If the industrial activities associated with a concrete or asphalt batch plant are directly related to your construction site and are covered under this permit, you must develop the SWP3 for such industrial activities according to Addendum F of this permit.

4.2 Signature, Posting a Notice, Making Plans Available, and DEQ's Notification

- 4.2.1 The SWP3 shall be signed in accordance with Part 6.7, and be retained on-site in accordance with Part 5 of this permit.
- 4.2.2 The Permittee shall post a notice near the main entrance of the construction site with the following information:
- A. The OPDES permit number for the project or a copy of the NOI if a permit number has not yet been assigned;
 - B. The name and telephone number of a local contact person;
 - C. A brief description of the project; and
 - D. The location of the SWP3 if the site is inactive or does not have an on-site location to store the plan.

If posting this information near a main entrance is infeasible due to safety concerns, the notice shall be posted in a local public building. If the construction project is a linear construction project (e.g., pipeline, highway, etc.), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. This permit does not provide the public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the public access to a construction site.

- 4.2.3 The permittee shall make SWP3s available upon request to: DEQ and/or any State, Federal, or local agency approving sediment and erosion plans, grading plans or stormwater management plans; the U.S. Fish and Wildlife Service or the Oklahoma Department of Wildlife Conservation; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site. The copy of the SWP3 that is required to be kept on-site or locally available must be made available to DEQ for review at the time of an on-site inspection. Also, in the interest of public involvement, DEQ encourages permittees to make their SWP3s available to the public for viewing during normal business hours.

- 4.2.4 DEQ may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provisions of this permit that are not being met by the SWP3 as well as those requiring modification in order to meet the minimum requirements of this Part. Within 7 calendar days of receipt of such notification from DEQ (or as otherwise provided by DEQ), the permittee shall make the required changes to the SWP3 and shall submit to DEQ a written certification that the requested changes have been made. DEQ may take appropriate enforcement action for the period of time the permittee was operating under a plan that did not meet the minimum requirements of this permit.

4.3 Contents of SWP3

The SWP3 must include the following information, at a minimum:

4.3.1 Stormwater Team

Identify the personnel (by name or position) that are part of the stormwater team, as well as their individual responsibilities, including which members are responsible for implementation of the SWP3 and compliance with permit requirements. Each member of the stormwater team must have ready access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWP3, and other relevant documents or information that must be kept with the SWP3.

4.3.2 Nature of Construction Activities

Describe the nature of the construction activity, including the size of the property in acres (or length in miles if it is a linear construction sit), latitude and longitude at the center of construction site (latitude and longitude at the starting and ending points if it is a linear construction site), the total area expected to be disturbed by the construction activities (in acres), on-site and off-site construction support activities covered by this permit, post-construction runoff coefficient, pre-construction and post-construction total impervious area (in acres), the maximum area expected to be disturbed at any one time and types of soil and fill materials.

4.3.3 Other Site Operators

Include a list of all other operators who will be engaged in construction activities at your site, and the areas of the site over which each operator has control.

4.3.4 Sequence and Estimated schedule of construction activities:

The SWP3 must include a description of the intended sequence of major construction activities, including a schedule of the estimated start dates and the duration of the activity, for the following activities:

- A. Installation of stormwater control measures, and when they will be made operational, including an explanation of how the sequence and schedule for installation of stormwater control measures complies with Part 3.3.3 and of any departures from manufacturer specifications;
- B. Commencement and duration of earth-disturbing activities in each portion of the site, including clearing and grubbing, mass grading, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
- C. Temporary or permanent cessation of construction activities in each portions of the site;
- D. Temporary or final stabilization of disturbed areas for each portion of the site; and
- E. Removal of temporary stormwater control measures and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.

4.3.5 Site Map

Include a legible map, or series of maps showing the following features of your site:

- A. Boundaries of the property;
- B. Locations where construction activities will occur, including:
 1. Locations where earth-disturbing activities will occur, noting any phasing of construction activities;

2. Approximate slopes before and after major grading activities. Note areas of steep slopes (i.e., greater than 40 percent);
 3. Locations where sediment, soil, or other construction materials will be stockpiled;
 4. Locations of crossings of any waters of the State;
 5. Designated points where vehicles will exit onto paved roads;
 6. Locations of structures and other impervious surfaces upon completion of construction; and
 7. Locations of on-site or off-site construction support activity areas covered by this permit.
- C. Locations of all waters of the State within and one mile of the site, including wetlands that exist within or in the immediate vicinity of the site. Indicate which waterbodies are listed as impaired, which lie within a watershed with approved TMDL, and which are identified by the State as ARC or ORW;
- D. Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, and structures);
- E. Drainage pattern(s) of stormwater run-on or runoff and authorized non-stormwater before and after major grading activities;
- F. Stormwater and allowable non-stormwater discharge locations, including:
1. Locations where stormwater and/or allowable non-stormwater will be discharged to storm drain inlets on the site and in the immediate vicinity of the site; and
 2. Locations where stormwater or allowable non-stormwater will be discharged directly to waters of the State on or near the site.
- G. Locations of all potential pollutant-generating activities identified in Part 4.3.6 below;
- H. Locations of stormwater control measures, including natural buffer areas (i.e., either the 100 feet or 50 feet buffer retained on site to be consistent with Parts 3.3.1.A and 3.5.2.A); and
- I. If applicable, sampling locations if the project is subject to the Part 3.4.1 numeric technology-based limitations for asphalt batch plants. Also indicate the sampling location(s) and all discharge points, and indicate which discharge points are considered “substantially identical”.

4.3.6 Construction Site Pollutants

Identify and list all pollutants (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels) and all pollutant-generating activities associated with those pollutants. You must take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, which will be disturbed or removed during construction.

4.3.7 A Copy of the Permit Requirements

Include a copy of this permit and signed NOI in your SWP3. Do not submit it to DEQ if you are required to submit your SWP3 for DEQ’s review (see Part 2.4 of this permit).

4.3.8 Measures to Protect ARC and ORW

Include information on whether listed endangered or threatened species or critical habitat are found in proximity to the construction activity, and whether such species may be affected by the stormwater discharges or stormwater discharge-related activities (see Addendum A and Parts 1.2.2.E and 10 of this permit) and on whether discharge to waters identified as ORW (see Addendum E). If your site discharges into the area identified as ARC and ORW, you must describe and implement the measures specified in Part 3.5.2 necessary to protect these endangered species and threatened habitat and resource waters in the SWP3, including any equivalent sediment controls specified in Addendum H (Buffer Requirements).

4.3.9 Federal, State or Local Historic Properties

Include documentation required in Part 9 of this permit.

4.3.10 Water Quality Impaired Water and TMDL Requirements

Include information on whether stormwater discharges or stormwater discharge-related activities would have an effect on water quality impaired receiving waters. The permittee must describe how the BMPs and other controls selected for the site will reduce and avoid the discharges of pollutants of concern into any 303(d) impaired waters, including requirements of Parts 4.1.4 and 3.5.1 of this permit. The permittee must describe and implement any measures necessary to meet the requirements of an approved TMDL or watershed plan and/or associated implementation schedule established in the TMDL or watershed plan. Monitoring and reporting of discharge quality may also be required if necessary to ensure compliance with an approved TMDL or watershed plan (see Part 4.1.5 of this permit).

4.3.11 Stormwater Controls Description

Include a description of all control measures (i.e., structural and non-structural BMPs) required in Parts 3.3, 3.4 (if applicable) and 3.5 of this permit. The description and implementation of control measures must include the following:

A. Erosion and Sediment Controls

1. Utilize EPA's national BMP menu and/or other references to select appropriate control measures, and provide the descriptions of the selected control measures for your site. The selected control measures must meet the following requirements, as well as being in compliance with state and local regulations for your site, including:
 - a. The construction-phase erosion and sediment controls should be designed to retain sediment on site to the extent practicable;
 - b. All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the Permittee must replace or modify the control for site situations;
 - c. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize off-site impact (e.g., fugitive sediment in streets could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets);
 - d. Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%;
 - e. Litter, construction debris, and construction chemicals (e.g., fuel, hydraulic fluids, etc.) exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., by screening outfalls or picking up daily);
 - f. Off-site construction storage areas (also including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the permitted project are considered a part of the project and shall be addressed in the SWP3; and
 - g. Many applications of straw and hay bales for erosion and sediment control are proving ineffective, maintenance-intensive and expensive. Therefore, straw or hay bales as BMP controls within the State are not allowed. Alternatives to straw or hay bales can be silt fence, rock check dams, fiber rolls, geotextiles, compost blankets, filter fabric, gravel bags and other designs.
2. Include natural buffers and/or equivalent sediment controls required in Part 3.3.1.B of this permit.
3. Describe the specific vegetative and/or non-vegetative stabilization practices that will be used to achieve temporary and final stabilization on the exposed portions of your site as required in Part 3.3.2 of this permit.
4. Include a description of structural practices to divert flows from exposed soils, retain flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Structural practices may include but are not limited to: silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment

basins (also see Part 3.3.1.L of this permit). Placement of structural practices in floodplains should be avoided to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA. If you install a sediment basin or similar impoundment, you must meet the following requirements:

- a. For common drainage locations that serve an area with 10 or more acres disturbed at one time (or 5 acres if required by Part 3.5.2), a temporary (or permanent) sediment basin(s) that provides overall storage for a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin(s) providing 3,600 cubic feet of overall storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from off-site areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin.

In determining whether installing sediment basin(s) is attainable, the Permittee may consider factors such as site soils, slope, available area on site, etc. In any event, the Permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin(s) and alternative sediment controls shall be used where site limitations would preclude a safe design. For drainage locations that serve 10 or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. DEQ encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

- b. For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down-slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless sediment basin(s) providing overall storage for a calculated volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet of storage per acre drained is provided. DEQ encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.
- c. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. no significant changes in the hydrological regime of the receiving water).

B. Pollution Prevention

1. Describe procedures that you will follow to prevent and respond to spills and leaks (also see Parts 3.2.2 and 3.3.3.C of this permit), including:
 - a. Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for the detection and response to spills or leaks; and
 - b. Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 3.2 and established under either 40 CFR Parts 110, 117, or 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available.

You may also reference the existence of Spill Prevention Control and Countermeasure (SPCC) plans developed for the construction activity under Part 311 of the CWA, or spill control programs otherwise required by an OPDES permit for the construction activity, provided that you keep a copy of that other plan onsite.

2. Describe waste management procedures for how you will handle and dispose of all wastes generated at your site, including, but are not limited to, clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste.
3. For application of fertilizers, document any departures from the manufacturer specifications where appropriate (also see Part 3.3.3.D of this permit).

C. Monitoring (if applicable)

If the discharges from the facilities are subject to the numeric limitations in Part 3.4.1 and Addendum F of this permit, the SWP3 must document the procedures you will follow for taking samples or observation consistent with Addendum F, including:

1. Locations where samples will be collected. For linear projects, document which locations are considered substantially identical and why they are substantially identical;
2. Personnel responsible for taking and handling samples, analyzing samples, and recording the results;
3. The normal working hours associated with the project (see Addendum F of this permit);
4. Equipment to be used for taking samples and for analysis;
5. Procedures to be followed for ensuring that samples are taken (see Addendum F of this permit); and
6. Procedures for notifying and activating your sampling team when a discharge is occurring or is expected to occur.

D. Approved Local Plans

Permittees which discharge stormwater associated with construction activities must ensure their SWP3 is consistent with requirements specified in applicable sediment and erosion site plans of site permits, or stormwater management site plans, or site permits approved by local officials. The SWP3 must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits, or stormwater management site plans or site permits approved by local officials for whom the Permittee receives written notice.

4.3.12 Maintenance

All erosion and sediment control measures and other protective measures identified in the SWP3 must be maintained in effective operating condition. If site inspections required by Part 4.2.13 identify BMPs that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of stormwater controls. If existing BMPs need to be modified or if additional BMPs are necessary for any reason, implementation must be completed before the next storm event whenever practicable. If maintenance prior to the next anticipated storm event is impracticable, the situation must be documented in the SWP3 and maintenance must be scheduled and accomplished as soon as possible. Any maintenance checklists or other forms that will be used must be included in the SWP3.

4.3.13 Inspections

A. Person(s) Responsible for Inspecting Site

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that the person who conducts inspections is a “qualified person.” A “qualified person” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit. An inspection form shall be developed and included in your SWP3.

B. Frequency of Inspections

At a minimum, you must conduct a site inspection once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater and within 24 hours of a discharge generated by snowmelt,

unless you are subject to Parts 3.5.1.B or 3.5.2.C. If a storm event of 0.5 inches or greater, or snowmelt, causes your site to discharge, within 24 hours of the end of the storm event or the beginning of the snowmelt discharge you must conduct a site inspection when the discharge is occurring and comply with the requirements of Part 4.3.13.D.

C. Reductions in Inspection Frequency.

You may reduce the frequency of inspections to once per month in areas of your site where you have initiated vegetative stabilization that meets the criteria in Part 3.3.2.A, once you have completed the initial seeding or planting, and provided protection with non-vegetative cover pursuant to Part 3.3.2.B.2, or you have installed temporary, non-vegetative stabilization that meet the criteria in Part 3.3.2.B.2. If construction activity resumes at a later date, the inspection frequency shall immediately increase to that is required in Part 4.3.13.B.

D. Requirements for Inspections.

1. Areas that need to be inspected. During your site inspection, you must at a minimum inspect the following areas of your site:
 - a. All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 3.3.2;
 - b. All stormwater controls (including pollution prevention measures) installed at the site to comply with this permit;
 - c. Material, waste, borrow, or equipment storage and maintenance areas that are covered by this permit;
 - d. All areas where stormwater typically flows within the site, including drainage ways designed to divert, convey, and/or treat stormwater;
 - e. All points of discharge from the site, including exit points that sediment that has been tracked out from the site; and
 - f. All locations where stabilization measures have been implemented.

2. Inspection Requirements

During your site inspection, you must at a minimum:

- a. Check whether all erosion and sediment controls and pollution prevention controls are properly installed, appear to be operational, and are working as intended to minimize pollutants discharges. Determine if any controls need to be replaced, repaired, or maintained in accordance with Part 4.3.12;
- b. Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
- c. Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 3.3, and/or 3.4 (if applicable);
- d. At point of discharge and, if applicable, the banks of any surface waters flowing within your property boundaries or immediately adjacent to your property, check for signs of visible erosion and sedimentation (i.e., sediment deposits) that have occurred and are attributable to your discharge. If not accessible, nearby downstream locations must be inspected to the extent practicable;
- e. Identify any incidents of noncompliance observed;
- f. If a discharge is occurring during your inspection, you are required, in addition to Part 4.3.13.D.1 and 2 above, to:
 - (1) Identify all points of the property from which there is a discharge;
 - (2) Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollutants; and

- (3) Document whether your stormwater controls are operating effectively, and describe any such controls that are clearly not operating as intended or are in need of maintenance.
- g. Based on the results of your inspection and necessary maintenance required in Part 4.3.12 initiate corrective action under Part 4.3.14 of this permit.

E. Inspection Report

1. Requirement to Complete Inspection Report. You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
 - a. The inspection date;
 - b. Names and titles of personnel making the inspection;
 - c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.3.13.D;
 - d. If you are inspecting your site at the frequency specified in Parts 4.3.13.B, C and 3.5.1.B and conducted an inspection because of rainfall measuring 0.5 inches or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and
 - e. If you have determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.
2. Signature Requirements. Each inspection report must be signed in accordance with Part 6.7 of this permit.
3. Recordkeeping Requirements. You are required to keep a current, copies of all inspection reports at the site or at an easily accessible location, so that they can be made available at the time of an on-site inspection or upon request by DEQ.

4.3.14 Corrective Actions

A. Requirements for Taking Corrective Action

You must complete the following corrective actions in accordance with Part 8.8 of this permit. In all circumstances, you must immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.

1. For any of the following conditions on your site, you must install a new or modified control and make it operational, or complete the repair, by no later than 7 calendar days from the time of discovery. If it is infeasible to complete the installation or repair within 7 calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7 calendar day timeframe and document your schedule for installing the stormwater controls and making it operational as soon as practicable after the 7-day timeframe.
 - a. A required stormwater control was never installed, was installed incorrectly or not in accordance with the requirements in Parts 3 and/or 4; or
 - b. A stormwater controls needs to be repaired or replaced (beyond routine maintenance required in Part 4.3.12 of this permit); or
 - c. You become aware that the controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.5; or
 - d. One of the prohibited discharges in Parts 3.1 and 3.3.3.A is occurring or has occurred; or
 - e. If you are subject to the monitoring requirements in Part 3.4.1 and Addendum F of this permit, samples indicate that you have a discharge that exceeds the applicable effluent limitation.

2. Where your corrective actions result in changes to any of the stormwater controls or procedures documented in your SWP3, you must modify your SWP3 accordingly within 7 calendar days of completing corrective action work.

B. Corrective Action Report

For each corrective action taken in accordance with this Part, you must complete a corrective action report, which includes the applicable information in this Part.

1. Within 24 hours of discovering the occurrence of one of the triggering conditions in Part 4.3.14.A.1 at your site, you must provide a record of the following:
 - a. Which triggering condition identified at your site;
 - b. The nature of the condition identified; and
 - c. The date and time of the condition identified and how it was identified.
2. Within 7 days of discovering the occurrence of one of the triggering conditions in Part 4.3.14.A.1 at your site, you must complete a record of the following:
 - a. Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
 - b. A summary of stormwater control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed;
 - c. Notice of whether SWP3 modifications are required as a result of the condition identified or corrective action; and
 - d. Signed in accordance with Part 6.7 of this permit.

C. Recordkeeping Requirements

You are required to keep current copies of all corrective action reports at the site or at an easily accessible location, so that they can be made available at the time of an onsite inspection or upon request by DEQ.

4.3.15 Non-Stormwater Discharges

Identify all allowable non-stormwater discharges in Part 1.2.1.C that will or may occur. You must document in your SWP3 of all non-stormwater discharges from the site.

4.3.16 Staff Training Requirements

- A. Prior to the commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, Permittee must ensure that the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:
 1. Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls, including pollution prevention measures;
 2. Personnel responsible for the application and storage of chemicals (if applicable);
 3. Personnel responsible for the inspection as required in Part 4.3.13 of this permit; and
 4. Personnel who are responsible for taking corrective actions as required in Part 4.3.14 of this permit.
- B. At a minimum, personnel must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspection):
 1. The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
 2. The proper procedures to follow with respect to the permit's pollution prevention requirements; and

3. When and how to conduct inspections, record applicable findings, and take corrective actions

4.3.17 NCOs for Individual Lots

You must document in the SWP3 if any lots are sold and transfer to other new owners. Copies of NCOs for Individual Lots shall be included in the SWP3 (also see Part 2.2.3 of this permit).

4.3.18 SWP3 Certification

The SWP3 must be signed and dated in accordance with Part 6.7 of this permit.

4.3.19 SWP3 Modification

- A. Modify the SWP3, including the site map(s), within 7 days of any of the following conditions:

1. Whenever new operators become active in construction activities on the site, or the construction plans, stormwater controls, or other activities have been changed at the site that are no longer accurately reflected in the SWP3, including the changes in Part 4.3.14 of this permit;
2. To reflect areas on the site map where operational control has been transferred since initiating permit coverage;
3. If inspections or investigations determine that SWP3 modifications are necessary for compliance with this permit;
4. Where an inspector or investigator determines it is necessary to install and/or implement additional controls at the site in order to meet the requirements of this permit (e.g., an approved TMDL report applies to the site);
5. To reflect any revision to applicable federal, state and local requirements that affect the stormwater controls implemented at the site; or

- B. Maintain records showing the dates of all SWP3 modifications, including the name of person authorizing each change; and

- C. Upon determining that a modification to the SWP3 is required, if there are multiple Operators (or subcontractors) covered under this permit, the Permittee must immediately notify any operators who may be impacted by the change to the SWP3.

4.3.20 On-Site Availability of the SWP3

A current copy of the SWP3 must be kept at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by DEQ.

4.4 Contractor Certifications

This procedure is initiated only at the discretion of the permittee with the cooperation and agreement of the contractor. The Contractor Certification form, Addendum D of this permit should be rewritten by the permittee to fit their specific objectives. Contractor Certification is recommended but is not a requirement of DEQ.

- 4.4.1 Contractors, subcontractors, builders, installers, regular suppliers, support service companies or others who are not the permittee (hereinafter referred as “contractor”) but are involved in construction activity, and have not been issued a construction general permit authorization, should execute a Contractor Certification, at the discretion of the permittee, which places the responsibility of complying with and abiding by the intent and purpose of the permit with the contractor for work performed under the authority and direction of the contractor. Contractors must ensure that activities regulated by the CGP are protective of endangered and threatened species and critical habitat according to Part 10 of this permit.

- 4.4.2 Contractors must ensure that any additional regulations and requirements specified by approved TMDL reports, watershed plans or local TMDL compliance plans applied to the sites (also see Part 4.1.5 of this permit).

- 4.4.3 Contractors must be thoroughly familiar with and adhere to NOI, SWP3, and BMPs. The SWP3 must clearly identify, for each control measure identified in the plan, the party which will implement the measure. The

Permittee(s) must ensure that all contractors or others involved in construction activity are identified in the plan as being responsible for implementing stormwater control measures, and sign a copy of the Contractor Certification, before performing any work in the area covered by the SWP3. All Contractor Certifications must be included with the SWP3.

- 4.4.4 The Contractor Certification must include the name and title of the person providing the signature, the name, address, and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made. An example of Contractor Certification can be found in Addendum D of the permit.

Part 5 Retention of Records

5.1 Documents

The permittee shall retain copies of the SWP3 and all reports required by this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by request of DEQ at any time.

5.2 Accessibility

The permittee shall retain a copy of the SWP3 required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to DEQ; a State or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final stabilization. Permittees with day-to-day operational control over SWP3 implementation shall have a copy of the SWP3 available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWP3 whenever they are on the construction site.

5.3 Addresses

All written correspondence concerning this permit, including the submittal of NOIs and NOTs, and SWPs shall be sent to the following address: Stormwater Unit of Environmental Complaints and Local Services (ECLS), Department of Environmental Quality (DEQ), 707 North Robinson Ave., P.O. Box 1677, Oklahoma City, OK 73101-1677 or email to ECLS-StormwaterPermitting@deq.ok.gov.

Part 6 Standard Permit Conditions

6.1 Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissue, or modification, or for denial of a permit renewal application. Penalties for violations of permit conditions are provided below:

6.1.1 Criminal Penalties

- A. *Negligent Violations*: The OPDES Act provides that any person who negligently violates permit conditions is subject to a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than 1 year, or both (27A O.S. § 2-6-206 (G) (1)).
- B. *Knowing Violations*: The OPDES Act provides that any person who knowingly violates permit conditions is subject to a fine of not less than \$5,000 nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or both (27A O.S. § 2-6-206 (G) (2)).
- C. *Knowing Endangerment*: The OPDES Act provides that any person who knowingly violates permit conditions, and who knows at that time that he is placing another person in imminent danger of death or

serious bodily injury, is subject to a fine of not more than \$250,000, or by imprisonment for not more than 15 years, or both (27A O.S. § 2-6-206 (G) (3)).

D. *False Statement:* The OPDES Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the OPDES, or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the OPDES, shall upon conviction, be punished by a fine of not more than \$10,000 or by imprisonment for not more than two years, or by both. If a conviction is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than four years, or by both (27A O.S. § 2-6-206 (G) (4)).

6.1.2 *Civil Penalties:* The OPDES Act provides that any person who violates a permit condition is subject to a civil penalty not to exceed \$10,000 per day for each violation (27A O.S. § 2-6-206 (F)).

6.1.3 *Administrative Penalties:* The OPDES Act provides that any person who violates a permit condition is subject to an administrative penalty, not to exceed \$10,000 per day of violation nor shall the maximum amount exceed \$125,000 per violation [see 27A O.S. § 2-6-206 (E)].

6.2 Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued and remain in full force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

- 6.2.1 Reissue or replacement of this permit, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain the authorization to discharge; or
- 6.2.2 The permittee's submittal of a Notice of Termination; or
- 6.2.3 Issuance of an individual permit for the permittee's discharges; or
- 6.2.4 A formal permit decision by DEQ not to reissue this general permit, at which time the permittee must seek coverage under an alternative general permit or an individual permit.

Any new applicant who applies for coverage after the expiration date of this general permit will not be granted permit coverage until this general permit is reissued.

6.3 Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

6.4 Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

6.5 Duty to Provide Information

The permittee shall furnish to DEQ, or an authorized representative of DEQ, any information that is requested to determine compliance with this permit or other information.

6.6 Other Information

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to DEQ, he or she shall promptly submit such facts or information.

6.7 Signatory Requirements

All Notices of Intent, Notices of Termination, reports, certifications (except the Contractor Certification under Part 4.6.) or information either submitted to DEQ or the operator of an MS4, or that this permit requires be maintained by the permittee, shall be signed as follows:

6.7.1 All Notices of Intent and Notices of Termination shall be signed as follows:

- A. For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
- B. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively (For Limited Liability Company (LLC): by one of its owners, called managing members/partners of the LLC); or
- C. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this Section, a principal executive officer of a Federal agency includes (i) The chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g. Regional Administrator of the EPA).

6.7.2 All reports required by this permit and other information requested by DEQ or authorized representative of DEQ shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- A. The authorization is made in writing by a person described above and submitted to DEQ;
- B. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- C. The signed and dated written authorization must be included in the SWP3.

6.7.3 Changes to Authorization: If an authorization under Part 2.1 is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new NOI satisfying the requirements of Part 2.1 must be submitted to DEQ prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part 2.1.2 and sent to the address specified in Part 2.3.

6.7.4 Any person signing documents under Part 6.7 shall make the following certification:

"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 gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this 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."

6.8 Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the

Clean Water Act (CWA) or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") of 1980, 42 USC § 9601 et. seq.

6.9 Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

6.10 Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

6.11 Requiring an Individual Permit or an Alternative General Permit

- 6.11.1 DEQ may require any person authorized by this permit to apply for and/or obtain either an individual OPDES permit or an alternative OPDES general permit. Any interested person may petition DEQ to take action under this paragraph. Where DEQ requires a permittee authorized to discharge under this permit to apply for an individual OPDES permit, DEQ shall notify the permittee in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the permittee to file the application, and a statement that on the effective date of issuance or denial of the individual OPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the address in Part 2.3 of this permit. DEQ may grant additional time to submit the application upon request of the applicant. If a permittee fails to submit in a timely manner an individual OPDES permit application as required by DEQ under this paragraph, then the applicability of this permit to the individual OPDES permittee is automatically terminated at the end of the day specified by DEQ for application submittal.
- 6.11.2 Any permittee authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26 (c) (1) (ii), with reasons supporting the request, to DEQ at the address in Part 2.3 of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.
- 6.11.3 When an individual OPDES permit is issued to a permittee otherwise subject to this permit, or the permittee is authorized to discharge under an alternative OPDES general permit, the applicability of this permit to the individual OPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual OPDES permit is denied to an operator otherwise subject to this permit or the operator is denied coverage under an alternative OPDES general permit, the applicability of this permit to the individual OPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by DEQ.

6.12 State/Tribal Environmental Laws

- 6.13.1 Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Tribal law or regulation under authority preserved by Section 510 of the Clean Water Act.
- 6.13.2 No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.
- 6.13.3 Construction activities on Indian Country lands are regulated by the EPA Region 6 office located in Dallas, Texas. Applicants seeking coverage for construction or surface disturbing activities located on Indian Country land should contact the EPA Region 6 office.

6.13 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions and requirements of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of this permit.

6.14 Inspection and Entry

The permittee shall allow DEQ or an authorized representative of DEQ, or in the case of a construction site that discharges through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

- 6.15.1 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 this permit;
- 6.15.2 Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
- 6.15.3 Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

6.15 Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part 7 Re-opener Clause

7.1 Potential to Cause or Contribute to a Violation

If there is evidence indicating that the stormwater discharges authorized by this permit cause, or have the reasonable potential to cause, or contribute to, a violation of a water quality standard, the permittee may be required to obtain an individual permit or an alternative general permit in accordance with Part 6.11 of this permit, or the permit may be modified to include different limitations and/or requirements.

7.2 Permit Modification or Revocation

Permit modification will be conducted according to the Oklahoma Uniform Environmental Permitting Act at Oklahoma Statutes, Title 27A, O.S., 2-14-101 et. seq., OAC, 252:4-7 and 252:606, and 40 CFR 122.62, 122.63, 122.64, and 124.5, incorporated and adopted reference in OAC 252:606-1-3(b).

Part 8 Definitions

1. **Applicant** means any person who is contemplating or planning to submit an NOI for approval, or has submitted an NOI for approval and is waiting for authorization to discharge stormwater under the provisions of this permit.
2. **Best Management Practices (BMPs)** means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the State. BMPs also include treatment requirements, operating procedures, and practice to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
3. **Commencement of Construction** means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

4. **Control Measure** as used in this permit refers to any BMP or other method used to prevent or reduce the discharge of pollutants to waters of the State.
5. **Construction Activities** means earth-disturbing activities, such as the clearing, grading, and excavation of land, and other construction-related activities (e.g., stockpiling of fill material; placement of raw materials at the site) that could lead to the generation of pollutants. Some of the types of pollutants that are typically found at construction sites are:
 - a. Sediment;
 - b. Nutrients;
 - c. Heavy metals;
 - d. Pesticides and herbicides;
 - e. Oil and grease;
 - f. Bacteria and viruses;
 - g. Trash, debris, and solids;
 - h. Treatment polymers; or
 - i. Any other toxic chemicals.
6. **Construction Site or Site or Development or Project or Construction** means the land or water area where construction activities will occur and where stormwater controls will be installed and maintained. The construction site or development or project includes construction support activities, which may be located at a different part of the property from where the primary construction activity will take place, or on a different piece of property altogether.
7. **Construction Support Activity** means a construction-related activity that specifically supports the construction activity and involves earth disturbance or pollutant-generating activities of its own, and can include activities associated with concrete or asphalt batch plants, equipment staging yards, materials storage areas, excavated material disposal areas, and borrow areas.
8. **Corrective Actions** are actions that Permittees take in compliance with this permit to:
 - a. Repair, modify, or replace any stormwater control used at the site;
 - b. Clean up and dispose of spills, releases, or other deposits; or
 - c. Remedy a permit violation.
9. **CWA** means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. Section 1251 et seq.
10. **Dewatering Activities** means the act of draining rainwater and/or ground water from building foundations, vaults, trenches and other construction structures.
11. **Discharge** when used without qualification means the “discharge of a pollutant.”
12. **Discharge of Stormwater Associated with Construction Activity** as used in this permit, refers to a discharge of pollutants in stormwater runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck washout, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located.
13. **Ephemeral Stream** means an entire stream which flows only during or immediately after a rainfall event, and contains no refuge pools capable of sustaining a viable community of aquatic organisms.
14. **Facility or Activity** means any OPDES “point source” or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the OPDES program.
15. **Hazardous Substances or Hazardous or Toxic Waste** means any liquid, solid, or contained gas that contain properties that are dangerous or potentially harmful to human health or the environment. See also 40 CFR §261.3.

16. **Impaired Water (or Water Quality Impaired Water)** is the water identified by the State, or EPA as not meeting applicable State water quality standards and (1) requires development of a TMDLs (pursuant to Section 303(d) of the CWA; or (2) is addressed by an EPA/State approved or established TMDL; (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1).
17. **Large Common Plan of Development or Sale** means an area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. This plan consists of many small construction projects that collectively add up to one or more acres of total disturbed land. For example, an original common plan of development of a residential subdivision might lay out the streets, house lots, and areas for parks, schools and commercial development that the developer plans to build or sell to others for development. All these areas would remain part of the common plan of development or sale until the intended construction is completed.
18. **Leachable Hazardous Substance** refers that those hazardous substances are naturally extracted from material during rain or routine external building wash events.
19. **Municipal Separate Storm Sewer System or MS4** is defined at 40 CFR §122.26(b)(8) to mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):
- Owned and operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
 - Designed or used for collecting or conveying stormwater;
 - Which is not a combined sewer; and
 - Which is not part of a Public Owned Treatment Works (POTW) as defined at 40 CFR §122.2.
- Note: A Phase II MS4 can also be owned or operated by Federal and State government, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. [see 40 CFR §122.26(b)(16)]
20. **Non-Process Water** means utility wastewaters (e.g., water treatment residuals, boiler blowdown, and air pollution control wastewaters from heat recovery equipment); treated or untreated wastewaters from groundwater remediation systems; dewatering water for building foundations; and other wastewater streams not associated with a production process.
21. **NOI** means Notice of Intent, (DEQ Form 606-002A, and see Part 2 of this permit.)
22. **NOT** means Notice of Termination (DEQ Form 606-003, and see Part 2 of this permit).
23. **Operator** for the purpose of this permit and in the context of stormwater associated with construction activity, means any party defined in 20.a or b, associated with a construction project that meets either of the following two criteria:
- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g. in most cases this is the owner of the site); or
 - The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a Stormwater Pollution Prevention Plan (SWP3) for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions; in most cases this is the general contractor of the project).

In addition, “owner” refers to the party that owns the structure being built. Ownership of the land where construction is occurring does not necessarily imply the property owner is an operator (e.g., a landowner whose property is being disturbed by construction of a gas pipeline or a landowner who allows a mining company to remove dirt, shale, clay, sand, gravel, etc. from a portion of his property).

This definition is provided to inform permittees of DEQ's interpretation of how the regulatory definitions of “operator” and “facility or activity” are applied to discharges of stormwater associated with construction activity.

24. **OPDES** means the Oklahoma Pollutant Discharge Elimination System.
25. **Outstanding Resource Waters** means those waters of the State which are designated as such in Oklahoma’s Water Quality Standards OAC 785:45-5-25, Addendum A of this permit.
26. **Permit** means the General Permit OKR10 for Stormwater Discharges from Construction Activities within the State of Oklahoma.
27. **Permittee** means a person who has submitted an NOI and has received authorization to discharge stormwater from construction or land disturbing activities under this permit.
28. **Point Source** means any discernible, confined, and discrete conveyance, including but are not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, landfill leachate collection system, or vessel or other floating craft, from which pollutants or wastes are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.
29. **Pollutant** means any material, substance, or property which may cause pollution (e.g., dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste).
30. **Runoff Coefficient** means the fraction of total rainfall that will appear at the conveyance as runoff.
31. **Stabilization** is the process of covering exposed ground surfaces with vegetative or non-vegetative practices that reduce erosion and prevent sediment discharge from occurring.
 - “Temporary stabilization” refers to the stabilization of exposed portions of the site in order to provide temporary cover (1) during the establishment and growth of vegetation, and/or (2) in areas where earth-disturbing activities will occur again in the future.
 - “Final stabilization” refers to the stabilization of exposed portions of the site using practices that provide permanent cover and qualify the permittee for permit termination.
- 30.1. All soil disturbing activities at the site have been completed and either of the two following criteria is met:
 - A. A uniform (e.g., evenly distributed, without large bare areas⁵) perennial vegetative cover with a 70% or more of the cover that is provided by vegetation native to local undisturbed areas; and/or
 - B. Equivalent permanent non-vegetative stabilization measures to provide effective cover (such as the use of riprap and gravel).
- 30.2. For individual lots in residential construction, either of the following criteria is met:
 - A. The homebuilder has completed final stabilization as specified above; or
 - B. The homebuilder has established temporary stabilization for an individual lot prior to occupation of the home by the homeowner and informed the homeowner of the need for, and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quickly as possible to keep mud out of their homes and off sidewalks and driveways.); or
- 30.3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to “waters of the State,” and areas that are not being returned to their pre-construction agricultural use must meet the final stabilization criteria 30.1 or 2 above.
32. **Stormwater** means rainwater runoff, snowmelt runoff, and surface runoff and drainage.

⁵ Large bare area is defined as an area with 10 ft² or more with no perennial vegetative cover established

33. **Stormwater Associated with Industrial Activity** is defined at 40 CFR 122.26 (b) (14) & (15) and incorporated here by reference. Most relevant to this permit is 40 CFR 122.26 (b) (14) (x) and 40 CFR 122.26 (b) (15) (i), that relates to construction activity including clearing, grading, and excavation activities that result in the disturbance of one or more acres of total land area, or less than one acre if part of a larger common plan of development or sale.
34. **Stormwater Discharge-Related Activity** is defined as disturbance activities that cause, contribute to, or result in point source stormwater pollutant discharges, including but are not limited to excavation, site development, grading, and other land disturbing activities; and control measures to control stormwater discharges including the siting, construction, and operation of best management practices (BMPs) to control, reduce, or prevent stormwater pollution.
35. **Takes or Taking** means any action that would “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” any threatened or endangered species. Harm may include significant habitat modification that actually injures a species.
36. **Total Maximum Daily Load or TMDL** means the sum of the individual waste load allocations (WLAs) for point sources, safety, reserves, and loads from nonpoint sources and natural background.
37. **Waters of the State** means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, storm sewers and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this state or any portion thereof, and shall include under all circumstances the waters of the United States which are contained within the boundaries of, flow through, or border upon this state or any portion thereof. Provided, waste treatment systems, including treatment ponds or lagoons designed to meet federal and state requirement other than cooling ponds as defined in the Clean Water Act or rules promulgated thereto and prior converted cropland are not waters of the State. (as defined in Oklahoma Statutes § 27A O.S. §1-1-201).

Part 9 Historic Preservation

The EPA has determined that DEQ’s NPDES permitting activities are not Federal undertakings and, therefore, are not subject to review under Section 106 of the National Historic Preservation Act. However, applicants and permittees must comply with the State Antiquities Act (Title 53, Chapter 20, Section 361) where applicable and the Burial Desecration Law (Title 21, Chapter 47, Section 1168.0-1168.6), as well as with any applicable local laws concerning the identification and protection of historic properties.

Applicants and permittees who may receive Federal funding or other Federal assistance in the completion of their projects must be aware that compliance with Section 106 of the Act may apply. For information about the Section 106 review process in Oklahoma, Oklahoma properties listed on or eligible for the National Register of Historic Places, and related topics, contact:

State Historic Preservation Office
 Oklahoma Historical Society
 800 Nazih Zuhdi Drive
 Oklahoma City, OK 73105
 (405)521-6249
www.okhistory.org/shpo/shpom.htm

Oklahoma Archeological Survey
 111 East Chesapeake
 Norman, OK 73019
 405/325-7211
www.ou.edu/cas/archsur

Part 10 Endangered Species

Addendum A is a Registry of Federally Identified Aquatic Resources of Concern (ARC) and State Identified ARC.

10.1 Background

DEQ is seeking to ensure the activities regulated by the Permit are protective of endangered and threatened species and critical habitat. To ensure that those goals are met, operators seeking permit coverage are required under Part 1.2.2.E to assess the impacts of their stormwater discharges and stormwater discharge-related activities on identified endangered and threatened species and designated critical habitat. This may be accomplished by following Steps 1 and 2 listed below in Part 10.2. It is not necessary to contact DEQ if you can comply with the provisions listed in Step 2. DEQ strongly recommends that applicants follow these steps at the earliest possible stage to ensure that measures to protect identified species are incorporated early in the planning process. At minimum, the procedures should be followed when developing the SWP3.

Permittees and contractors have an independent obligation to ensure that their activities do not result in any prohibited “take” of identified species. Many of the measures required in the Permit and in these instructions to protect identified species may also assist operators in ensuring that their construction or land disturbing activities do not result in a prohibited take of a species. Operators who plan construction or land disturbing activities within the corridor of a Federally identified ARC or a State identified ARC, (see Addendum A), may meet the requirements of Step 2.

This permit provides for the possibility of multiple operators and contractors at a construction site. Applicants should be aware that in some cases they may meet the permit eligibility requirements by relying on another permittee’s certification of eligibility under Part 1.2.2.E.2.a, b, c, or d. This is allowed under Part 1.2.2.E.2.e of the permit, however, the other permittee's certification must apply to the contractor’s project area and must address the effects from the Contractor's stormwater discharges and stormwater discharge-related activities on listed species and critical habitat. By certifying eligibility under Part 1.2.2.E.2.e, the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part 1.2.2.E.2.a., b., c., or d. was based. This situation will typically occur where a developer or primary contractor, such as one for construction of a subdivision or industrial park, conducts a comprehensive assessment of effects on listed species for the entire construction project, certifies eligibility under Part 1.2.2.E.2.a, b, c, or d and that certification is relied upon by other operators (i.e., contractors) at the site. However, applicants that consider relying on another operator's certification should carefully review that certification along with any supporting information. If an applicant does not believe that the operator's certification provides adequate coverage for the applicant's stormwater discharges and stormwater discharge-related activities or for the applicant's particular project area, the applicant should provide its own independent certification under Part 1.2.2.E.2.a, b, c, or d.

10.2 Procedures

To receive coverage under the CGP, applicants must assess the potential effects of their stormwater discharges and stormwater discharge-related activities on listed species. To make this assessment, applicants must follow the steps outlined below prior to completing and submitting a NOI form (see Addendum B of this permit).

Step 1: Determine Whether the Project Area Drains to ARC

- A. Refer to Addendum A of this permit, that lists all of the waters of Oklahoma which the U.S. Fish and Wildlife Service and the Oklahoma Department of Wildlife Conservation consider to be sensitive because they harbor populations of federal or state listed species or their designated critical habitat.
- B. If the applicant’s proposed construction site is not located within any of these areas, the proposed construction stormwater discharge or stormwater discharge related activities are not likely to significantly affect endangered and threatened species. The applicant may then skip Step 2 and further investigation is unnecessary.
- C. If the applicant’s proposed construction site is located within the corridor of any ARC, the applicant must continue on to Step 2.

Step 2: Implementation of Stormwater Control Measures to Protect Endangered and Threatened Species in ARC:

- A. Applicants whose proposed construction site is located within an ARC must incorporate the following measures into the SWP3 for this site unless permit coverage is allowed under Parts 1.2.2.E.2.d or e. Other pollutants such as, but are not limited to, oil, grease, solid waste (i.e. building material scrap, and trash), and human and hazardous waste, (e.g., paint and solvents), are not authorized for discharge under this permit. These potential

pollutants must be properly managed and their contact with stormwater minimized or eliminated to the greatest extent practicable.

1. Consistent with Parts 3.3 and 3.5 of this permit, sediment, solid waste and human waste must be retained on site to the greatest extent practicable; all control measures must be properly installed and maintained at all times; and off-site accumulations of any escaped sediment must be removed.
2. A vegetated buffer zone of at least 100 feet must be retained or successfully established or planted between the area disturbed during construction and all perennial or intermittent streams on or adjacent to the construction site. A vegetated buffer zone at least 50 feet wide must be retained or successfully established or planted between the areas disturbed during construction and all ephemeral streams or drainages. Buffer zones shall be measured from the top of the first defined bank of the stream and shown on the site map in the SWP3.

If characteristics of the site or the project make it impossible to maintain the required buffer, refer to Addendum H (Buffer Requirements) for information to assist you in developing equivalent sediment controls. You must maintain the buffer or selected alternative throughout your period of coverage under this permit and no construction activities may be conducted in this area. All discharges through the buffer must be non-channelized or non-concentrated, and must first be treated by the site's sediment and erosion controls.

3. Document in your SWP3 the following:
 - a. If the buffer is less than 100 or 50 feet, the width of the buffer vegetation to be retained; and
 - b. Information you relied on to comply with the requirement to achieve the equivalent sediment load reduction as an undisturbed naturally vegetated 100 or 50-foot buffer.
4. For any disturbances within the required 100 or 50-foot buffer area, you must comply with the following stabilization requirements, which replace the corresponding requirements in Part 3.3.2:
 - a. You must immediately initiate stabilization in any disturbed areas of the buffer where earth-disturbing activities have permanently or temporarily ceased on any portion of the site, and will not resume for a period exceeding 7 calendar days. For the purposes of this permit, earth-disturbing activities have temporarily ceased when all construction activities within any area of your construction site will not resume for a period of 14 or more days, and earth-disturbing activities have permanently ceased when clearing and excavation within any area of your construction site has been completed, and final grade has been reached.
 - b. Within 7 calendar days of initiating stabilization, you are required to have completed:
 - i. For vegetative cover, all soil conditioning, seeding, watering, mulching, and any other required activities related to the planting and establishment of vegetation; and/or
 - ii. For non-vegetative cover, the installation or application of all non-vegetative measures.
5. You are not required to comply with this buffer requirement for the following types of construction projects, provided that you limit the area of disturbance to the minimum needed to complete the construction and to access the site, and that you retain the natural vegetation in the buffer outside this area:
 - a. Construction of water crossings authorized under a CWA Section 404 permit (where required) for water lines, sewer lines, utility lines, and roadways;
 - b. Construction of water-dependent structures and water access areas (piers, boat ramps, etc.) approved under a CWA Section 404 permit (where required); or
 - c. Development of a site where no naturally vegetated buffer area exists due to prior disturbances.
6. You must conduct inspections within 7 calendar days and within 24 hours of a storm event of 0.5 inches or greater instead of the inspection frequency specified in Part 4.3.13.B.
7. You must meet any local requirements affecting construction in the buffer.

- B. Consistent with Parts 3.3.2 and 3.5.2.D, an implementation schedule must be included which describes the stabilization practices that will be used to control erosion during construction and when construction has permanently ceased. The preservation of mature vegetation on-site is preferred.
- C. Consistent with Parts 3.3.1 and 4.3.11, structural BMPs must be successfully implemented to divert uphill stormwater flows from crossing disturbed areas, to store flows (e.g., retention ponds) or to otherwise control runoff from disturbed areas during construction. At a minimum this must include silt fencing and vegetated buffer strips on all down slope boundaries of the area disturbed during construction. The construction of temporary or permanent stormwater detention or retention structures (e.g., ponds) is preferred, but these must not be constructed within intermittent or perennial stream channels or within floodplains.
- D. Consistent with Part 3.3.1.K and 4.5.11.A.4.c, velocity dissipation devices must be incorporated into the design of outfall channels and discharge locations. Outfalls must be screened to prevent the discharge of solid materials with stormwater runoff.
- E. Hazardous construction materials and waste must be stored in a manner that minimizes their contact with stormwater. An emergency response must be included which addresses the handling of accidental spills (see Part 3.3.3 of this permit).
- F. The applicant must comply with any terms and conditions imposed under the eligibility requirements of Part 1.2.2.E.2 a, b, c, d, or e to ensure that its stormwater discharges and stormwater discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWP3. If the eligibility requirements of Part 1.2.2.E.2 a, b, c, d, or e cannot be met, the applicant may seek relief from the appropriate service in the form of an approved take. As an alternative, the applicant may seek coverage under a DEQ individual permit.

ADDENDUM A – OKLAHOMA AQUATIC RESOURCES OF CONCERN (ARC)

A. Aquatic Resources of Concern (ARC) for Federally Listed Species, as Identified by the U.S. Fish & Wildlife Service for the DEQ CGP

Grand (Neosho) River - A two-mile corridor (one mile from each bank) of the main stem of the Grand (Neosho) River above its confluence with Tar Creek. Includes portions of Ottawa and Craig Counties.

Cimarron River - A two-mile corridor (one mile from each bank) of the main stem of the Cimarron River from the US Hwy-77 bridge in Logan County upstream to and including Beaver County. Includes river segments in: Logan, Kingfisher, Major, Woods, Woodward, Harper, and Beaver Counties.

South Canadian River - A two-mile corridor (one mile from each bank) of the main stem from the Eufaula Reservoir flood pool upstream to the northern border of Custer County. Includes river segments in: McIntosh, Pittsburg, Hughes, Pontotoc, Seminole, Pottawatomie, McClain, Cleveland, Canadian, Grady, Caddo, Blaine, and Custer Counties.

Muddy Boggy River - A two-mile corridor (one mile from each bank) of the main stem of the Muddy Boggy River. Includes portions of Choctaw, Atoka, and Coal Counties.

Kiamichi River – The watershed of the Kiamichi River upstream from the Hugo Reservoir. Includes portions of Pushmataha, Atoka, Pittsburg, Latimer, and LeFlore Counties.

Little River – The watershed of the Little River. Includes portions of LeFlore, Pushmataha and McCurtain Counties.

Glover River – The watershed of the Glover River. Includes portions of Pushmataha and McCurtain Counties.

Mountain Fork River – The watershed of the Mountain Fork River above Broken Bow Reservoir. Includes portions of LeFlore and McCurtain Counties.

Northeast HUC-11 Watersheds – The watersheds identified by the following 11-digit Hydrologic Unit Codes: 11070207190, 11070206060, 11070209030, 11070209050, 11070209060*, 11070209040, 11070209070, 1107020206030, 11070208070, 11070209020, 11070209100, 11070209110 and 11070209120. Includes portions of Ottawa, Craig, Delaware, and Mayes Counties.

* This HUC does not contain a known Ozark cavefish cave. It was included because it is entirely surrounded by 11-digit HUCs with known Ozark cavefish caves, therefore we assume that Ozark cavefishes likely occupy this portion of the aquifer.

Elk River – A two-mile corridor (one mile from each bank) of the Elk River. Includes portions of Delaware and Ottawa Counties.

Spring River – A two-mile corridor (one mile from each bank) of the Spring River. Includes portions of Ottawa County.

Verdigris River – A two-mile corridor of the main stem from the dam of Lake Oologah to the confluence of the Arkansas River. Includes river segments in Rogers, Wagoner and Muskogee counties.

B. ARC for State Listed Species, as Identified by the Oklahoma Department of Wildlife Conservation for the DEQ CGP.

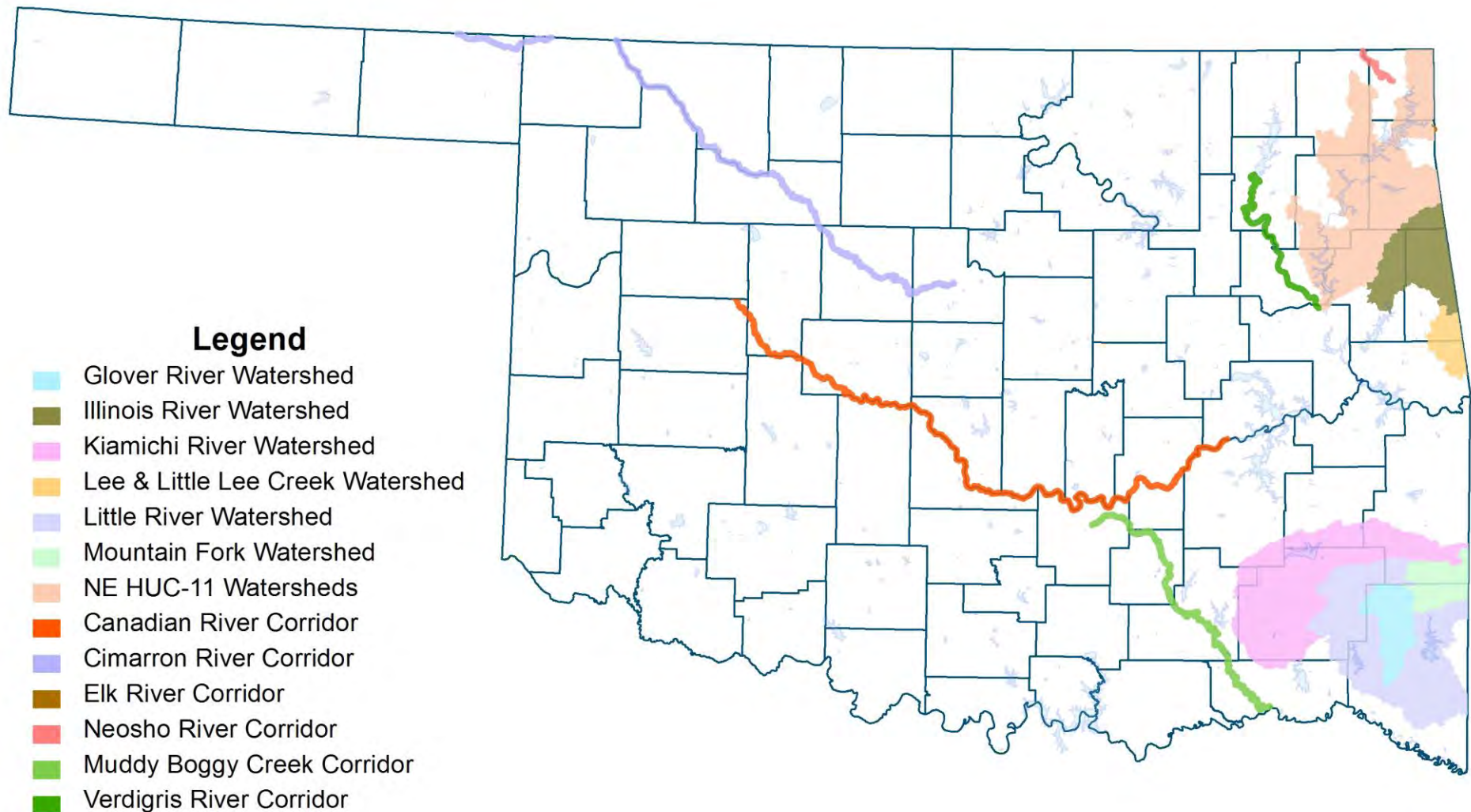
Illinois River – A **ten-mile** corridor (five miles from each bank within the watershed) of the main stem of the Illinois River above the Tenkiller Reservoir. Includes portions of Cherokee, Delaware and Mayes Counties.

Lee and Little Lee Creeks – The **watershed** of Lee Creek and Little Lee Creek. Includes portions of Sequoyah and Adair Counties.

Note: No stormwater discharge-sensitive endangered or threatened species occur in the following counties: Cimarron, Texas, Beckham, Greer, Washita, Kiowa, Alfalfa, Comanche, Grant, Garfield, Oklahoma, Garvin, Murray, Stephens, Carter, Lincoln, Johnston, Okfuskee, Okmulgee, Washington, Nowata, and Rogers.

Oklahoma Aquatic Resources of Concern for Federal & State Listed Species

as identified by the U.S. Fish & Wildlife Service and the Oklahoma Department of Wildlife Conservation



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DEQ Form 606-002A Sept. 13, 2017		Oklahoma Department of Environmental Quality Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under the OPDES Construction General Permit OKR10
Submission of this NOI constitutes notice that the party identified in Section I of this form intends to be authorized by DEQ for stormwater discharges associated with construction activity on land disturbance of equal to or greater than 1 or more acres, or less than 1 acre of total land area that is part of a larger common plan of development or sale in the State of Oklahoma. Becoming a permittee obligates such discharger to comply with the terms and conditions of this permit. To obtain an authorization from DEQ, this form must be complete with all the pertinent information. All associated fees must be submitted with this NOI. See instructions for completing the NOI on pages 3 and 4 of this form.		
☐ NEW APPLICATION, ☐ MODIFICATION or ☐ RENEWAL of current permit, enter the authorization number: OKR10_____		
I. Operator Information		
Operator Name: _____ Phone: _____ Mailing Address: _____ City: _____ State: _____ Zip Code: _____ Operator's Point of Contact : _____ Title: _____ Phone: _____ E-mail: _____		
II. Site/Project Information		
Site/Project Name: _____ Phone: _____ Site/Project Address: _____ City: _____ County: _____ State: _____ Zip Code: _____ Site/Project's Point of Contact : _____ Title: _____ Phone: _____ E-mail: _____ Site/Project's purpose: ☐ Road/Bridge ☐ Wind Farm ☐ Residential Subdivision ☐ Commercial Building ☐ Others Latitude: _____ Longitude: _____ at the center of the Site/Project (or starting and ending points for linear project) Estimated construction start date: _____ Estimated construction end date: _____ Total area of the construction site: _____ (acres) Estimated area to be disturbed: _____ (acres) Current total impervious area: _____ (acres) Post-construction total impervious area: _____ (acres) Post -construction runoff coefficient of the site: _____ Soil and fill material description: _____ Is this site part of the common plan of development or sales? ☐ Yes ☐ No		
Endangered Species Eligibility		
a. ☐ My site/project is not located within any of the corridors of Federal and State identified Aquatic Resources of Concern (ARC); b. ☐ My site/project is located within a corridor of Federal and State identified ARC and I agree to implement the control measures specified in Step 2 of Part 10.2 of this OKR10 Permit; c. ☐ If one of eligibility criteria cannot be met, I may use Addendum H for equivalent sediment controls or contact DEQ at (405)702-8100 for further assistance; d. ☐ I am required to have an Endangered Species Act Section 7 consultation process; or e. ☐ I am relying on another permittee's certification of eligibility and agree to comply with the conditions of that certification.		

III. Site/Project Discharge InformationDoes the facility discharge stormwater into a MS4? ☐ Yes ☐ No, If yes, name of the MS4 Operator: _____**Receiving Water Information** Note: use additional sheet of paper if necessary.

Name of the Receiving Waterbody	Is this waterbody impaired? If so, what are its impairments?	Is there a TMDL for that impairment?
	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No

IV. Stormwater Pollution Prevention Plan (SWP3) InformationHas the SWP3 been prepared and available on site? ☐ Yes ☐ NoIs the operator registered for construction activities with the Secretary of State of Oklahoma? ☐ Yes ☐ No**Proposed Best Management Practices to control pollution in the stormwater discharges, check all that apply:**

☐ Construction phased	☐ Sediment basin/Trap	☐ Mulching/Seeding/sodding	☐ Vegetated Buffer
☐ Vehicle/Concrete wash-out	☐ Site inspection	☐ Diversion dikes	☐ Inlet Protection
☐ Construction entrances	☐ Silt fence	☐ Waste management	☐ Stream Crossings
☐ Spill prevention/cleanup	☐ Employee Training	☐ Compost blanket/geotextiles	☐ Check dams
☐ Construction sequencing	☐ Riprap	☐ Gradient terraces	☐ Silt dikes

Other BMPs: _____

Post-construction Best Management Practices for construction activities, Check all that apply:

☐ Narrow street /turnaround	☐ Wet/dry pond	☐ Protected natural features	☐ Vegetated filter trips
☐ Eliminated curbs & gutters	☐ Wetland	☐ Infiltration basin/trench	☐ Porous pavement
☐ Bio-retention/rain gardens	☐ Riparian	☐ Redevelopment/retrofit	☐ Grassed swales
☐ Low impact development	☐ Green designs	☐ Conservation easements	☐ Retrofit

Other BMPs: _____

V. Certification

"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 have no personal knowledge that the information submitted is other than 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."

Print Name: _____ Title: _____

Signature: _____ Date: _____

For DEQ use only: Assigned Authorization Number: OKR10_____



Instructions for Completing NOI Form 606-002A for Stormwater Discharges Associated with Construction Activities on Sites of One or more acres under the OPDES Construction General Permit OKR10

Who Must File an NOI Form

Under Section 402(p) of the Clean Water Act and regulation at 40 CFR § 122.26, adopted and incorporated by reference in Oklahoma Administrative Code (OAC) 252:606-1-3(b)(3)(L), stormwater discharges associated with construction activities are prohibited to waters of Oklahoma State unless authorized under an Oklahoma Pollutant Discharge Elimination System (OPDES) permit from Oklahoma Department of Environmental Quality (DEQ). Operators of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre must obtain coverage under the OPDES Construction General Permit (CGP) OKR10 by submitting a completed NOI to DEQ. If you have questions regarding permit coverage under the Stormwater Program, you may call the Stormwater Unit of Environmental Complaints and Local Services (ECLS) of DEQ at (405) 702-6100 or email to ecls-stormwaterpermitting@deq.ok.gov.

Completing the NOI Form

To complete an NOI form, type or print in all the appropriate places of the form. Check the appropriate box whether you are filing for a new application or modification or renewal of your current permit. Enter your current authorization number, if you are applying for permit modification or renewal.

Section I. Operator Information

Provide the legal name, mailing address and telephone number of the company/firm, public organization, or any other entity that either individually or together meets the following two criteria: (1) have operational control over construction plans and specifications, including that the ability to make modifications to those plans and specifications (e.g., in most cases this is the owner of the site); and/or (2) have the day-to-day operational control of those activities at the site necessary to ensure compliance with Stormwater Pollution Prevention Plan (SWP3) and/or other permit conditions (e.g., they are authorized to direct worker at a site to carry out activities required by the permit; in most cases this the general contractor of the project).

Also enter the name, title, phone number, and email address for the operator's point of contact.

Section II. Site/Project Information

Provide the site/project's official or legal name, phone number and street address or general location information (e.g., Intersection of State Highways 61 and 34). Also provide the name, title, phone number, and email address for the site/project's point of contact.

Indicate the purpose of the project (i.e., residential subdivision, commercial building, road and/or bridges, wind farm, etc.).

Provide Latitude and Longitude of the construction project or site (at the center of the site). Latitude and Longitude can be obtained online at DEQ and USGS's websites or other mapping tools.

Provide the estimated starting and ending dates of the construction or site or project. The date must be provided in DD-MM-YYYY where MM is the month, DD is the date and YYYY is the year.

Provide total area of construction site, and estimated area to be disturbed in acres.

Provide total impervious area (pre-construction) and total impervious area construction completed (post-construction) in acres.

Provide post-construction runoff coefficient of the site after the construction addressed in the NOI is completed. Operator may use recommended runoff

coefficients in Addendum I of this permit. Average coefficients for composite area may be calculated on an area weighted basis from $C = \frac{\sum C_i A_i}{\sum A_i}$ Where C_i is the coefficient applicable to the area A_i

Describe the nature of fill material and existing soil data describing soils (i.e., coarse-grained soils: gravels, sands, or fine-grained soils: silts and clays, silts and clays, and highly organic soils etc.). Operator may use soil classification chart in Attachment 1 of Addendum H to determine the types of the soils on the sites.

Indicate whether this is the site of the common plan of development or sale.

Complete the section on Endangered Species Eligibility by checking the appropriate box: (a) the site/project is not located within any of the corridors of the Federal or State identified Aquatic Resources of Concern (ARC) and further investigation is not required; or (b) the site/project is located within a corridor of a Federal or State identified ARC. Operator agrees to implement the control measures specified in Step 2 of Part 10.2 of this permit; or (c) If one of those eligibility criteria under Part 1.2.2.E.2.b, d, or e cannot be met, operator may use Addendum H Buffer Requirements to evaluate alternatives of buffer requirements and select equivalent sediment controls or contact DEQ for further consultation; or (d) operator's federally approved construction activities are authorized by the appropriate Federal or State agency and that authorization addresses the Endangered Species Act Section 7 consultation for the operator's stormwater discharge or stormwater-related activities. Operator selecting option d must include documentation from US Fish and Wildlife Service (USFWS) or a qualified biologist that demonstrates Section 7 consultation has been completed. The SWP3 must include any conditions resulting from that consultation; or (e) operator's stormwater discharges and stormwater-related activities were already addressed in another operator's certification of eligibility under Part 1.3.2E.2.d that included the proposed site/project area. Operator agrees to comply with any conditions attached to that certification.

Section III. Site/Project Discharge Information

Indicate whether the site/project discharges stormwater to a Municipal Separate Storm Sewer System (MS4), if yes; enter the name of the MS4 operator. A MS4 is defined as a conveyance or system of conveyances, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains that are owned or operated by a state, city, town, borough, parish, district, association, or other public body which is designed or used for collecting or conveying stormwater.

Identify all the receiving waterbodies from the sites that discharge stormwater, including names of those waterbodies. Check appropriate box if the receiving waterbody is listed in DEQ 303(d) impaired waterbodies or drained to the watershed with approved Total Maximum Daily Loads (TMDL) report. Identified the pollutant(s) for which the waterbody is impaired.



Instructions for Completing NOI Form 606-002A for Stormwater Discharges Associated with Activity of One or More Acres under the OPDES Construction General Permit OKR10

Section IV. Stormwater Pollution Prevention Plan (SWP3) Information

All site/projects eligible for coverage under the CGP OKR10 permit must prepare a SWP3 prior to submitting the NOI to DEQ. The SWP3 is intended to document the selection, design, and installation of different control measures to meet the permit's non-numeric technology based effluent limitations, if applicable, numeric effluent limitations, and water quality based effluent limitations contained in Part 3 of the Permit as well as to document compliance with other permit requirements. The SWP3 must be prepared in accordance with good engineering practices and to industry standards.

Check appropriate box whether the SWP3 has been prepared and is available on site.

Check appropriate box if the operator has registered for construction activities with the Secretary of State of Oklahoma.

List all the proposed Best Management Practices (BMPs) for construction activities. Operator must describe the proposed measures, including BMPs to control pollutants in stormwater discharges during construction. Specify any BMPs to be used if additional erosion and sediment controls are required by local government or due to specific site conditions.

List all the post-construction proposed Best Management Practices (BMPs) for construction activities. Operator must describe the proposed measures to be used to control pollutants in stormwater discharges that will occur after construction operations have been complete, including any BMPs to be used if additional erosion and sediment controls are required by local government or due to specific site conditions.

Section V. Certification

Federal regulations require all permit applications and report shall be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental law and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents had been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietors, respectively (*Note: for limited liability company (LLC) - by one of its owners, called managing members/partners of the company*); or

For a municipality, state, Federal, or other public facility: by either a principal executive or ranking elected official.

Modifying Existing Notice Of Intent (NOI)

After issuance of an authorization, an amended NOI may be submitted by a permittee if circumstances change (e.g., the area to be disturbed has been changed from 20 acres to 40 acres). However, the modification of an NOI cannot be used if the area to be disturbed has been changed from 40 acres to 20 acres. The amended NOI shall include the operator's assigned authorization number and request a change.

The original authorization number will be retained. DEQ will provide an acknowledgement by either mail or email that the amended NOI has been received and processed. Permittees must update their SWP3 to reflect the modification.

Submitting Your NOI Form

Completed NOI form must be submitted to the following address:

Stormwater Unit of ECLS
Oklahoma DEQ
P.O. Box 1677, Oklahoma City, OK 73101-1677
or fax it to: (405)702-6226
or email it to: ecls-stormwaterpermitting@deq.ok.gov

All applicable fees must be submitted with this NOI, including:

- Renewal NOI - \$100 application fee
- New NOI - \$447.71 (\$100 application fee and \$347.71 annual permit fee)

Note: Commencing December 21, 2020, NOI must be electronically submitted to DEQ. Instructions on how to access and use the appropriate electronic reporting tool will be made available on DEQ's website prior to the December 21, 2020 compliance deadline.

Do not submit an SWP3 with the NOI unless the site/project is located (1) within Outstanding Resource Waters (ORW), or (2) within a Federal and State ARC, or (3) within a Watershed that is subject to an approved TMDL, and/or watershed plan and/or local compliance plan and such site to be disturbed is about 5 acres or more, or (4) within a larger site which is disturbing land of 40 or more acres.

ADDENDUM C – NOTICE OF TERMINATION

DEQ Form 606-003 Sept 13, 2017		Oklahoma Department of Environmental Quality Notice of Termination (NOT) for Stormwater Discharges Associated with Industrial or Construction Activity under an OPDES Stormwater General Permit
Submission of this NOT form constitutes notice that the operator identified in Section II of this form no longer intends to be authorized to discharge stormwater associated with industrial or construction activity under an OPDES Stormwater General Permit. Authorization to discharge is not terminated until you are notified that all termination requirements have been met and your complete NOT has been processed by DEQ. All necessary information must be provided on this form. See completing instructions on the back of this form.		
I. Permit Information		
DEQ Authorization Number: OKR _____ Reason for Termination (check one only): ☐ A new owner or operator has taken over responsibility for the facility/site/project and has submitted an NOI for permit coverage. ☐ Stormwater discharge from industrial activity is being terminated under OKR05 permit. ☐ All construction activities have been completed and met all other requirements under OKR10 permit, including final stabilization, on all portion of the site. ☐ You obtained coverage under an individual or alternative general permit for all stormwater discharges.		
II. Operator Information		
Operator Name: _____ Phone: _____ Mailing Address: _____ City: _____ County: _____ State: _____ Zip Code: _____ E-mail: _____		
III. Facility/Site/Project Information		
Facility/Site/Project Name: _____ Address: _____ City: _____ County: _____ State: _____ Zip Code: _____ Latitude: _____ Longitude: _____ at the entrance of the Facility/Site/Project <i>(Note: You must include an updated facility map or site map that shows all final plans have been completed with this form.)</i>		
IV. New Operator Information		
New Operator Name: _____ Phone: _____ Address: _____ City: _____ County: _____ State: _____ Zip Code: _____ E-mail: _____ <i>(Note: Use additional sheets of paper if necessary. Permittee is required to prepare a Notification of Change of Ownership (NCO) for each new operator and submit it to DEQ at the change of ownership or with the NOT (see also Part 2.2.3 of this permit).</i>		
V. Certification		
<i>I certify under penalty of law that all stormwater discharges associated with industrial or construction activity from the identified facility that was authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this NOT form and upon receiving termination letter from DEQ that the all termination requirements have been met and the complete NOT has been processed, I am no longer authorized to discharge stormwater associated with industrial or construction activity under the General Permit OKR05 or OKR10 to waters of the State. It is unlawful under the Clean Water Act and OAC 252:606-1-3(b)(3)(L) where the discharge is not authorized by an OPDES permit. I also understand that the submittal of this NOT form does not release me as operator from liability for any violations of this Permit or the Clean Water Act.</i> Print Name: _____ Title: _____ Signature: _____ Date: _____		



Instructions for Completing NOT Form 606-003 for Stormwater Discharges Associated with Industrial or Construction Activity

Who May File a Notice of Termination Form

The Permittee currently covered by the OKR05 (Industrial) or OKR10 (Construction) General Permit for stormwater discharges associated with industrial or construction activity must submit a Notice of Termination (NOT) within 30 days after one or more of the following conditions have been met:

- A new owner or operator has taken over responsibility for the facility or site or project, and has submitted an NOI for permit coverage.
- Stormwater discharge from industrial activity is being terminated under the OKR05 permit.
- All construction activities have completed and met all other requirements under the OKR10 permit, including final stabilization, on all portions of the site (See Part 3.3.2.B of the OKR10 permit for specific requirement on final stabilization).
- You obtained coverage under an individual or alternative general permit for all discharges.

You must meet all of the termination requirements of the general permit prior to submitting the NOT.

Section I. Permit Information

Provide the current OPDES General Permit number assigned to the facility or the site identified in Section II. Indicate your Reason for submitting this NOT by checking the appropriate box.

Section II. Operator Information

Provide the legal name of the company, firm, public organization or any other entity that operates the facility or site described in this NOT. Provide the operator's phone number, mailing address, and email address.

Section III. Facility/Site/Project Information

Provide the legal name of the facility or site or project and complete street address, including city, county, state, and ZIP code of the facility or site. If the facility or site lacks a street address, indicate the general location of the facility (e.g., Intersection of State Highways 74 and 34).

Provide the latitude and longitude at the entrance of the facility or the center of site, or the general location information of the facility or site (e.g., Intersection of State Highways 74 and 34). Latitude and Longitude can be obtained online at DEQ and USGS and other mapping tools.

You must also include an updated facility map or site map that shows all disturbed areas over the course of your construction/project (i.e., aerial images or general site maps with project extents marked, including stabilized areas of concrete or asphalt batch plants, equipment staging yards, stockpile, borrow areas, wash-out area, previously disturbed areas etc.) with this form.

Section IV. New Operator Information

If applicable, provide the legal name of the company, firm, public organization or any other entity that has assumed ownership for the facility or site described in this NOT.

Provide phone number, complete physical address including city, state, ZIP code, and email address. If there is more than one new operator, use additional sheet(s) to include all the new operators' information.

Permittee is required to prepare and submit a Notification of Change of Ownership (NCO) form for each new owner(s) (see Part 2.3.3 of OKR10 for change of ownership requirement). NCO forms may be submitted at the change of ownership or with the NOT.

Section V. Certification

The NOT form must be signed as follows:

For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor, respectively (**Note:** for limited liability company (LLC) - by one of its owners, called managing members/partners of the company);

For a municipality, state, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Include the name and title of the person signing the form and the date of signing.

An unsigned or undated NOT form will not be processed for termination of permit coverage.

If you have questions, contact the Stormwater Unit of Environmental Complaints and Local Services Division (ECLS) of DEQ at (405) 702-6100 or email to

ecls-stormwaterpermitting@deq.ok.gov

Where to File an NOT form:

Completed NOT must be submitted to the following address:

Stormwater Unit of ECLS, Oklahoma DEQ

P.O. Box 1677

Oklahoma City, Oklahoma 73101-1677

or fax it to: (405)702-6226

or email it to: ecls-stormwaterpermitting@deq.ok.gov

Note: Commencing December 21, 2020, all NOTs will be required to be submitted electronically to DEQ. Instructions on how to access and use the appropriate electronic reporting tool will be made available prior to the December 21, 2020 compliance deadline.

ADDENDUM D - CONTRACTOR CERTIFICATION

(Optional; sample format)

(Name of Operator)

(Project Name)

Contractors, builders, regular suppliers or others (contractors) involved in construction activity who are not the operator, developer, or general contractor, and have not been issued the Stormwater Construction General Permit's (CGP) authorization to discharge, execute this Contractor Certification which places the responsibility of complying with and abiding by the intent and purpose of the permit with the contractor for any and all work performed under the authority and direction of the contractor. Furthermore, the contractor assumes responsibility to avoid or eliminate any actual or potential adverse effects upon the environment according to the Stormwater Pollution Prevention Plan (SWP3), during all phases of building, construction, or delivery activity on any and all construction sites under the control and responsibility of the contractor as described in the SWP3.

1. Contractor company name: _____
2. Contractor address: _____
3. Project locations: _____

(For additional addresses, attach list to this form)

4. Contractor must be thoroughly familiar with the original Notice of Intent (NOI) filed by _____
_____ with the Oklahoma Department of Environmental Quality (DEQ).

(Operator Name)

Contractor must also be thoroughly familiar with, and adhere to, the Stormwater Pollution Prevention Plan (SWP3) and the Best Management Practices (BMP) on file at the following location:

The Contractor is certifying below that they assume all physical responsibility for any and all construction activities performed by the Contractor or under the direction and control of the Contractor, to avoid or eliminate any actual or potential adverse effects upon the environment pertaining to the properties listed in Item 3 above.

Certification

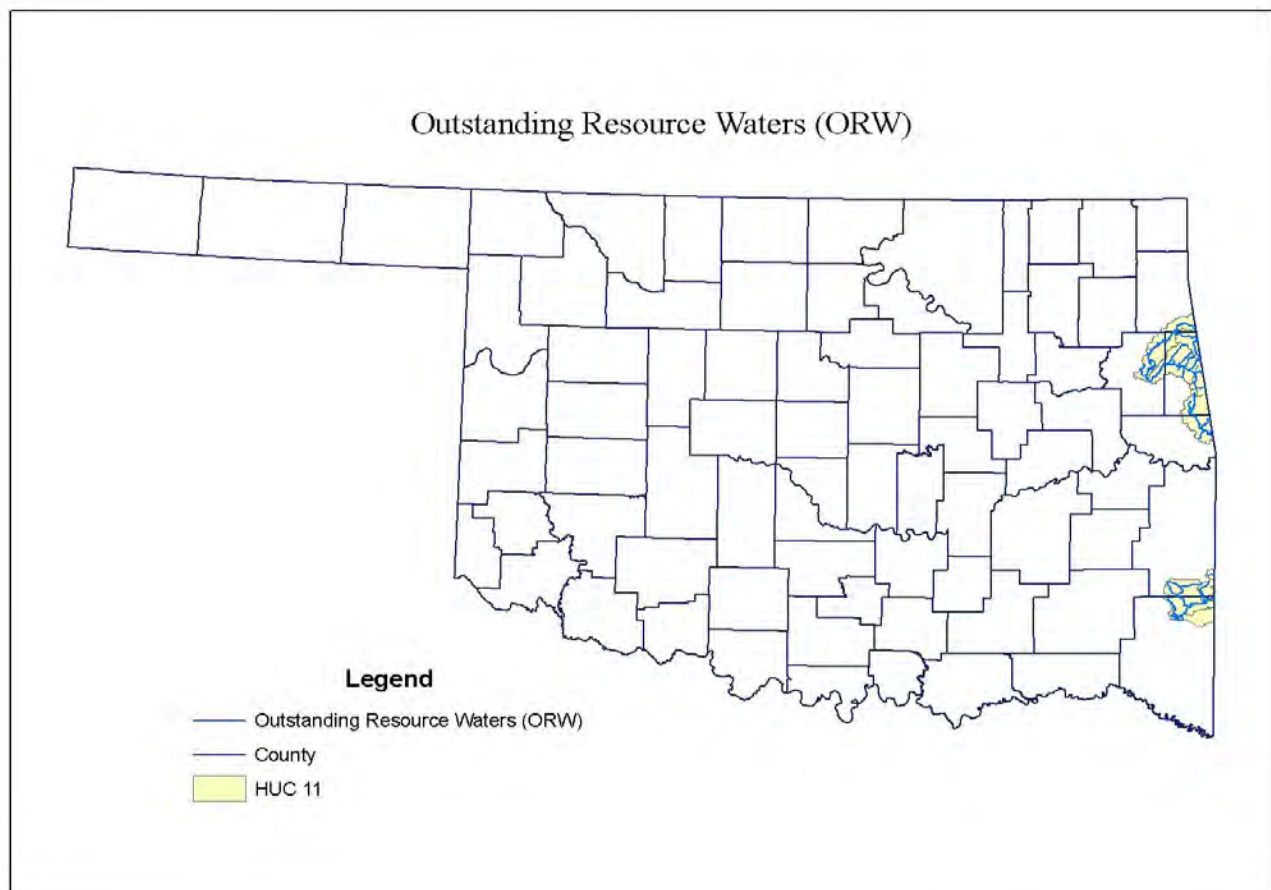
I certify that I understand the terms and conditions of the Oklahoma Pollutant Discharge Elimination System Act (OPDES) General Permit that authorizes stormwater discharges associated with construction activity from the construction site identified as part of this certification. I have read and understand the Operator's NOI and Part 1.2 for coverage under the General Permit for stormwater discharges from construction activities, including those requirements published in the modified OPDES General Permit OKR10 of September 13, 2017, and the SWP3 and BMP described pertaining to the project locations in Item 3 above. I agree that as a contractor, builder, regular supplier, or a support service company, I am responsible for installing and/or maintaining the appropriate pollution prevention measures that I am responsible for according to the agreement I have with the permittee.

I understand that continued coverage under this permit is contingent upon maintaining Part 1.2 of the permit.

Signature: _____ Title: _____

Print Name: _____ Date: _____

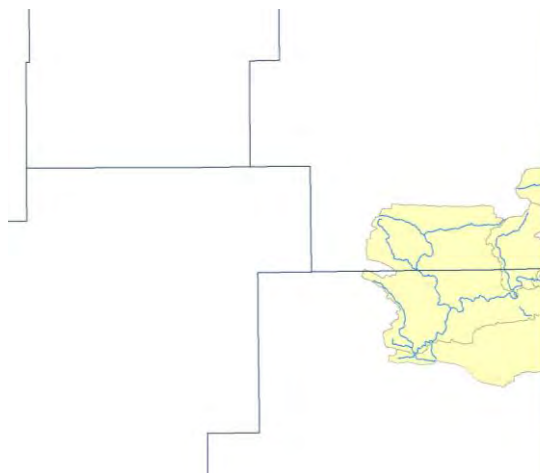
ADDENDUM E – OUTSTANDING RESOURCE WATERS (ORW)



Outstanding Resource Waters Details



Illinois River & Lee Creek Watersheds



Mountain Fork River Watershed

ADDENDUM F – ADDITIONAL REQUIREMENTS FOR CONCRETE AND ASPHALT BATCH PLANTS

F.1 Site Description

Describe the nature of industrial activities at your facility and include a site map. The site map shall specify boundaries of the facility, significant structures and impervious area, the locations of all stormwater monitoring points, if any.

F.2. Summary of Potential Pollutant Sources

Document the area at your facility where industrial materials or activities are exposed to stormwater. Industrial materials or activities include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products. Material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product or waste product. (also see Part 4.3.6).

F.3. Sampling Data

Provide a summary of any existing stormwater discharge sampling data taken at your facility. All stormwater sampling data collected during the term of this permit must also be summarized and included in this part of the SWP3. The SWP3 shall document the procedures for conducting the types of analytical monitoring specified by this permit.

F.4. Stormwater Controls

Describe the type and location of existing non-structural and structural BMPs selected for each of the areas where industrial materials or activities are exposed to stormwater. For areas where BMPs are not currently in place, describe appropriate BMPs that you will use to control pollutants in stormwater discharges. Selection of BMPs should take into consideration:

A. Non-Structural BMPs

1. **Good Housekeeping:** You must keep all exposed areas of the facility in a clean, orderly manner where such exposed areas could contribute pollutants to stormwater discharges. Common problem areas include: around trash containers, storage areas and loading docks. Measures must also include: a schedule for regular pickup and disposal of garbage and waste materials, routine inspections for leaks and conditions of drums, tanks and containers.
2. **Minimizing Exposure:** You must minimize the exposure of manufacturing, processing, and material storage areas (including loading and unloading, storage, disposal, cleaning, maintenance, and fueling operations) to rain, snow, snowmelt, and runoff by either locating these industrial materials and activities inside or protecting them with storm resistant coverings (although significant enlargement of impervious surface area is not recommended).
3. **Preventive Maintenance:** You must have a preventive maintenance program which includes timely inspection and maintenance of stormwater management devices, (e.g., cleaning oil/water separators, catch basins) as well as inspecting, testing, maintaining and repairing facility equipment, and systems to avoid breakdowns or failures that may result in discharges of pollutants to surface waters.
4. **Routine Facility Inspections** (also see Part 4.3.13 of this permit): In addition to, or as part of the Comprehensive Site Evaluation Report required, you must have qualified facility personnel inspect all areas of the facility where industrial materials or activities are exposed to stormwater. You shall develop the routine facility inspection procedures and document the evaluation of existing stormwater BMPs. You must correct any deficiencies in implementation of your SWP3 you find as soon as practicable, but not later than within 14 days of the inspection. You must document in your SWP3 the results of your inspections and the corrective actions you took in response to any

deficiencies or opportunities for improvement that you identify. You must develop and include an inspection form in your SWP3.

5. Corrective Action

If any of the following conditions occur, you must review and revise the selection, design, installation, and implementation of your control measures to ensure that the condition is eliminated and will not be repeated in the future:

- a. An unauthorized release or discharge (e.g., spill, leak, or discharge of non-stormwater not authorized by this or another OPDES permit) occurs at your facility;
- b. A discharge violates a numeric effluent limit;
- c. You become aware, or DEQ determines, that your control measures are not stringent enough for the discharge to meet applicable water quality standards;
- d. An inspection or evaluation of your facility by a DEQ official, or local MS4, determines that modifications to the control measures are necessary to meet the non-numeric effluent limits in this permit; or
- e. You find in your routine facility inspection, quarterly visual inspection, or comprehensive site inspection that your control measures are not being properly operated and maintained.

Within 14 days of such discovery, you must document any corrective action(s) to be taken to eliminate or further investigate the deficiency, or if no corrective action is needed, the basis for that determination. If you determine that changes are necessary following your review, any modifications to your control measures must be made before the next storm event if possible, or as soon as practicable following that storm event. These time intervals are not grace periods, but are schedules considered reasonable for documenting your findings and for making repairs and improvements. They are included in this permit to ensure that the conditions prompting the need for these repairs and improvements are not allowed to persist indefinitely.

6. Final Stabilization

You must ensure in compliance with final stabilization requirements specified in Part 3.3.2 of the permit. All industrial activities at the mobile concrete batch plant or/and portable asphalt plant have been completed and a uniform (e.g., evenly distributed, without large bare areas⁶) perennial vegetative cover with a 70% or more of the cover that was provided by vegetation to all undisturbed areas or equivalent permanent stabilization measures (such as the use of riprap and gravel) have been employed.

7. Employee Training: You must describe a stormwater employee training program for the facility, including spill response, good housekeeping and material management practices, and must identify periodic dates (e.g., every 6 months during the months of July and January) for such training.

8. Spill Prevention

You must identify and document where potential spills and leaks could occur that contribute pollutants to stormwater discharges and corresponding outfall(s) that can be affected by such spills and leaks. Also you must describe the procedures that will be followed for cleaning up spills or leaks.

B. Structural BMPs

You must comply with Part 3.3.1 for sediment and erosion control. Also you could use the following BMPs, which include but are not limited to: stormwater detention structures (including wet ponds); stormwater retention structures; flow attenuation by use of open vegetated swales and natural

⁶ Large bare area is defined as an area with 10 ft² or more with no perennial vegetative cover established

depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). You must maintain all BMPs in effective operating condition. If site inspections indicate BMPs are not operating effectively, maintenance must be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of stormwater controls.

F.5 Comprehensive Site Compliance Evaluation

The concrete or asphalt batch plants covered under this permit must conduct an Annual Comprehensive Site Compliance Evaluation and file a report (see Addendum G ACSCER). At a minimum, your documentation of the comprehensive site evaluation must include the scope of the inspections, the name(s) of personnel making the inspections, the date(s) of the inspections, and major observations relating to the implementation of the SWP3. Major observations should include, the location(s) of discharges of pollutants from the site, BMPs that need to be maintained, BMPs that failed to operate as designed or that proved inadequate for a particular location, additional BMPs that are needed to address any conditions requiring corrective action identified during the inspection, previously unidentified discharges from the site, previously unidentified pollutants in existing discharges, evidence of, or the potential for, pollutants entering the drainage system, evidence of pollutants discharging to receiving waters at all facility outfall(s), and the condition of and around the outfall, including flow dissipation measures to prevent scouring; and any required revisions to the SWP3 resulting from the inspection.

A. Frequency of the Comprehensive Site Compliance Evaluation

You must conduct a comprehensive site compliance evaluation at least once a year. The inspections must be conducted by qualified personnel with at least one member of your stormwater pollution prevention team participating in the comprehensive site inspections. The qualified personnel you use may be either your own employees or outside consultants that you have hired, provided they are knowledgeable and possess the skills to assess conditions at your facility that could impact stormwater quality. They must also have the skills to assess the effectiveness of the BMPs you have chosen to use to control the quality of your stormwater discharges. If you decide to conduct more frequent inspections, your SWP3 must specify the frequency of inspections.

B. Scope of the Comprehensive Site Compliance Evaluation

Your inspections must include all areas where industrial materials or activities are exposed to stormwater, as identified in Parts F.1 and areas where spills and leaks have occurred within the past three (3) years.

F.6 Maintaining Updated SWP3

A. Change in Your Physical Operation

You must amend the SWP3 whenever there is a change in design, construction, operation, or maintenance at your facility which has a significant effect on the discharge, or potential for discharge, of pollutants from your facility;

B. Maintaining Your SWP3

You must amend the SWP3 whenever during inspections or investigations by you or by local, State, or Federal officials it is determined the SWP3 is ineffective in eliminating or significantly minimizing pollutants from sources identified under the SWP3 or is otherwise not achieving the general objectives of controlling pollutants in discharges from your facility.

F.7 Monitoring Requirements

All facilities will be subject to quarterly visual monitoring. Also the Numeric Effluent Limitation Monitoring (NELM) is required once per year if your asphalt batch plants are covered under this permit. Also these specific monitoring requirements and limitations are applied to the discharge at facilities with co-located activities. Where stormwater from the co-located activities is co-mingled, the monitoring requirements and limitations are additive.

A. Quarterly Visual Monitoring

The requirements and procedures for quarterly visual monitoring are applicable to all concrete and asphalt batch plants covered under this permit, regardless of your industrial activities.

1. You must perform and document a quarterly visual examination of a stormwater discharge associated with industrial activity from each outfall, except discharges exempted below. If no storm event resulted in runoff from the facility during a monitoring quarter, you are excused from visual monitoring for that quarter provided you document in your monitoring records that no runoff occurred. You must sign and certify the documentation in accordance with Part 6.7 of the permit.
2. Your visual examination must be made during daylight hours (e.g., normal working hours). The visual examinations must be made of samples collected within the first 30 minutes of when the runoff or snowmelt begins discharging from your facility. The examination must document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollution. The examination must be conducted in a well-lighted area. No analytical tests are required to be performed on the samples. All such samples must be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where practicable, the same individual should carry out the collection and examination of discharges for the entire permit term.

The following Table is an example of what you should look for in a visual monitoring sample.

TABLE F-1 VISUAL MONITORING

Parameter	Method	Results
Color and Extent	Visual	Clear, yellow, red, blue, green, brown, black, milky, etc.
Odor	Smell	None, earthy, sewage, musky, rotten eggs, petroleum, etc.
Clarity or Turbidity	Come up with your own test such as: clean off the label from a 1 liter or similar size clear plastic or glass bottle, fill the bottle with the sample, and try to see things through it.	1) can't see through the bottle 2) can see through but could not read newsprint 3) can see through and can read newsprint 4) pretty clear, but not as clear as bottled water 5) as clear as bottled water
Floating solids	Visual	Yes/no - describe what they are.
Settled solids	Use same 1 liter or similar size plastic or glass bottle	Tablespoons or cups of material or millimeters of solids on bottom after at least 60 minutes
Suspended solids	Look through the container.	Describe what do you see?
Foam	Visual	Yes - how thick is the foam? How much of the surface does it cover? What color is the foam? Or No
Oil sheen	Visual	Color and extent
Other obvious indicators of stormwater pollution	Indicate what you observed that would lead a reasonable person to believe that the stormwater was polluted.	Describe what do you see?

3. You must maintain your visual examination reports onsite with the SWP3. At a minimum, the report must include the examination date and time, locations, personnel, the nature of the discharge

(i.e., runoff or snow melt), results of observations of the stormwater discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollution), and probable sources of any observed stormwater contamination. If applicable, the report shall include why it was not possible to take samples within the first 30 minutes and signed in accordance with Part 6.7.

B. Numeric Effluent Limitation Monitoring (NELM)

1. If your facility has discharges of stormwater from an asphalt batch plant, you must comply with the limitations and monitoring requirements of Part 3.4.1(also see Table 3.1) for all discharges containing asphalt batch plant runoff, regardless of your industrial activities.
2. *Monitoring Periods.* If the project takes less than one year to complete, you shall collect at least one sample. otherwise, you must start to collect your grab samples and analyze the samples annually within the following time periods:

The yearly monitoring periods are from January 1st to December 31st.

3. Collection and Analysis of Samples

You must assess your sampling requirements on an outfall by outfall basis.

- a. *When and How to Sample.* All required monitoring must be performed on a storm event that results in an actual discharge from your site (at least 0.1 inch of stormwater event defined as a “measurable storm event”) that follows the preceding measurable storm event by at least 72 hours (3 days). The 72 hours (3 days) storm interval does not apply if you are able to document that less than a 72-hour (3 days) interval is representative for local storm events during the sampling period. In the case of snowmelt, the monitoring must be performed at a time when a measurable discharge occurs at your facility.
- b. Take a minimum of one grab sample within the first 30 minutes of the discharge resulting from a measurable storm event. If it is not practicable to take the sample during the first 30 minutes, the sample must be collected as soon as practicable after the first 30 minutes. You must document in your SWP3 why it was not possible to take samples within 30 minutes. If the sampled discharge commingles with process or non-process water, attempt to sample the stormwater discharge before it mixes with the non-stormwater. In the case of snowmelt, samples must be taken during a period with a measurable discharge.

4. Storm Event Data

For each monitoring event, except snowmelt monitoring, you must provide the date and duration (in hours) of the storm event(s); rainfall measurements or estimates (in inches) of the storm event; time (in days) since the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sample. For snowmelt monitoring, you must identify the date of the sampling event.

5. Follow-up Monitoring Requirements if Discharge Exceeds Numeric Effluent Limit

You must conduct follow-up monitoring within 30 calendar days, or during the next qualifying runoff event of implementing corrective action(s) taken pursuant to Part 4.5.14 in response to an exceedance of a numeric effluent limit contained in this permit.

Monitoring must be performed for any pollutant(s) that exceeds the effluent limit. You must continue to monitor, at least quarterly, until your discharge is in compliance with the effluent limit or until DEQ waives the requirement for additional monitoring. You must include the results of follow-up monitoring in the report.

C. Representative Outfalls - Substantially Identical Discharges.

Applicable monitoring requirements apply to each outfall authorized by this permit, except as otherwise exempt from monitoring as a “substantially identical outfall.” If your facility has 2 or more

outfalls that you believe discharge substantially identical effluents, based on similarities of the industrial activities and control measures, exposed materials that may significantly contribute pollutants to stormwater, and runoff coefficients of the outfalls' drainage areas, you may monitor the effluent of just one of the outfalls and report that the results also apply to the substantially identical outfall(s). You may monitor selected substantially identical outfall(s) on a rotating basis. For this to be permissible, you must describe each outfall authorized by this permit and rationale for any substantially identical outfall determinations, including the locations of the outfalls, why the outfalls are expected to discharge substantially identical effluents, estimates of the size of the drainage area (in square feet) for each of the outfalls; and an estimate of the runoff coefficient of the drainage areas (low: under 40 percent; medium: 40 to 65 percent; high: above 65 percent). The allowance for monitoring only one of the substantially identical outfalls is not applicable to any outfalls with numeric effluent limitations. You are required to monitor each outfall covered by a numeric effluent limit as identified in Part 3.4.1 (also see F.7.B.1).

F.8 Reporting

A. Reporting Results of Numeric Effluent Limitation Monitoring (NELM)

You are required to submit the results of your NELM to the DEQ according to the following schedule:

1. Save and submit monitoring results by March 1st of the year following the monitoring period.
2. Visual monitoring results must be retained with the SWP3. Do not submit unless requested to do so by the Executive Director.
3. If required, you must submit NELM results obtained from each outfall associated with industrial activity with electronic Discharge Monitoring Report (eDMR) that started on December 21, 2016. Instructions on how to register as a Preparer or Signatory for eDMR, as well as how to prepare and submit eDMR, can be found on DEQ website at <http://www.deq.state.ok.us/wqdnew/ereporting/index.html> . Assistance is also available by contacting DEQ at (405)702-8100 or deqreporting@deq.ok.gov .

B. Annual Comprehensive Site Compliance Evaluation Reporting Requirement

1. An Annual Comprehensive Site Compliance Evaluation Report using Form 606-006 found in Addendum G must be filed each year. The report must be filed by March 1st of each year beginning in 2018. If your permit becomes effective less than 1 month from the end of the yearly monitoring period, your first monitoring period starts with the next respective annual monitoring period.
2. The report must include requirements specified in Part F.5 of this Addendum and certified by an authorized representative of your facility (see Part 6.7 of this permit)

ADDENDUM G – ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION REPORT

DEQ Form
606-005B
Sept. 13, 2017



Oklahoma Department of Environmental Quality Annual Comprehensive Site Compliance Evaluation Report (ACSCER) for Stormwater Discharges Associated with Construction Supporting Activity under the OPDES General Permit OKR10

Submission of this ACSCER form is required in ADDENDUM G of this permit for Concrete and Asphalt Plants.

All requested information must be provided on this form. See instructions on Page 5 of this form

DEQ Authorization Number: OKR10 _____

Part A: Operator Information and Certification

Section I. Operator Information

Operator Name: _____

Mailing Address: _____ City: _____

County: _____ State: _____ Zip Code: _____

Operator's Point of Contact : _____ Title: _____

Phone: _____ Email: _____

Section II. Facility Information

Facility Name: _____ Phone: _____

Address: _____

City: _____ County: _____ State: _____ Zip Code: _____

Latitude: _____ Longitude: _____

Facility's Point of Contact : _____ Title: _____

Phone: _____ E-mail: _____

Section III. Certification

I certify under penalty of law that I have read and understand the requirements for filing this Annual Comprehensive Site Compliance Evaluation Report, which is to be filed by March 1st of each year beginning in 2018.

This report is also to be retained as part of the Stormwater Pollution Prevention Plan (SWP3) for at least three (3) years from the date permit coverage expires or is terminated and will be made available to any State or Federal Inspector visiting this facility. All records of actions taken in accordance with Addendum F of this Permit as part of the SWP3 will be retained for at least three (3) years from the date permit coverage expires or is terminated. 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 upon my inquiry of the person or persons who manage the system, or those persons directly involved in gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: _____ Title: _____

Signature: _____ Date: _____

Part B: Annual Comprehensive Site Compliance Evaluation**Reporting period:** _____

1.	Number of routine facility inspections you performed during the reporting period: _____				
2.	Dates of the Inspection performed: _____				
3.	Did any of your routine facility inspections find that one or more of your BMPs was not effective in controlling the pollutant source for which it was designed? ☐ Yes ☐ No ☐ All BMPs were effective				
4.	Were all BMPs you indicated you would be using in your SWP3, including good housekeeping practices, actually being implemented at the time of the Annual Comprehensive Site Compliance Evaluation? ☐ Yes ☐ No				
5.	If you found one or more ineffective BMPs, have they all been replaced with an alternative or modified BMP? ☐ Yes ☐ No ☐ All BMPs were being effective				
6.	Were there additional BMPs needed to address any conditions requiring corrective action? ☐ Yes ☐ No				
7.	If one or more BMPs were not being implemented, were corrective actions taken after the first inspection to eliminate the problem? ☐ Yes ☐ No ☐ All BMPs were being implemented				
8.	Was/were the same failure(s) to implement a BMP deficiency(ies) noted in more than one inspection? ☐ Yes ☐ No ☐ No deficiencies noted in any inspection				
9.	Document any deficiencies identified and any corrective actions implemented to remove the original violation below. Use additional sheets if necessary.				
	Date	Deficiencies	Corrected		Date of Correction
	_____	_____	☐ Yes	☐ No	_____
	_____	_____	☐ Yes	☐ No	_____
	_____	_____	☐ Yes	☐ No	_____
	_____	_____	☐ Yes	☐ No	_____
10.	What must you do to correct the deficiencies that remain uncorrected? _____ _____				
11.	Did any conditions require SWP3 review and revision to eliminate design, selection, installation, and/or implementation problem during the past year? If yes, describe the conditions in brief: ☐ No ☐ Yes				

12.	At any time during the reporting period, did you discover any previously unidentified unauthorized non-stormwater discharges from your facility or previously unidentified pollutants in the existing discharges? ☐ Yes ☐ No
13.	Have all unauthorized non-stormwater discharges (including any discovered in previous years) been eliminated or permitted? ☐ Yes ☐ No ☐ Permit applied for ☐ No unauthorized discharges
14.	Have any significant spills or leaks occurred at your facility during the reporting period? ☐ Yes ☐ No
15.	If any significant spills or leaks occurred, did they result in either a dry weather discharge or an actual discharge of the spilled or leaked material commingled with stormwater (as opposed to the spilled material being washed away by stormwater?) ☐ Yes ☐ No
16.	If any significant spills or leaks occurred, did they result in more than the minimum amounts of material being discharged in stormwater? Base your answer on your knowledge of the material you spilled or that leaked. The minimum amounts could vary with the nature (toxicity, oxygen demand, pH, etc.) of the spilled or leaked material from amounts left after normal "sweeping" type cleanup to the point at which even trace amounts left after cleanup could cause an environmental problem. ☐ Yes ☐ No ☐ No spills or leaks occurred
17.	Have all known spills or leaks been cleaned up or otherwise prevented from contaminating stormwater that would be discharged under the authority of this permit? ☐ Yes ☐ No ☐ No spills or leaks occurred
18.	How many times did you visually monitor all of your stormwater discharges at all the outfalls during the reporting year? _____
19.	Would the results of your visual monitoring indicate that there are pollutants in your stormwater discharges that are not adequately controlled by your current BMPs? ☐ Yes ☐ No
20.	If the results of your visual monitoring indicated a potential problem, was it due to one or more of the following? ☐ New pollutant source (including exposure of previously unexposed material) ☐ Failure to implement or maintain an existing BMP ☐ Less than expected performance from a BMP ☐ No BMP was selected to deal with that problem ☐ N/A (No problems identified)
21.	If your visual monitoring indicated a potential problem, what have you done to resolve the problem? ☐ Eliminated exposure or pollutant source ☐ Modified existing BMPs

	☐ Added a new BMP ☐ Plan to address problem by end of current reporting year ☐ Nothing planned ☐ N/A (No problems identified)																								
22.	Did any monitoring results exceed a numeric effluent limitation contained in Parts 3.4.1 and F.7.B during the past discharge monitoring period? ☐ Yes ☐ No																								
23.	If your answer to the previous question was Yes , list the dates, name of the pollutants and the test results that exceeded numeric effluent limitations. Use additional sheets if necessary.																								
	<table border="1"> <thead> <tr> <th>Date</th><th>Pollutants</th><th>Test Results</th><th>Date</th><th>Pollutants</th><th>Test Results</th></tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date	Pollutants	Test Results	Date	Pollutants	Test Results																		
Date	Pollutants	Test Results	Date	Pollutants	Test Results																				
24.	Were there any incidents of noncompliance in the past year or any noncompliance that is currently ongoing? ☐ Yes ☐ No ☐ Compliant with the Permit																								
25.	Were there any required revisions to the SWP3 resulting from the inspection and/or monitoring? ☐ Yes ☐ No																								
26.	If your answer to the previous question was Yes , list the dates, reason for revision and brief description of the revision. Use additional sheets if necessary.																								
	<table border="1"> <thead> <tr> <th>Date</th><th>Reason for Revision</th><th>Description of Revision</th></tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date	Reason for Revision	Description of Revision																					
Date	Reason for Revision	Description of Revision																							



Instructions for Completing the Annual Comprehensive Site Compliance Evaluation Report (ACSCER) Form 606-005B for Stormwater Discharges Associated with Construction supporting Activity for Concrete or Asphalt Batch Plants

When to File an ACSCER Form

Permittees who are presently covered under OPDES construction general permit OKR10 for stormwater discharges associated with construction supporting activity for concrete or asphalt batch plants must submit an Annual Comprehensive Site Compliance Evaluation Report (ACSCER) form to DEQ by March 1 of each year beginning in 2018. If your authorization becomes effective less than 1 month from the end of the yearly monitoring period, your first monitoring period starts with the next annual monitoring period.

Completing the Form

To complete this form, type or print in the appropriate areas only.

Permit Information

Enter the existing DEQ Authorization assigned to the facility identified in Section I for stormwater discharges from industrial activity.

Part A: Operator Information and Certification

Section I. Operator Information

Provide the legal name of the person, firm, public organization or any other commercial entity that owns or operates the facility described in this application. The name of the operator may or may not be the same name as the facility. An operator is the legal entity that controls the facility's operation, rather than the plant or site manager. Provide complete mailing address including city, county, state, and ZIP code. Include operator's point of contact name, title, telephone number and a valid email address.

Section II. Facility Information:

Enter the facility's official or legal name and complete physical address including city, county, state, and ZIP code. Include facility's point of contact name, telephone number and email address. Indicate the latitude and longitude of the facility to the nearest 15 seconds. . Include facility's point of contact name, title, telephone number and a valid email address.

Section III. Certification

The ACSCER form must be signed by a responsible party - for corporation: by a responsible corporate official, such as: president, vice president, secretary, and treasurer either for a corporation or company; for a partnership or sole proprietorship: by a general partner or the proprietor, respectively. (Note: for limited liability company (LLC): by one of its owners, called managing members/partners of the company); for a municipality, state, Federal, or other public facility: by either a principal executive or ranking elected official.

Part B: Annual Comprehensive Site Compliance Evaluation Report

1. A summary of your past year's routine facility inspection documentation such as control measures' maintenance, repair and/or replacement, any additional control measures needed to comply with the permits;
2. The location(s) of discharges of pollutants from the site, evidence of pollutants discharging to receiving waters at all facility outfall(s), and the condition of and around the outfall(s);
3. A summary of your past year's corrective action documentation;
4. A summary of your past year's quarterly visual monitoring documentation;
5. A summary of your past year's effluent limitation violations if applicable; and
6. Describe any incidents of noncompliance in the past year or currently ongoing, or if none, provide a statement that you are in compliance with the Permit.

Note: Please see Part F.5 of CGP OKR10 for detailed scope of Annual Comprehensive Site Compliance Evaluation

Completed ACSCER form must be submitted to DEQ by March 1 of each year beginning in 2018.

If you need any assistance or have any question, contact the Stormwater Unit of Environmental Complaints and Local Services (ECLS) of DEQ at (405) 702-6100 or email to:

ecls-stormwaterpermitting@deq.ok.gov

Where to file an ACSCER Form

Completed ACSCER form must be submitted to the following address:

Stormwater Unit of ECLS
Oklahoma DEQ
P.O. Box 1677
Oklahoma City, OK 73101-1677

or fax it to: (405)702-6226

or email it to: ecls-stormwaterpermitting@deq.ok.gov

*Commencing **December 21, 2020**, NECs must be electronically submitted to DEQ. Instructions on how to access and use the appropriate electronic reporting tool will be made available on DEQ's website prior to the December 21, 2020 compliance deadline.*

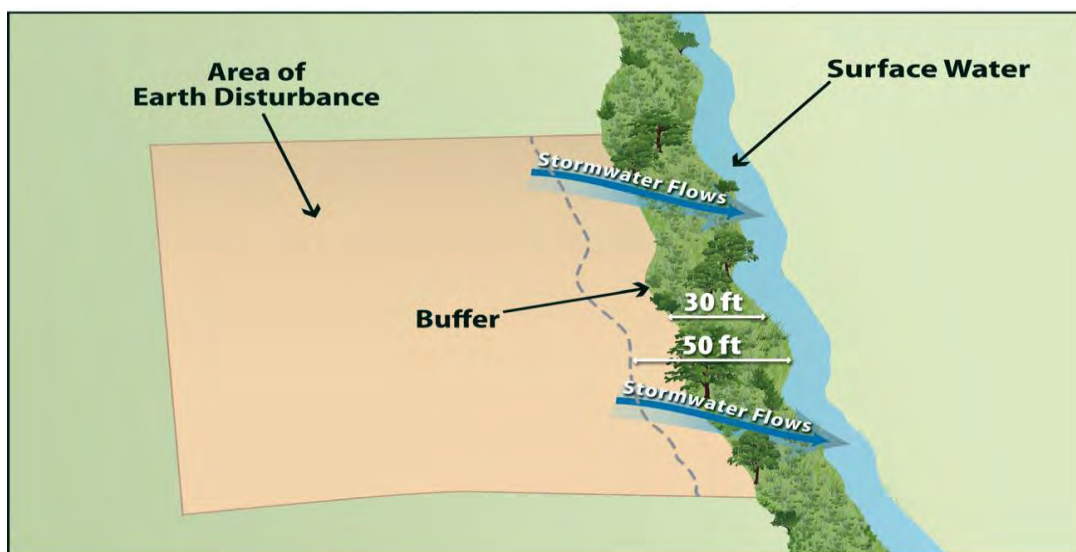
ADDENDUM H – BUFFER REQUIREMENTS

The purpose of this Addendum is to assist you in complying with the requirements in Parts 3.3.1.B and 3.5.2.A of this permit regarding the establishment of natural buffers or equivalent sediment controls.

H.1 Sites that are required to provide and maintain natural buffers and/or equivalent erosion and sediment controls

If the land disturbing activities will occur within the Aquatic Resources of Concern (ARC) which are identified by USFWS and ODWC, a vegetated buffer of at least 100 feet is required between the area disturbed and all perennial or intermittent streams on or adjacent to the construction site, or a vegetated buffer of at least 50 feet is required between the area disturbed and all ephemeral streams. If your disturbing activities will be adjacent to the waters of the State, a vegetated buffer of at least 50 feet is required. Figure H – 1 illustrates when a site would be required to comply with the requirements in Part 3.3.1.D due to their proximity to surface waters. If the surface water is not located within 50 feet of the earth-disturbing activities, Part 3.3.1 does not apply. If you determine that the buffer requirements apply to your site and those buffer requirements cannot be met, you may continue on to Part H. 2 of this Addendum.

Figure H - 1. Example of Earth-Disturbing Activities within 50 feet of surface water.



H.2 Compliance Alternatives to the Buffer Requirements

The following are 3 compliance alternatives from which permittees can choose, unless you qualify for any of the exceptions in Part H.3 of the Addendum:

1. Provide and maintain a 100-foot or 50-foot undisturbed natural buffer; or
2. Provide and maintain an undisturbed natural buffer that is less than 100-feet or 50-feet and is supplemented by additional erosion and sediment controls that achieve the sediment load reduction equivalent to a 100-foot or 50-foot undisturbed natural buffer; or
3. 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 100-foot or 50-foot undisturbed natural buffer.

The compliance alternative selected must be maintained throughout the duration of permit coverage.

H.3 Exceptions to the Compliance Alternatives

The following exceptions apply to the requirement of Parts 3.3.1.B and 3.5.2.A

- Construction approved under a CWA Section 404 permit; or
- Construction of a water-dependent structure or water access areas (e.g., pier, boat ramp, trail); or
- If there is no discharge of stormwater to waters of the State through the area between the disturbed portions of the site and any waters of the State located within 100-feet or 50-feet of the site; or
- Where no natural buffer exists due to preexisting development disturbances (e.g., structures, impervious surfaces) that occurred prior to the initiation of planning for the current development of the site.

You must document in your SWP3 if any disturbances related to any of the above exceptions occurs within the buffer area on your site.

H.4 Requirements for Providing and Maintaining Natural Buffers

This part of the Addendum applies to you if you choose either Compliance Alternative 1 (100-foot or 50-foot buffer) or Compliance Alternative 2 (a buffer of < 100 feet or < 50 feet supplemented by additional erosion and sediment controls that achieve the equivalent sediment load reduction as the 100-foot or 50-foot buffer).

A. Buffer Width Measurement

Where you are 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.

Refer to Figure H-2 and Figure H-3. You may find that specifically measuring these points is challenging if the flow path of the surface water changes frequently, thereby causing the measurement line for the buffer to fluctuate continuously along the path of the waterbody. Where this is the case, DEQ suggests that rather than measuring each change or deviation along the water's edge, it may be easier to select regular intervals from which to conduct your measurement. For instance, you may elect to conduct your buffer measurement every 5 to 10 feet along the length of the water.

Figure H - 2 Buffer measurement from the ordinary high water mark of the water body, as indicated by a clear natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, and/or the presence of litter/debris.

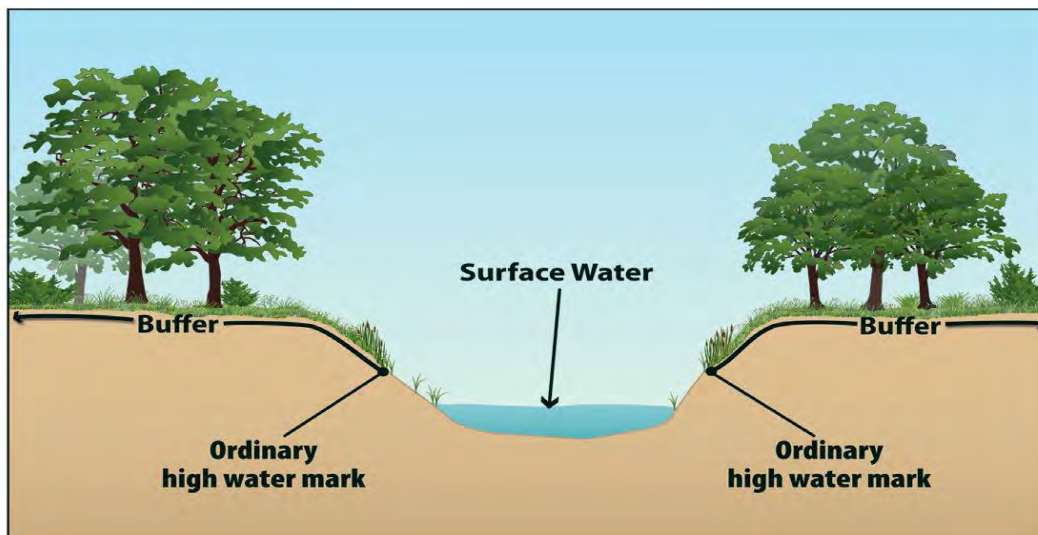
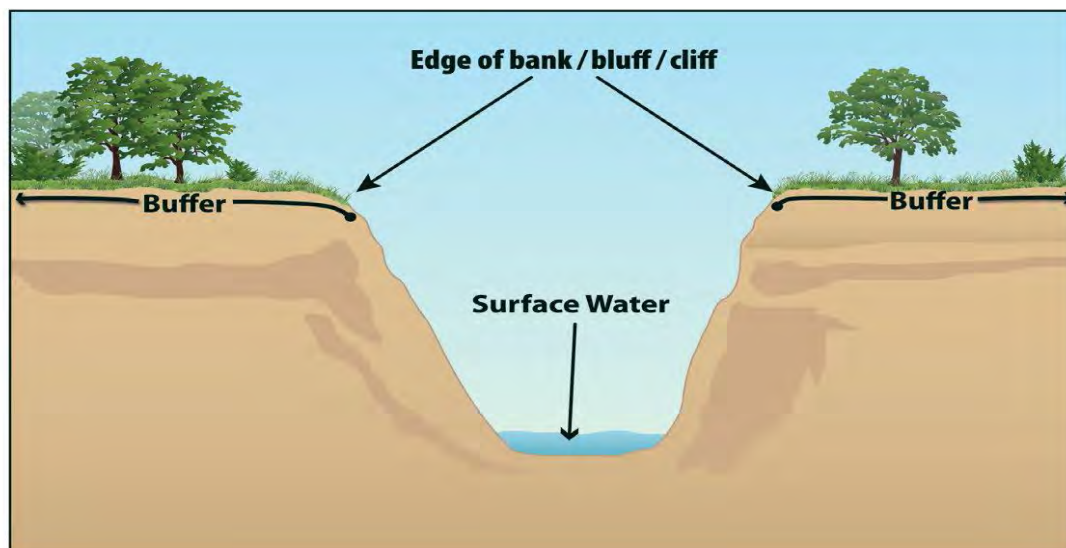


Figure H - 3 Buffer measurement from the edge of the bank, bluff, or cliff, whichever is applicable.



B. Limits to Disturbance within the Buffer

You are considered to be in compliance with this requirement to provide and maintain a natural buffer if you retain and protect from construction activities the natural buffer that existed prior to the commencement of construction. If the buffer area contains no vegetation prior to the commencement of construction (e.g., sand or rocky surface), you are not required to plant vegetation. As noted above, any preexisting structures or impervious surfaces are allowed in the buffer provided you retain and protect from disturbance the vegetation in the buffer outside the preexisting disturbance.

To ensure that the water quality protection benefits of the buffer are retained during construction, you are prohibited from conducting any earth-disturbing activities within the buffer during permit coverage.

C. Discharges to the Buffer

You must ensure that all discharges from the area of earth disturbance to the natural buffer are first treated by the site's erosion and sediment controls (*for example, you must comply with the Part 3.3.1.C requirement to establish sediment controls along any perimeter areas of the site that will receive pollutant discharges*), and if necessary to prevent erosion caused by stormwater flows within the buffer, you must use velocity dissipation devices.

D. SWP3 Documentation

You are required to document in your SWP3 the natural buffer width that is retained. For example, if you are complying with Compliance Alternative 1, you must specify in your SWP3 that you are providing a 100-foot or 50-foot buffer. Or, if you will be complying with Compliance Alternative 2, you must document the reduced width of the buffer you will be retaining (and you must also describe the erosion and sediment controls you will use to achieve an equivalent sediment reduction, as required in Part H.5 below. Note that you must also show any buffers on your site map in your SWP3. Additionally, if any disturbances related to the exceptions in Part H. occur within the buffer area, you must document this in the SWP3.

H.5 Guidance for Providing the Equivalent Sediment Reduction as the 100-foot or 50-foot Buffer

If you are selecting Compliance Alternative 2 (provide and maintain a buffer that is less than 100 feet or 50 feet that is supplemented by erosion and sediment controls that achieve the sediment load reduction equivalent to a 100-foot or 50-foot buffer) or Compliance Alternative 3 (implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot or 50-foot buffer)

A. Determine Whether it is Feasible to Provide a Reduced Buffer

DEQ recognizes that there will be a number of situations in which it will be infeasible to provide and maintain a buffer of any width. While some of these situations may exempt you from the buffer requirement entirely (See H.3), if you do not qualify for one of these exemptions, there still may be conditions or circumstances at your site that make it infeasible to provide a natural buffer. For example, there may be sites where a significant portion of the property on which the earth-disturbing activities will occur is located within the buffer area, thereby precluding the retention of natural buffer areas.

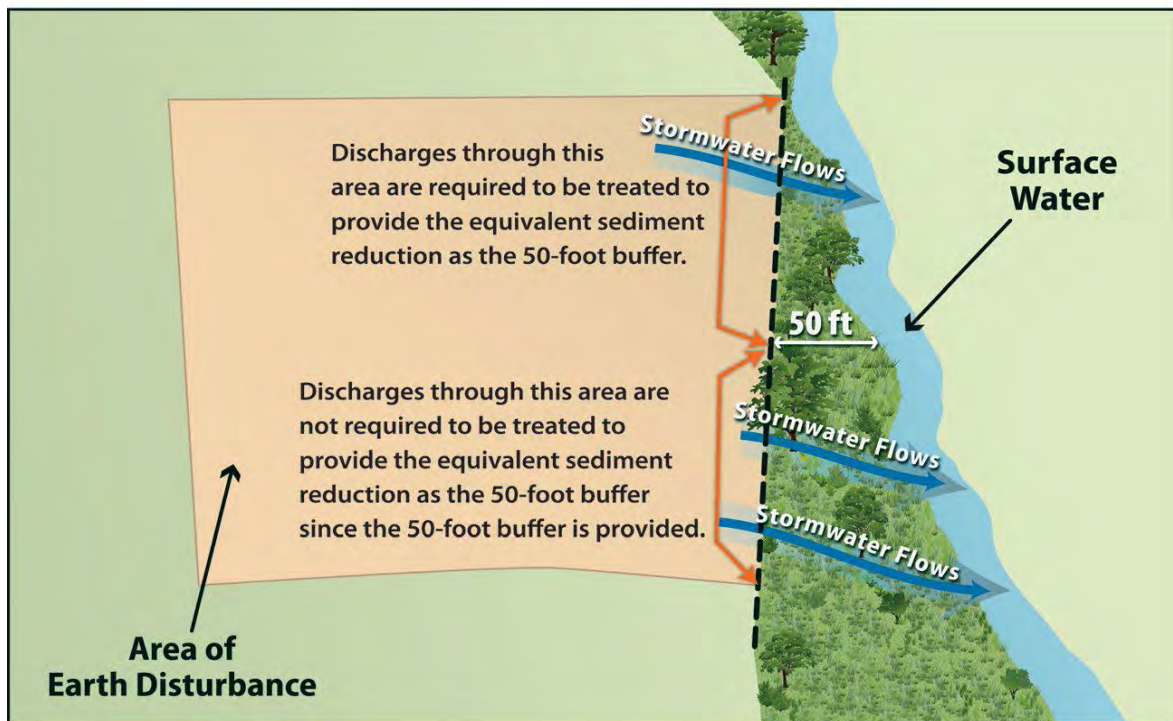
Therefore, you should choose Compliance Alternative 2 if it is feasible for you to retain some natural buffer on your site. (Note: For any buffer width retained, you are required to comply with the requirements in Part H.4, above, concerning the retention of vegetation and restricting earth disturbances.) Similarly, if you determine that it is infeasible to provide a natural buffer of any size during construction, you should choose Compliance Alternative 3.

B. Design Controls That Provide Equivalent Sediment Reduction as 100-foot or 50-foot Buffer

You must next determine what additional controls must be implemented on your site that, alone or in combination with any retained natural buffer, achieve a reduction in sediment equivalent to that achieved by a 100-foot or 50-foot buffer.

Note that if only a portion of the natural buffer is less than 50 feet, you are only required to implement erosion and sediment controls that achieve the sediment load reduction equivalent to the 50-foot buffer for discharges through that area. You would not be required to provide additional treatment of stormwater discharges that flow through 50 feet or more of natural buffer. See Figure H - 4.

Figure H - 4 Example of how to comply with the requirement to provide the equivalent sediment reduction when only a portion of your earth-disturbances discharge to a buffer of less than 50 feet.



Steps to help you meet Compliance Alternative 2 and 3 requirements are provided below:

Step 1 - Estimate the Sediment Reduction from the 100-foot or 50-foot Buffer

In order to design controls that match the sediment removal efficiency of a 100-foot or 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 sediment controls used to reduce the

discharge of sediment prior to the buffer. DEQ has simplified this calculation by developing buffer performance tables covering a range of vegetation and soil types for the areas covered by the permit. See Attachment 1, Tables H - 1 through H - 4.

Note: buffer performance values in Tables H - 1 through H - 4 represent the percent of sediment captured through the use of perimeter controls (e.g., silt fences) and 100-foot or 50-foot buffers at disturbed sites of fixed proportions and slopes. Using Tables H - 1 through H - 4 (see Attachment 1), you can determine the sediment removal efficiency of a 100-foot or 50-foot buffer for your geographic area by matching the vegetative cover type and the type of soils that predominate at your site. For example, if your site is located in Oklahoma City (see Table H - 1), and your buffer vegetation corresponds most closely with that of fescue grass, and the soil type at your site is best typified as sand, your site's sediment removal efficiency would be 90 percent.

In this step, you should choose the vegetation type in the tables that most closely matches the vegetation that would exist naturally in the buffer area on your site regardless of the condition of the buffer. However, because you are not required to plant any additional vegetation in the buffer area, in determining what controls are necessary to meet this sediment removal equivalency in Step 2 below, you will be able to take credit for this area as a fully vegetated "natural buffer."

Similarly, if a portion of the buffer area adjacent to the surface water is owned by another party and is not under your control, you can treat the area of land not under control as having the equivalent vegetative cover and soil type that predominates on the portion of the property on which your construction activities are occurring. *For example, if your earth-disturbances occur within 50 feet of a surface water, but the 10 feet of land immediately adjacent to the surface water is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you can treat the 10 foot area adjacent to the stream as having the equivalent soil and vegetation type that predominates in the 40 foot area under your control. You would then make the same assumption in Step 2 for purposes of determining the equivalent sediment removal.*

Alternatively, you may do your own calculation of the effectiveness of the 50-foot buffer based upon your site-specific conditions, and may use this number as your sediment removal equivalency standard to meet instead of using Tables H - 1 through H - 4. This calculation must be documented in your SWP3.

Step 2 - Design Controls That Match the Sediment Removal Efficiency of the 100-foot or 50-foot Buffer

Once you have determined the estimated sediment removal efficiency of a 100-foot or 50-foot buffer for your site in Step 1, you must next select stormwater controls that will provide an equivalent sediment load reductions.

To make the determination that your controls and/or buffer area achieve an equivalent sediment load reduction as the 100-foot or 50-foot buffer, you may use stormwater controls listed in Tables H-1 through H-4 to select a single designed control, such as 12" or 6" wattle, roll material, silt fence or straw mulch or gravel bag berm (see Attachment 1), or you will use a model or other type of calculator. There are a variety of models available that can be used to support your calculation, including USDA's RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other models.

Alternatively, you may elect to install a combination of stormwater controls and to retain some amount of a buffer. Whichever control(s) you select, you must demonstrate in your SWP3 that the controls will provide at a minimum the same sediment removal capabilities as the 100-foot or 50-foot buffer (Step 1). You are allowed to take credit for the removal efficiencies of your required perimeter controls in your calculation of equivalency, because these were included in calculating the buffer removal efficiencies in Tables H - 1 through H - 4. (Note: You are reminded that the controls must be kept in effective operating condition until you have completed final stabilization on the disturbed portions of the site discharging to the surface water.)

If you are retaining a buffer of less than 100 feet or 50 feet, you may take credit for the removal that will occur from the reduced buffer and only need to provide additional controls to make up the difference between the removal efficiency of a 100-foot or 50-foot buffer and the removal efficiency of the narrower buffer. For example, if you are retaining a 30-foot buffer, you can account for the

sediment removal provided by the 30-foot buffer retained, and you will only need to design controls to make up for the additional removal provided by the 20-foot of buffer that is not being provided. To do this, you would plug the width of the buffer that is retained into RUSLE or another model, along with other stormwater controls that will together achieve a sediment reduction equivalent to a natural 50-foot buffer.

As described in Step 1 above, you can take credit for the area you have retained as a “natural buffer” as being fully vegetated, regardless of the condition of the buffer area.

For example, if your earth-disturbances occur within 30 feet of a surface water, but the 10 feet of land immediately adjacent to the surface water is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you can treat the 10-foot area adjacent to the stream as having the equivalent soil and vegetation type a natural buffer, regardless of the activities that are taking place in the area. Therefore, you can assume (for purposes of your equivalency calculation) that your site is providing the sediment removal equivalent of a 30-foot buffer, and you will only need to design controls to make up for the additional removal provided by the 20-foot of buffer that is not being provided.

Step 3 - Document How Site-Specific Controls Will Achieve the Sediment Removal Efficiency of the 100-foot or 50-foot Buffer

In Steps 1 and 2, you determined both the expected sediment removal efficiency of a 100-foot or 50-foot buffer at your site, and you used this number as a performance standard to design controls to be installed at your site, which alone or in combination with any retained natural buffer, achieves the expected sediment removal efficiency of a 100-foot or 50-foot buffer at your site. The final step is to document in your SWP3 the information you relied on to calculate the equivalent sediment reduction as an undisturbed natural buffer. DEQ will consider your documentation to be sufficient if it generally meets the following:

For Step 1: refer to the Table in Attachment 1 that you used to derive your estimated 100-foot or 50-foot buffer sediment removal efficiency performance. Include information about the buffer vegetation and soil type that predominate at your site, which you used to select the sediment load reduction value in Tables H - 1 through H - 4. Or, if you conducted a site-specific calculation for sediment removal efficiency, provide the specific removal efficiency, and the information you relied on to make your site-specific calculation.

For Step 2: (1) Specify a single designed stormwater control (see Table H-1 – H-4) or other stormwater controls that you used to estimate sediment load reductions from your site. Specify a model or other type of calculator that you used to support your calculation if any; and (2) the results of calculations showing how your controls will meet or exceed the sediment removal efficiency from Step 1. If you choose Compliance Alternative 3, you must also include in your SWP3 a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size.

ATTACHMENT 1

Sediment Removal Efficiency Tables: Percent of sediment removal was calculated for a 200-foot runoff area with a 100-foot buffer, and a 100-foot runoff area with a 50-foot buffer. DEQ recognizes that very high removal efficiencies, even where theoretically achievable by a 50-foot or 100-foot buffer, may be very difficult to achieve in practice using alternative controls. Therefore in the tables below, DEQ has limited the removal efficiencies to a maximum of 90%. Efficiencies that were calculated at greater than 90% are shown as 90%, and this is the minimum percent removal that must be achieved by alternative controls. When more than one alternative BMP must be used to compensate for the loss of the buffer strip, this amount should be calculated using the following formula:

$$\text{Removal Rate}_{\text{total}} = \text{Removal Rate}_1 + (1 - \text{Removal Rate}_1)(\text{Removal Rate}_2)$$

For example, if we are installing two BMPs that both have a 70% removal rate, the total removal rate is:

$$0.70 + (1 - 0.70)(0.70) = 0.91 = 91\%$$

Best Management Practices Defined:

- Fescue: Buffer strip (100 feet or 50 feet) at the end of the overland flow path of Fescue grass, the area has not been grazed
- Grama Grass: Buffer strip (100 feet or 50 feet) at the end of the overland flow path of Grama grass, at least the third year after seeding
- Range Grass: Buffer zone (100 feet or 50 feet) at the end of the overland flow path of a generic low production range grass
- Weeds: Buffer zone (100 feet or 50 feet) at the end of the overland flow path of at least 5 years of growth of generic weeds started from volunteer germination
- 12" Wattle: 12 inch straw sock or wattle installed at the base of the runoff area
- 6" Wattle: 6 inch straw sock or wattle installed at the end of the overland flow path
- Roll Material: Erosion control blanket placed over the disturbed area
- Silt Fence: Full retardance fabric silt fence installed at the end of the overland flow path
- Straw Mulch: Straw mulch applied over the disturbed area, 4000 lbs/acre
- Gravel Berm: Gravel bag berm installed on a level contour to intercept sheet flows.

Soils Defined:

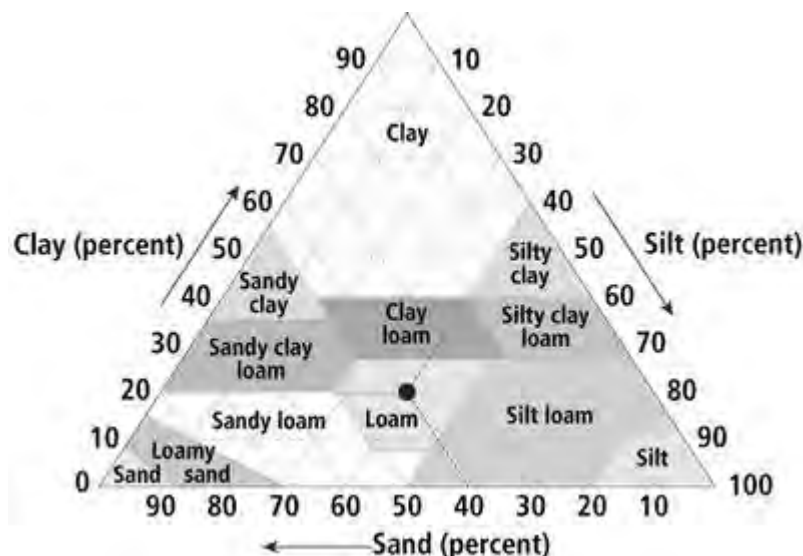


Table H-1 Estimated Buffer Performance of Blade Fill in Oklahoma County, Oklahoma *

Best Management Practices**	Estimated % Sediment Removal										
	Clay	Silty Clay	Silty Clay Loam	Clay Loam	Silt Loam	Loam	Sandy Loam	Silt	Sandy Clay Loam	Loamy Sand	Sand
Fescue (100' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Fescue (50' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Grama Grass (100' Buffer)	80	83	81	82	81	81	80	79	82	85	87
Grama Grass (50' Buffer)	79	79	82	80	81	80	80	79	80	83	76
Range Grass (100' Buffer)	89	87	90	90	90	90	90	90	90	90	89
Range Grass (50' Buffer)	88	86	90	90	90	90	90	90	90	98	87
Weeds (100' Buffer)	68	67	70	71	71	72	73	72	73	73	63
Weeds (50' Buffer)	67	65	69	68	70	71	71	70	72	67	53
12" Wattle	71	61	56	67	45	57	70	20	76	82	73
6" Wattle	61	52	48	59	41	52	68	20	73	66	29
Roll Material	90	90	90	90	90	90	90	90	90	90	90
Silt Fence	61	52	48	59	41	52	68	20	73	66	66
Straw Mulch	76	75	77	73	78	75	77	81	76	77	88
Gravel Bag Berm	80	68	64	75	50	62	74	27	80	84	86

* Applicable for sites less than nine percent slope

** Characterization focuses on the under-story vegetation

Table H-2 Estimated Buffer Performance of Blade Cut in Oklahoma County, Oklahoma *

Best Management Practices**	Estimated % Sediment Removal										
	Clay	Silty Clay	Silty Clay Loam	Clay Loam	Silt Loam	Loam	Sandy Loam	Silt	Sandy Clay Loam	Loamy Sand	Sand
Fescue (100' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Fescue (50' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Grama Grass (100' Buffer)	60	58	74	69	78	77	73	74	72	57	16
Grama Grass (50' Buffer)	59	53	67	62	74	30	69	74	70	38	11
Range Grass (100' Buffer)	87	85	89	90	90	90	90	89	89	86	86
Range Grass (50' Buffer)	85	84	88	89	90	90	90	89	87	84	84
Weeds (100' Buffer)	57	52	62	63	64	64	66	62	26	52	43
Weeds (50' Buffer)	53	51	58	58	62	64	66	62	58	46	39
12" Wattle	63	53	55	65	46	62	75	20	77	54	11
6" Wattle	28	26	45	46	42	58	63	17	38	7	1
Roll Material	83	84	85	83	86	85	85	90	85	86	86
Silt Fence	28	26	45	46	42	58	63	17	38	7	1
Straw Mulch	44	42	45	42	46	44	46	55	43	48	47
Gravel Bag Berm	76	65	61	72	48	62	73	22	77	82	82

* Applicable for sites less than nine percent slope

** Characterization focuses on the under-story vegetation

Table H-3 Estimated Buffer Performance of Blade Fill Tulsa County, Oklahoma *

Best Management Practices**	Estimated % Sediment Removal										
	Clay	Silty Clay	Silty Clay Loam	Clay Loam	Silt Loam	Loam	Sandy Loam	Silt	Sandy Clay Loam	Loamy Sand	Sand
Fescue (100' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Fescue (50' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Grama Grass (100' Buffer)	81	82	82	82	81	81	80	79	82	85	87
Grama Grass (50' Buffer)	79	80	82	82	81	81	80	78	80	84	76
Range Grass (100' Buffer)	90	87	90	90	90	90	90	89	90	90	89
Range Grass (50' Buffer)	88	86	89	90	90	90	90	90	90	88	86
Weeds (100' Buffer)	50	50	48	51	50	50	49	47	51	51	48
Weeds (50' Buffer)	43	48	47	49	48	47	49	45	49	44	40
12" Wattle	68	60	53	658	44	57	69	18	73	80	71
6" Wattle	57	50	47	58	40	53	66	18	71	62	30
Roll Material	90	90	90	90	90	90	90	90	90	90	90
Silt Fence	57	50	47	58	40	53	66	18	71	62	30
Straw Mulch	72	75	75	73	76	74	74	79	92	75	76
Gravel Bag Berm	77	66	60	71	49	62	72	24	77	82	84

* Applicable for sites less than nine percent slope

** Characterization focuses on the under-story vegetation

Table H-4 Estimated Buffer Performance of Blade Cut in Tulsa County, Oklahoma *

Best Management Practices**	Estimated % Sediment Removal										
	Clay	Silty Clay	Silty Clay Loam	Clay Loam	Silt Loam	Loam	Sandy Loam	Silt	Sandy Clay Loam	Loamy Sand	Sand
Fescue (100' Buffer)	90	90	90	90	90	90	90	90	90	90	90
Fescue (50' Buffer)	90	89	90	90	90	90	90	90	90	90	90
Grama Grass (100' Buffer)	60	59	73	68	78	77	73	88	72	56	13
Grama Grass (50' Buffer)	58	55	68	63	76	75	70	73	69	39	11
Range Grass (100' Buffer)	87	85	89	90	90	90	90	87	90	86	85
Range Grass (50' Buffer)	85	84	88	89	90	90	90	88	87	84	84
Weeds (100' Buffer)	52	50	58	59	63	64	66	63	56	42	40
Weeds (50' Buffer)	49	45	45	56	59	61	59	56	49	41	36
12" Wattle	62	55	55	63	45	61	75	20	77	55	8
6" Wattle	25	27	45	50	41	57	63	198	38	6	1
Roll Material	82	83	84	80	86	90	85	90	84	86	86
Silt Fence	40	27	45	50	74	57	63	18	38	6	1
Straw Mulch	35	41	42	27	43	39	40	51	42	43	44
Gravel Bag Berm	73	63	58	69	47	61	70	20	74	79	82

* Applicable for sites less than nine percent slope

** Characterization focuses on the under-story vegetation

ADDENDUM I – STORMWATER RUNOFF COEFFICIENTS

Typical Runoff Coefficients for 5 to 10 year Frequency Design*

	Description of Area	Runoff Coefficients
Business		
1	Downtown areas	0.70-0.95
2	Neighborhood areas	0.50-0.70
Residential		
3	Single-family areas	0.30-0.50
4	Multiunits, detached	0.40-0.60
5	Multiunits, attached	0.60-0.75
6	Residential (suburban)	0.25-0.40
7	Apartment dwelling areas	0.50-0.70
Industrial		
8	Light areas	0.50-0.80
9	Heavy areas	0.60-0.90
10	Parks, cemeteries	0.10-0.23
11	Playgrounds	0.20-0.35
12	Railroad yard areas	0.20-0.40
13	Unimproved areas	0.10-0.30
Streets		
14	Asphalt	0.70-0.95
15	Concrete	0.80-0.95
16	Brick	0.70-0.85
17	Drives and walks	0.75-0.85
18	Roofs	0.75-0.95
Lawns, Sandy soil		
19	Flat, 2%	0.05-0.10
20	Average, 2-7%	0.10-0.15
21	Steep, 7%	0.15-0.20
Lawns, Heavy soil		
22	Flat, 2%	0.13-0.17
23	Average, 2-7%	0.18-0.22
24	Steep, 7%	0.25-0.35

*Viessman, W., Jr., G. L. Lewis, J. W. Knapp, 1989, *Introduction to Hydrology*, 3rd ed., Harper and Row, New York.

ADDENDUM J – NOTIFICATION OF CHANGE OF OWNERSHIP

(Project Name and permit authorization number #)

I, _____, operator of a larger common plan of development or sale,
(Name of Permittee)

located at _____ and authorized under DEQ's Construction
(Subdivision Name)

General Permit (CGP) OKR10, have notified the new owner/operator, _____,
(Name of New Owner/Operator)

who can be reached at _____ and _____,
(Phone Number) (Email Address)

of an individual lot # _____, Block # _____ of _____,
(Lot Number) (Block Number) (Subdivision Name)

of the stormwater permitting requirements for his/her construction site(s).

DEQ CGP OKR10 requires this new owner/operator to submit a NOI and prepare a SWP3 prior to commencement of any construction activity for this lot(s). I understand that with the sale of this lot to the new owner(s)/operator(s); I must notify the new owner(s)/operator(s) of their obligation to obtain their own permit coverage with DEQ prior to commencement of construction activity.

Signature: _____ Title: _____

Print Name: _____ Date: _____

Attachment D
(Notice of Intent)

DEQ Form
606-002A
Sept. 27, 2022



**Oklahoma Department of Environmental Quality Notice of Intent (NOI)
for Stormwater Discharges Associated with Construction Activity under
the OPDES Construction General Permit OKR10**

Submission of this NOI constitutes notice that the party identified in Section I of this form intends to be authorized by DEQ for stormwater discharges associated with construction activity on land disturbance equal to or greater than one acre, or less than one acre of total land area that is part of a larger common plan of development or sale in the State of Oklahoma. Becoming a permittee obligates such discharger to comply with the terms and conditions of this permit.
To obtain an authorization from DEQ, this form must be complete with all the pertinent information.

All associated fees must be submitted with this NOI. See instructions for completing the NOI on pages 4 and 5 of this form.

☒ NEW APPLICATION ☐ AMENDMENT/MODIFICATION ☐ RENEWAL Existing Authorization Number: OKR10

I. Operator Information *For type of entity, select federal, state, private or municipal.*

Operator Name: City of Sapulpa Phone: 918-224-3040
Mailing Address: 425 E Dewey Avenue Type of entity: Public
City: Sapulpa State: Oklahoma Zip Code: 74066
Operator has operational control over: ☒ - Plans and specifications and/or ☐ - Day-to-day construction activities
Operator's Point of Contact (Name): James Vickrey Title: Fire Chief
Phone: 918-724-8525 E-mail: jvickreysfd@sapulpaok.gov

II. Site/Project Information *Provide latitude/longitude of the center of the site or start/end of the linear project.*

Site/Project Name: Sapulpa Fire Training Facility
Site/Project Address: 15 Sahoma Lake Road SIC: 1542
City: Sapulpa County: Creek Zip Code: 74066
Site/Project's Point of Contact: _____ Title: _____
Phone: _____ E-mail: _____
Site/Project's Consultant: Wallace Design Collective (Jackson Emery) Title: Civil Engineer
Phone: 918.584.5858 E-mail: jackson.emery@wallace.design

Description of activity: Construction of a new building, fire training tower, and associated drainage and pavement infrastructure
Latitude: 36.12689 N Longitude: -95.96422
Estimated construction start date: 09.01.2025 Estimated construction end date: 09.01.2026
Total area of the construction site: 2.66 acres Estimated area to be disturbed: 2.66 acres
Current total impervious area: 2.08 acres Post-construction total impervious area: 1.26 acres
Post-construction runoff coefficient of the site: 0.85 Soil and fill material description: Engineered Fill
Is this site/project part of the common plan of development or sale?
☒ - No ☐ - Yes, please provide current authorization number (if applicable): OKR10

III. Notification of Multiple Operators

Are there other operators associated with this site/project?

☐ - No ☒ - Yes: ☒ - All operators will be covered under this authorization.
☐ - All, or some, operators will be obtaining a separate authorization and will be documented in the SWP3.
☐ - New owner/operators will be obtaining a separate authorization and will be documented using Form 605-NCO Notification of Change of Ownership (NCO) which will be kept with the SWP3.

IV. Site/Project Discharge Information *Use additional sheets of paper if necessary.*Does the site/project discharge stormwater into an MS4? ☐ No ☒ Yes City of Sapulpa Name of the MS4

Name of all Receiving Waterbodies	Is the waterbody impaired? If so, what are its impairments?	Is there a TMDL for that impairment?
Rock Creek	☐ Yes ☒ No Benthic_Ma, E_coli, Fish_Bio	☐ Yes ☒ No
	☐ Yes ☐ No Cadmium	☐ Yes ☐ No

Endangered Species Eligibility

- a. ☒ My site/project is not located within any of the corridors of federal and state identified Aquatic Resources of Concern (ARC).
b. ☐ My site/project is located within a corridor of federal and state identified ARC.
c. ☐ If one of the eligibility criteria cannot be met, I may use Addendum D for equivalent sediment controls.
d. ☐ I am required to have an Endangered Species Act Section 7 consultation process.
e. ☐ I am relying on another permittee's certification of eligibility and agree to comply with the conditions of that certification.

V. Stormwater Pollution Prevention Plan (SWP3) InformationHas the SWP3 been prepared and is it available on-site for review? ☒ Yes (SWP3 must be developed prior to NOI submittal)Is the operator registered and in good standing with the Secretary of State of Oklahoma? ☒ Yes ☐ NoDoes your site/project have construction support activities? ☐ Yes (asphalt batch plant) ☐ Yes (concrete batch plant)☒ Other (e.g., equipment storage yards, material storage areas, excavated material disposal areas, borrow areas, etc.) ☐ No**Proposed Best Management Practices (BMPs) to control pollution in the stormwater discharges, check all that apply:**

☐ Construction phased	☒ Sediment basin/trap	☐ Mulching/seeding/sodding	☐ Vegetated buffer
☒ Vehicle/concrete wash-out	☐ Site inspection	☐ Diversion dikes	☐ Inlet protection
☒ Construction entrances	☒ Silt fence	☐ Waste management	☐ Stream crossings
☐ Spill prevention/cleanup	☐ Employee training	☐ Compost blanket/geotextiles	☐ Check dams
☐ Construction sequencing	☒ Riprap	☐ Gradient terraces	☐ Silt dikes

Other BMPs: Dust Suppression, Good Housekeeping, Preventative Maintenance**Post-construction Best Management Practices for construction activities, check all that apply:**

☐ Narrow street/turnaround	☐ Wet/dry pond	☐ Protected natural features	☐ Vegetated filter strips
☐ Eliminated curbs & gutters	☐ Wetland	☐ Infiltration basin/trench	☐ Porous pavement
☐ Bio-retention/rain gardens	☐ Riparian	☐ Redevelopment/retrofit	☐ Grassed swales
☐ Low impact development	☐ Green designs	☐ Conservation easements	☐ Retrofit

Other BMPs: _____

VI. Required Attachments☒ A legible site map showing your facility location and boundaries, including support activities, and all waters of the state within one mile of the site.☒ Application fee (\$100.00) and first-year permit fee (\$347.71) or ☐ Fees have already been paid**VII. Certification**

"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 have no personal knowledge that the information submitted is other than 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."

Print Name: _____ Title: _____

E-mail: _____ Phone: _____

Signature: _____ Date: _____

For DEQ use only: Assigned Authorization Number: OKR10_____



Instructions for Completing NOI Form 606-002A for Stormwater Discharges Associated with Construction Activities on Sites of One or more acres under the OPDES Construction General Permit OKR10

Who Must File an NOI Form

Under Section 402(p) of the Clean Water Act and regulation at 40 C.F.R. § 122.26, adopted and incorporated by reference in Oklahoma Administrative Code (OAC) 252:606-1-3(b)(3)(L), stormwater discharges associated with construction activities are prohibited to waters of the state unless authorized under an Oklahoma Pollutant Discharge Elimination System (OPDES) permit from the Oklahoma Department of Environmental Quality (DEQ). Operators of construction sites where one or more acres are disturbed and smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre must obtain coverage under the OPDES Construction General Permit (CGP) OKR10 by submitting a completed NOI to DEQ. If you have questions regarding permit coverage under the Stormwater Program, you may call the Stormwater Unit of Environmental Complaints and Local Services (ECLS) of DEQ at (405) 702-6100 or email to ecls-stormwaterpermitting@deq.ok.gov.

Completing the NOI Form

To complete an NOI form, type or print in all the appropriate places of the form. Check the appropriate box whether you are filing for a new application, amendment/modification, or renewal of your current permit authorization. Enter your current authorization number if you are applying for permit amendment/modification or renewal.

Section I. Operator Information

Provide the legal name, mailing address and telephone number of the company/firm, public organization, or any other entity that either individually or together meets the following two criteria: (1) have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g., in most cases this is the owner of the site); and/or (2) have the day-to-day operational control of those activities at the site necessary to ensure compliance with Stormwater Pollution Prevention Plan (SWP3) and/or other permit conditions (i.e., they are authorized to direct workers at a site to carry out activities required by the permit; in most cases this the general contractor of the project). Also enter the name, title, phone number, and email address for the operator's point of contact.

Section II. Site/Project Information

Provide the site/project's official or legal name, phone number and street address or general location information (e.g., Intersection of State Highways 61 and 34). Also provide the name, title, phone number, and email address for the site/project's point of contact.

Indicate the purpose of the project (e.g., residential subdivision, commercial building, road and/or bridge, wind farm, etc.).

Provide latitude and longitude of the construction project or site (at the center of the site). Latitude and Longitude can be obtained online at DEQ and USGS's websites or other mapping tools.

Provide the estimated starting and ending dates of the construction on site or project. The date must be provided in MM-DD-YYYY where MM is the month, DD is the date and YYYY is the year. Provide total area of construction site, and estimated area to be disturbed in acres. Provide total impervious area before construction starts (pre-construction) and total impervious area after construction completed (post-construction) in acres.

Provide post-construction runoff coefficient of the site after the construction addressed in the NOI is completed. Operator may use recommended runoff coefficients in Addendum E of the OKR10 permit. Average coefficients for composite areas may be calculated on an area weighted basis from $C = \frac{\sum C_i A_i}{\sum A_i}$, where C_i is the coefficient applicable to the area A_i .

Describe the nature of fill material and existing soil data describing soils (e.g., coarse-grained soils: gravels, sands, or fine-grained soils: silts and clays, and highly organic soils, etc.). Operators may use soil classification chart in Attachment 1 of Addendum D to determine the types of the soils on the site. Indicate whether this is the site of the common plan of development or sale. Enter the current OKR10 authorization number if it is part of a common plan of development or sale.

Complete the section on Endangered Species Eligibility by checking the appropriate box: (a) the site/project is not located within any of the corridors of the federal or state identified Aquatic Resources of Concern (ARC) and further investigation is not required; or (b) the site/project is located within a corridor of a federal or state identified ARC. Operators must provide and implement measures to protect the endangered or threatened species or their critical habitat; or (c) If one of those eligibility criteria under Part 2.5.B.3.b, d, or e cannot be met, operator may use Addendum D to evaluate alternatives of buffer requirements and select equivalent sediment controls or contact DEQ for further consultation; or (d) operator's federally approved construction activities are authorized by the appropriate federal or state agency and that authorization addresses the Endangered Species Act Section 7 consultation for the operator's stormwater discharge or stormwater-related activities. Operator selecting option d must include documentation from the United States Fish and Wildlife Service (USFWS) or a qualified biologist that demonstrates Section 7 consultation has been completed. The SWP3 must include any conditions resulting from that consultation; or (e) operator's stormwater discharges and stormwater-related activities were already addressed in another operator's certification of eligibility that included the proposed site/project area. Operator agrees to comply with any conditions attached to that certification.

Section III. Notification of Multiple Operators

Indicate whether all operators on the site will be covered under this authorization or have obtained/will obtain their own authorizations. If operators will be obtaining their own authorizations, indicate whether they will be documented in the SWP3 or, for new owner/operators, in Form 605-NCO which shall be kept with the SWP3.

Section IV. Site/Project Discharge Information

Indicate whether the site/project discharges stormwater to a Municipal Separate Storm Sewer System (MS4). If yes, enter the name of the MS4. A MS4 is defined as a conveyance or system of conveyances, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains that are owned or operated by a state, city, town, borough, parish, district, association, or other public body which is designed or used for collecting or conveying stormwater. Identify all the receiving waterbodies from the sites that discharge stormwater, including names of those waterbodies. Check appropriate box if the receiving waterbody is listed in DEQ 303(d) impaired waterbodies or drains to watershed with approved Total Maximum Daily Loads (TMDL) report. Identify the pollutant(s) for which the waterbody is impaired.

For a current list of MS4s in the State of Oklahoma, review the 2021 OKR04 Fact Sheet located at <https://www.deq.ok.gov/stormwater-permitting/okr04-municipal-stormwater>.



Instructions for Completing NOI Form 606-002A for Stormwater Discharges Associated with Construction Activity of One or More Acres under the OPDES Construction General Permit OKR10

Section V. Stormwater Pollution Prevention Plan (SWP3) Information

All sites/projects eligible for coverage under the CGP OKR10 permit must prepare a SWP3 prior to submitting the NOI to DEQ. The SWP3 is intended to document the selection, design, and installation of different control measures to meet the permit's non-numeric technology based effluent limitations, if applicable, numeric effluent limitations, and water quality-based effluent limitations contained in Part 3 of the Permit as well as to document compliance with other permit requirements. The SWP3 must be prepared by a qualified person in accordance with good engineering practices and to industry standards. The SWP3 is considered a "living document" and must be maintained/updated regularly to accurately reflect current site conditions. Check the appropriate box if the SWP3 has been prepared and is available on site. Check the appropriate box if the operator has registered for construction activities with the Secretary of State of Oklahoma.

List all the proposed Best Management Practices (BMPs) for construction activities. Operator must describe the proposed measures, including BMPs to control pollutants in stormwater discharges during construction. Specify any BMPs to be used if additional erosion and sediment controls are required by local government or due to specific site conditions.

List all the post-construction proposed Best Management Practices (BMPs) for construction activities. Operator must describe the proposed measures to be used to control pollutants in stormwater discharges that will occur after construction operations have been completed, including any BMPs to be used if additional erosion and sediment controls are required by local government or due to specific site conditions.

Section VI. Required Attachments

Submit the following with the NOI:

- A legible site map showing your facility location and boundaries, including support activities, and all waters of the state within one mile of the site, and
- The application fee and permit fee or indicate if fees have already been paid
 - Renewal NOI - \$100 application fee,
 - New NOI - \$447.71 (\$100 application fee and \$347.71 annual permit fee).

Section VII. Certification

Federal regulations require all permit applications and report shall be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or (ii) the manager of one or more

manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental law and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents had been assigned or delegated to the manager in accordance with corporate procedures;

For a limited liability company (LLC): by a member, managing or otherwise;

For a partnership: by a general partner;

For a sole proprietorship: by the proprietor (owner); or

For a municipality, state, federal, or other public facility: by either a principal executive or ranking elected official.

Modifying an Existing NOI

After issuance of an authorization, an NOI modification may be submitted by a permittee if circumstances change (e.g., the area to be disturbed has increased from 20 acres to 40 acres). However, the modification of an NOI cannot be used if the area to be disturbed has decreased (e.g., the area to be disturbed has been changed from 40 acres to 20 acres). The amended NOI shall include the operator's assigned authorization number and request a change.

The original authorization number will be retained. DEQ will provide an acknowledgement by either mail or email that the amended NOI has been received and processed. Permittees must update their SWP3 to reflect the modification.

Submitting Your NOI Form and Required Attachments

The completed NOI form and all required attachments must be submitted to the following address, fax, or email:

Stormwater Unit of ECLS
Oklahoma DEQ
P.O. Box 1677, Oklahoma City, OK 73101-1677

Fax to (405)702-6226

Email to ecls-stormwaterpermitting@deq.ok.gov

Once DEQ's online NOI submission tool is made available, NOIs may also be completed and submitted electronically using that tool.

Attachment E
(Inspection Report)

Site Inspection Report

Inspection Date: _____

General Information (OKR10 Part 4.3.13.E)	
Name of Project:	DEQ Permit No.:
Inspector Name:	Inspector Title:
Inspector's Contact Information:	
Inspection Frequency: Standard Frequency: ☐ Every 7 days and within 24 hours of a 0.50" rain, or discharge from snowmelt ☐ Every 14 days and within 24 hours of a 0.50" rain, or discharge from snowmelt Reduced Frequency: ☐ Once per month (for stabilized areas)	
Weather at the time of this inspection: _____	
Was this inspection after a 0.50" storm event? ☐ Yes ☐ No, Total rainfall that triggered the inspection (in inches): _____	
Are there any discharges at the time of inspection? ☐ Yes ☐ No	

List all areas where soil stabilization is required to begin because construction work in that area has permanently or temporarily stopped and all areas where stabilization has been implemented:

Stabilization of Exposed Soil (OKR10 Part 4.3.13.D)			
Stabilization Area	Stabilization Method	Have You Initiated Stabilization?	Notes (describe your observation)
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	
		☐ Yes ☐ No If yes, provide date:	

(Notes: For each area where stabilization has been initiated, describe the progress that has been made, and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated, and the date it is to be completed.)

Provide a list/description of all structural and non-structural BMPs that your SWP3 indicates will be installed and implemented at your site. You must separately identify the **location** of each control. During Inspection, identify whether they are **installed and operating properly**, or any **corrective action** is necessary. Provide the **date** on which the condition that triggered the need for maintenance or corrective action was first identified. In the notes section you must describe the **specifics about the problem** you observed.

For large projects, the installation of erosion control measures may be phased along with the construction. Controls should be installed prior to disturbance of areas draining to the control.

Condition and Effectiveness of BMP Controls & Pollution Prevention (OKR10 Part 3.3, 4 & 5)					
No.	BMP Description & Location	Is BMP Installed & Operating Properly?	Corrective Action (CA) Required?	Date on Which Maintenance or CA First Identified?	Notes (describe if you observed any problem)
1.	Silt Fence/Fiber Rolls/Berm/Wattles Location:	☐ Yes ☐ No	☐ Yes ☐ No		
2.	Silt Dikes/Check Dams/Rock Dams Location:	☐ Yes ☐ No	☐ Yes ☐ No		
3.	Stabilized Construction Entrance/Exit Location:	☐ Yes ☐ No	☐ Yes ☐ No		
4.	Inlet Protection on all storm drain Location:	☐ Yes ☐ No	☐ Yes ☐ No		
5.	Sand Bag Barrier/Gravel Bag Barrier Location:	☐ Yes ☐ No	☐ Yes ☐ No		
6.	Vegetated Swales Location:	☐ Yes ☐ No	☐ Yes ☐ No		
7.	Compost Blankets/Geotextiles/Mats Location:	☐ Yes ☐ No	☐ Yes ☐ No		
8.	Vegetative Buffers Location:	☐ Yes ☐ No	☐ Yes ☐ No		
9.	Sediment Trap/ Sediment Basin Location:	☐ Yes ☐ No	☐ Yes ☐ No		
10.	Concrete Washout Pit Location:	☐ Yes ☐ No	☐ Yes ☐ No		
11.	Dust Control/Prevention	☐ Yes ☐ No	☐ Yes ☐ No		
12.		☐ Yes ☐ No	☐ Yes ☐ No		
13.		☐ Yes ☐ No	☐ Yes ☐ No		
14.		☐ Yes ☐ No	☐ Yes ☐ No		
15.		☐ Yes ☐ No	☐ Yes ☐ No		
16.		☐ Yes ☐ No	☐ Yes ☐ No		

(Note: The permit differentiates between conditions requiring repairs and maintenance, and those requiring corrective action. The permit requires maintenance in order to keep controls in effective operating condition and requires repairs if controls are not operating as intended. Corrective actions are triggered only for specific, more serious conditions – whether a required stormwater control was never installed, or was installed incorrectly, or not installed in accordance with the requirements of OKR10)

Pollution Prevention and Waste Management (OKR10 Part 3.3.3)		
Items of Inspection	Response & Reason	Action(s) Needed
Is the site free of floatables, litter, and construction debris?	☐ Yes ☐ No If no, reason:	
Are material storage and handling areas, including fueling areas, free of spills and leaks?	☐ Yes ☐ No If no, reason:	
Are spill kits available where spills and leaks are likely to occur?	☐ Yes ☐ No If no, reason:	
Are dumpsters and waste receptacles covered when not in use?	☐ Yes ☐ No If no, reason:	
Has preventative maintenance been conducted on equipment and machinery?	☐ Yes ☐ No If no, reason:	
Are material stockpiles sufficiently contained?	☐ Yes ☐ No If no, reason:	
Has there been any sediment tracked-out from the site onto the surface of paved street, sidewalks or other paved areas outside of the site?	☐ Yes ☐ No If no, reason:	
Is the project free from visible erosion and/or sedimentation?	☐ Yes ☐ No If no, reason:	

Complete the following section if a discharge is occurring at the time of inspection:

Description of Discharges (OKR10 Part 4.3.13.D.2.f)	
Was a stormwater discharge or other discharge occurring from any part of your site at the time of the inspection? ☐ Yes ☐ No, If yes, provide the following information for each point of discharge:	
Specify Discharge Location	Observations (Visual Quality of the Discharge)
1.	Describe the discharge (color, odor, floating, settled/suspended solids, foam, & oil sheen): Are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No, If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:
2.	Describe the discharge (color, odor, floating, settled/suspended solids, foam, & oil sheen): Are there any visible signs of erosion and/or sediment accumulation that can be attributed to your discharge? ☐ Yes ☐ No, If yes, describe what you see, specify the location(s) where these conditions were found, and indicate whether modification, maintenance, or corrective action is needed to resolve the issue:

Contractor or Subcontractor Certification and Signature:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____

Date: _____

Print Name: _____

Affiliation: _____

Attachment F
(Corrective Action Report)

Corrective Action Report

Today's Date: _____

(You are only required to fill out this form if any of the corrective action triggering conditions occurs on your site. Routine maintenance and repairs are generally not considered to be a corrective action triggering condition.)

Section A: Initial Report (Part 4.3.14.B.1 of OKR10)	
(Complete this section <u>within 24 hours</u> of discovering the condition that triggered corrective action)	
Name of Project:	DEQ's Permit No. OKR10
Date Problem First Discovered:	Time Problem First Discovered:
Name & Contact Information of the Individual:	
What site conditions triggered the requirement to conduct corrective action (<i>check the box that applies</i>): ☐ A required stormwater control was never installed or was installed incorrectly, or not in accordance with the corresponding OKR10 permit requirement ☐ A stormwater control is not effective enough for the discharge to meet applicable water quality standards ☐ A prohibited discharge (OKR10 Parts 3.1 and 3.3.3.A) is occurring or has occurred. ☐ DEQ requires corrective action as a result of permit violations found during an DEQ inspection	
Provide a description of the problem:	
Deadline for completing corrective action:	<i>not more than 7 calendar days after the date you discovered the problem</i>

Section B: Corrective Action Progress (Part 4.3.14.B.2 of OKR10)			
(Complete this section <u>no later than 7 calendar days</u> after discovering the condition that triggered corrective action)			
Section B.1: Why the Problem Occurred			
Cause(s) of Problem	How It Was Determined & Date of Determining the Cause		
1.	1.		
2.	2.		
Section B.2: Stormwater Control Modifications to be Implemented to Correct the Problem			
Stormwater Control Modification(s) Needed to Correct Problem	Date of Completion	SWP3 Update Necessary?	SWP3 Modifications Notes
1.		☐ Yes ☐ No, If yes, provide date SWP3 modified:	
2.		☐ Yes ☐ No, If yes, provide date SWP3 modified:	

Section C: Certification and Signature by Permittee

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.

Name: _____ Title: _____

Signature: _____ Date: _____

Attachment G
(Employee Training Report)

SWP3 Employee Training Report

Project Name: _____ DEQ Authorization No. OKR10 _____

Instructor's Name: _____ Instructor's Title: _____

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

☐ Overview of SWP3	☐ Temporary & Permanent Stabilization
☐ Erosion & Sediment Controls Installation	☐ Good Housekeeping
☐ Erosion & Sediment Controls Maintenance	☐ Inspections and Corrective Actions
☐ Spill Prevention & Response	☐ Emergency Procedures

Specific Training Objective: _____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Signature of the Attendees	Date
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Attachment H
(SWP3 Modifications Log)

SWP3 Modification Log

No.	Description of the Modification	Date of Modification	Modification Prepared by [Name(s) and Title]	Signature by Designated Corporate Official
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Attachment I
(Site Stabilization Log)

Grading and Stabilization Activities Log

Date Grading Initiated	Description of Grading Activity	Description of Stabilization Measure and Location	Date Grading Activity Ceased (Temporary or Permanent)	Date When Stabilization Initiated

Attachment J
(Subcontractor Certification Form)

Subcontractor Certifications/Agreement

(Name of Operator)

(Project Name)

Contractors, builders, regular suppliers or others (contractors) involved in construction activity who are not the operator, developer, or general contractor, and have not been issued the Storm Water Construction General Permit (Permit) authorization, execute this Contractor Certification which places the responsibility of complying with an abiding by the intent and purpose of the permit with the contractor for any and all work performed under the authority and direction of the contractor. Furthermore, the contractor assumes responsibility to avoid or eliminate any actual or potential adverse effects upon the environment according to the Storm Water Pollution Prevention Plan (SWP3), during all phases of building, construction, or delivery activity on any and all construction sites under the control and responsibility of the contractor as described in the SWP3.

1. Contractor company name: _____
2. Contractor address: _____
3. Project locations: _____

(For addition addresses attach list to this form)

4. Contractor must be thoroughly familiar with the original Notice of Intent (NOI) filed by _____ with the Oklahoma Department of Environmental Quality.

Contractor must also be thoroughly familiar with, and adhere to, the SWP3 and the Best Management Practices (BMP) on file at the following location:

The Contractor is certifying below that they assume all physical responsibility for any and all construction activities performed by the Contractor or under the direction and control of the Contractor, to avoid or eliminate any actual or potential adverse effects upon the environment pertaining to the properties listed in Item 3 above.

Certification

I certify that I understand the terms and conditions of the Oklahoma Pollutant Discharge Elimination System Act (OPDES) General Permit that authorizes storm water discharges associated with construction activity from the construction site identified as part of this certification. I have read and understand the Operators Notice of Intent and Part 1.2 for overage under the General Permit for stormwater discharges from construction activities, including those requirements published in the modified OPDES General Permit OKR10 of September 18, 2017 and the SWP3 and BMP described pertaining to the project locations in Item 3 above. I agree that as a contractor, builder, regular supplier, or a support service company, I am responsible for installing and/or maintaining the appropriate pollution prevention measures that I am responsible for according to the agreement I have with the permittee.

I understand that continued coverage under this permit is contingent upon maintaining eligibility as provided for in Part 1.2 of the permit.

Signature: _____ Title: _____

Print Name: _____ Date: _____

SECTION 312000
EARTH MOVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for areas outside the building perimeter.
 - 2. Subbase and base course for paving.
 - 3. Subsurface drainage backfill for walls and trenches.
 - 4. Excavating and backfilling for utility trenches.
- B. Related Sections include the following:
 - 1. Division 01 Section "Unit Prices" for unit-price rock excavation and authorized additional excavation provisions.
 - 2. Division 01 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
 - 3. Division 03 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
 - 4. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 5. Division 32 Section "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.

1.03 UNIT PRICES

- A. Unit prices for earthwork are included in Division 01 Section "Unit Prices."

1.04 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subgrade and hot-mix asphalt or concrete paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Initial Backfill: Fill free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit and as defined by utility trench detail on the plans.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, or ripping, or blasting, when permitted:
1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface. Refer to structural earthwork specifications for earth moving for structures.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base course, drainage fill, or topsoil materials.
- L. Utilities: Underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.05 SUBMITTALS

- A. Product Data: For the following:
1. Each type of plastic warning tape.
 2. Controlled low-strength material, including design mixture.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
1. Classification according to ASTM D 2487 of each soil material proposed for fill and backfill.
 2. Laboratory compaction curve according to ASTM D 698 for each soil material proposed for fill and backfill.
- C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.06 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

- B. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient on site materials do not match the Geotech report for engineered fill.
- B. Base Course: Naturally graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; conforming to ODOT Type "A" aggregate base.
- C. Engineered Fill (Structural Fill):
 - 1. Approved Low Volume Change Cohesive Soils:
 - a. Plasticity Index (PI) 8 to 18
 - b. Containing at least 20 percent fines (material passing the No.200, based on dry weight)
 - c. Shall not contain rock fragments greater than 1.5 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
 - d. Prior to any filling operations, samples will need to be tested by and approved by Geotech Engineer.
- D. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve. Or as defined by the utility trench details.
- E. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- F. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- G. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- H. Fly Ash: ASTM C618, Class C

2.02 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
 - 4. Tear Strength: 56 lbf; ASTM D 4533.
 - 5. Puncture Strength: 56 lbf; ASTM D 4833.
 - 6. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 90 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.03 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Low-density, self-compacting, flowable concrete material as follows:
 1. Portland Cement: ASTM C 150, Type I, II or III.
 2. Fly Ash: ASTM C 618, Class C or F.
 3. Normal-Weight Aggregate: ASTM C 33, 3/8-inch nominal maximum aggregate size.
 4. Foaming Agent: ASTM C 869.
 5. Water: ASTM C 94/C 94M.
 6. Air-Entraining Admixture: ASTM C 260.
- B. Produce conventional-weight, controlled low-strength material with 80-psi compressive strength when tested according to ASTM C 495.

2.04 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.

- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.
- E. After stripping and completing all cuts, proof-roll the exposed subgrade with a fully-loaded, pneumatic-tired, 10-wheeled tandem-axle dump truck weighing not less than 25 tons. Overexcavate and replace soft, unstable or unsuitable materials with approved engineered fill if they cannot be stabilized in place.
- F. After completing proof-rolling and before placing any fill, scarify the exposed subgrade to a minimum depth of 8 inches, moisture condition to a level at least 1 percentage point above the material's optimum moisture content, and compact to at least 95 percent of its maximum standard Proctor dry density.

3.02 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.03 EXPLOSIVES

- A. Explosives: No explosives are allowed.

3.04 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsuitable soil materials and rock, replace with approved engineered fill materials.
 - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches.

3.05 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (m). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work. If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation shall be extended to deeper suitable soils or lean concrete backfill placed in the excavations.
 2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Construct a 24-inch layer of low volume change engineered fill below floor slab. The thickness of the low volume change fill zone does not include the thickness of any granular leveling material below the floor slab. This layer of fill shall extend at least 5 feet beyond the building perimeter.

3.06 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.07 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

3.08 SUBGRADE INSPECTION

- A. Notify Engineer when excavations have reached required subgrade.
- B. After stripping and completing any cuts, the subgrade shall be proofrolled. Proof-roll subgrade under the observation of the geotechnical engineer, with a loaded, tandem-axle dump truck weighing at least 25 tons, to locate any zones that are soft or unstable. The Proofrolling should involve overlapping passes in mutually perpendicular directions. Where rutting or pumping is observed during proof-rolling, the unstable soils shall be over-excavated and replaced with engineered fill.
- C. After completing the proof-rolling and required over-excavations and before placing any fill, the exposed subgrade shall be scarified to a depth of at least eight (8) inches and moisture conditioned to a level at least 1 percentage point above the material's optimum moisture content. The scarified zone shall be compacted to at least 95 percent of the material's standard Proctor maximum dry density, per ASTM D-698.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.09 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated on-site suitable soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, sub-drainage, damp-proofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Place and compact initial backfill of , free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- D. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit.
- E. Backfill voids while installing and removing shoring and bracing.
- F. Place and compact final backfill to final subgrade elevation.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
- H. Construct clay "trench plug" that extends at least 5 feet out from the face of the building exterior. The plug material shall consist of clay compacted at a water content at or above the soils optimum water content. The clay fill shall be placed to completely surround the utility line and be compacted to at least 95% standard proctor density.

3.13 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use on-site soils.
 2. Under walks and pavements, use engineered fill.
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.
- D. Prior to placing fill, the exposed subgrade shall be scarified to a depth of at least 8 inches, moisture conditioned to a level at least 1 percentage point above the material's optimum moisture content and recompact to at least 95 percent of the material's standard proctor maximum dry density, determined in accordance with ASTM D-698, the standard proctor procedure.

3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to a level at least 1 percentage point above the material's optimum moisture content, determined in accordance with ASTM D-698, (standard Proctor procedure).

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 9 inches in depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 :
1. Under pavements and walkways, scarify and recompact top 8 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 2. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 3. For utility trenches in unpaved areas, compact each layer of initial and final backfill soil material at 85 percent. In paved areas, compact utility trench backfill at 95 percent.

3.16 SUBGRADE STABILIZATION

- A. Pavement Subgrade Stabilization:
1. The existing soils (ML, CL-ML or SM) in pavement subgrade areas shall be stabilized with Class "C" fly ash.
 - a. 15 to 17 percent Class "C" fly ash, based on the material's compacted dry unit weight, shall be used to treat the subgrade soils.
 - b. Fly Ash stabilization shall be performed according to the ODOT Specifications.
 - c. Fly Ash stabilized subgrade shall be compacted within 2 hours after the addition of water to the mix.
 - d. Actual amount shall be determined in the field to reduce the plasticity of the subgrade soils to 18 or less.

3.17 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks and Pavements: minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.18 SUBSURFACE DRAINAGE

- A. Subdrainage Pipe: Specified in Division 33 Section "Subdrainage."

3.19 BASE COURSES

- A. Place base course on subgrade free of mud, frost, snow, or ice.
- B. On prepared subgrade, place base course under pavements and walks as follows:
 - 1. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Shape base course to required crown elevations and cross-slope grades.
 - 3. Place base course in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 4. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D-698.

3.20 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.

3.21 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Contact Engineer for subgrade proofrolling.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Perform Atterberg limits tests on fly ash and cement kiln dust treated fill/backfill materials placed in the building area for the low volume change fill layer at frequency of at least 1 test per 5,000 SF of area with at least 2 test per lift. Intent of Atterberg limits testing is to determine if the soil has been effectively treated.

- F. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
 2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
 3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.
- G. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.22 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion prior to placement of subsequent base course, paving, or foundations above. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove waste material, including unsuitable soil, trash, and debris, and legally dispose of it off Owner's property. Retain paragraph above or paragraph and subparagraph below.
- B. Transport surplus engineered fill to designated storage areas on Owner's property.

END OF SECTION

SECTION 313116

TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Treatment of soil against subterranean termites in area of new building slab and around entire building perimeter.

1.02 QUALITY ASSURANCE

- A. Soil treatment shall be performed by a reliable, licensed commercial termite control firm with a minimum of 5 years experience.
- B. Soil treatment shall be applied in accordance with all applicable codes.

1.03 WARRANTEE

- A. Contractor shall submit the following warrantee upon completion of soil treatment:
 - 1. Warrant that the soil treatment shall be effective against subterranean termite infestation for a minimum of 5 years. Any re-infestation within this time period shall require re-treatment at no cost to the Owner.
 - 2. Warrant that the chemical used, and amount used, complies with all federal, state and local requirements.

PART 2 PRODUCTS

2.01 TREATMENT

- A. Termite control products shall bare an EPA-registered label.
- B. Termiticide Treatment
 - 1. Provide an EPA-registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's label.
 - 2. Active Ingredient: 40% Disodium Octaborate Tetrahydrate (DOT)
 - 3. Penetrant: Glycol mixture

PART 3 EXECUTION

3.01 APPLICATION

- A. Treatment shall not be made immediately after heavy rains or when soil is excessively wet.
- B. Treatment shall be made in such a manner to assure against contamination of adjacent areas.
- C. Treatment shall be applied as follows:
 - 1. Mix termiticide treatment solution to a uniform consistency. Provide quantity required for application at label volume and rate for the maximum specified concentration of termiticide, according to the manufacturer's EPA-registered label. Apply to create a continuous horizontal barrier. Distribute treatment evenly.

END OF SECTION

SECTION 320505

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes: Selective demolition as follows:
 - 1. Remove architectural, structural, plumbing, fire protection, mechanical and electrical materials and equipment as indicated or required for new construction.
 - 2. Sawcut and remove concrete for drains, plumbing piping, etc. and where necessary to prepare for subsequent work.
 - 3. Cut and patch roof for new roof curbs, and mechanical and electrical items.
 - 4. Remove materials from site, and dispose of legally.
 - 5. Disconnect, remove, cap and identify utilities for later reconnection.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate areas for demolition, removal sequence, and location of salvageable items; location and construction of temporary Work.
- B. Project Record Documents: Accurately record locations of capped utilities, subsurface obstructions, and other items that may require future locating.
- C. Shoring Design: Demolition Contractor shall be responsible for retaining the services of a professional engineer, licensed in the State of Oklahoma, to design temporary shoring of existing structure when shoring is necessary. Shoring drawings shall be signed and sealed by the professional engineer responsible for the shoring design.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of applicable codes, rules and regulations referenced in Division 01 Section "General Requirements"
 - 2. Obtain required permits from applicable authorities.
 - 3. Do not close or obstruct roadways or sidewalks without permits.
 - 4. Utility Shutdowns: Comply with requirements of Division 01
 - 5. Maintain building and room egress and access at all times. Do not reduce required egress width to exits.
 - 6. Minimize interference with corridors, exits, sidewalks, roadways and public thoroughfares.
 - 7. Comply with applicable procedures if hazardous or contaminated materials are discovered or suspected.

1.4 MATERIALS OWNERSHIP

- A. Unless noted specifically to be returned to Owner or to be reused or relocated, all demolition material shall be removed from the site and disposed of properly at a landfill suitable for the debris.
- B. Existing materials in area of Project identified to be relocated or returned to Owner, shall be relocated by contractor to Owner's designated location.

1.5 PROJECT CONDITIONS

- A. Protect adjacent work to remain, and items to be turned over to Owner, from damage.
- B. Existing Conditions:
 - 1. If asbestos or other hazardous materials are found or suspected, immediately stop work in the suspected area and advise the Contractor. Do not recommence work in the area until advised by the Contractor that the area has been cleared for work.
- C. Owner will occupy adjacent areas during the course of the Work. Work under this Section shall not affect Owner's operation of adjacent areas.

1.6 SEQUENCING

- A. Submit schedule indicating proposed sequence of operations for selective demolition work to Contractor for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services, and details for dust and noise control.
 - 1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's operations.
 - 2. Coordinate the scheduling of work of this Section with the work of other sections.
- B. At re-roofing and roof tie-in locations, do not remove more roof at a time than can be reroofed in one day.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect and verify the existing conditions and become familiar with the extent of the Work.
- B. Examine the site to determine proper access within the limitations of the site. Conduct operations so as not to interfere with adjacent roads, driveways, walks, buildings, corridors, means of access and egress, and work areas.

3.2 PREPARATION

- A. Interfaces With Other Work: Coordinate extent of selective demolition work with limits of new work and existing work to remain, and with demolition and modification requirements shown on the Drawings.
- B. Protection:
 - 1. Protect existing materials, appurtenances and equipment which are not to be demolished. Existing materials, appurtenances and equipment, building exterior and interior, and landscaping altered or damaged during demolition work shall be repaired or replaced by the contractor to match existing undisturbed conditions at no additional cost to Owner.
 - 2. Prevent movement of structure; provide bracing and shoring as required.
 - 3. Provide proper and permanent support to adjacent structure for all piping, conduits and cables to remain.
 - 4. Contractor shall provide and maintain temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage, or wind damage occurs to structure or interior areas of existing building.
 - 5. Contractor shall provide and maintain temporary barriers and security devices. Barriers shall be one-hour fire-rated at exit corridors.
 - 6. Use periodic light water mist, temporary enclosures, and other suitable methods to limit dust and dirt. Comply with applicable environmental protection regulations. Use water only if approved by Contractor.
 - 7. Maintain path of travel for debris removal dust free and clean at all times.
 - 8. Maintain ventilation system dust free at all times.
 - 9. Cover and protect windows and walls that are adjacent to areas to be demolished.
 - 10. Protect smoke alarms and fire sprinklers from dust intrusion.
 - 11. Maintain parking areas, driveways, exterior walkways, exit paths, and landscaping in a clean, undisturbed condition. Any debris caused by selective demolition work shall be removed each day.
- C. Field verify the exact location of existing concealed utilities. Use caution if working in or about concealed or exposed utilities.
- D. Disconnect, remove, and cap designated utility lines within demolition areas. Mark locations of disconnected utilities. Identify utilities and indicate capping locations on Project Record Documents.

3.3 EXECUTION

- A. Minimize interference with adjacent occupied areas, materials and equipment, and as required to allow Owner's continued use of the facilities.
- B. Remove items in an orderly and careful manner.
 - 1. Remove only as much material as is required for new construction work to be conveniently performed.
 - 2. Cut surfaces so as to minimize the amount of new surfaces required to match existing. Make cuts plumb, true, level and straight, or as otherwise required to provide proper surfaces to receive new work and repairs.
 - 3. Cut asphalt and concrete by power saw in neat, sharp straight lines. Repair broken edges or as directed by Contractor.
- C. Remove miscellaneous abandoned appurtenances that will be exposed to view, unless indicated otherwise.

- D. Investigate and measure the nature and extent of unanticipated items that conflict with intended function or design. Submit written report with accurate detailed information to Contractor. While awaiting instructions, rearrange selective demolition schedule as necessary to continue overall job progress without delay.
- E. Stop work and notify Contractor immediately if structure or other items to remain appear to be endangered. Do not resume work until directed by Contractor.
- F. Do not disrupt service to existing fire sprinkler lines. If disruption becomes necessary, coordinate with Owner and Contractor.
- G. Cover roof penetrations with plywood and visqueen to provide a weathertight enclosure until roof equipment is completely installed and roofing work in the area can be completed the same day.
- H. Remove, store and protect materials to be re-installed or retained so as to prevent damage.
- I. Remove and promptly dispose of vermin infested materials.
- J. During torching, welding or any other construction activity that generates sparks or intense heat, the Contractor shall provide adequate fire protection to the existing structure and contents. As a minimum, Contractor shall remove combustibles from areas or torching or welding; provide fireproof blankets and shields to contain sparks where combustibles cannot be removed; provide a fire safety observer with a fire extinguisher during torching or welding operations.

3.4 DISPOSAL AND CLEANUP

- A. Material removed under this Contract which is not to be salvaged or reused in the Project shall become the property of the Contractor and shall be promptly removed from the site. Do not store or permit debris to accumulate at the site.
- B. Upon completion, clean the entire area of demolition residue satisfactory for the continuation of the Work. Remove temporary work.

END OF SECTION

SECTION 321216

ASPHALT PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Hot-mix asphalt paving.
 - 2. Pavement-marking paint.
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for aggregate sub base and base courses and for aggregate pavement shoulders.
 - 2. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants and fillers at paving terminations.

1.03 DEFINITIONS

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.
- B. ODOT: Oklahoma Department of Transportation.

1.04 SYSTEM DESCRIPTION

- A. Provide hot-mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications of ODOT.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.05 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Qualification Data: For manufacturer.
- D. Material Test Reports: For each paving material.

- E. Material Certificates: For each paving material, signed by manufacturers.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer.
 - 1. Manufacturer shall be a paving-mix manufacturer registered with and approved by ODOT.
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548.
- C. Regulatory Requirements: Comply with ODOT standard specifications for highway construction.
- D. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - 1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - 2. Review condition of subgrade and preparatory work.
 - 3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
 - 1. Tack Coats: Minimum surface temperature of 60 deg F.
 - 2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, 50 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 PRODUCTS

2.01 AGGREGATES

- A. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.
- B. Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof.
 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- C. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

2.02 ASPHALT MATERIALS

- A. Asphalt Binder, Asphalt Cement and Tack Coat in accordance with ODOT standard specifications for highway construction.
- B. Water: Potable.

2.03 AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.
- B. Sand: ASTM D 1073, Grade Nos. 2 or 3.
- C. Joint Sealant: ASTM D 3405, hot-applied, single-component, polymer-modified bituminous sealant.
- D. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952E, Type II, with drying time of less than 45 minutes.
 1. Color: As indicated.

2.04 MIXES

- A. Surface Slurry: Type 1 slurry seal as defined by ISSA slurry seal guidelines – ISSA A105.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
 - 1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.02 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt base course in lifts of 3" or less.
 - 2. Place hot-mix asphalt surface course in single lift.
 - 3. Spread mix at minimum temperature of 250 deg F, or higher temperature as required by the grade of asphalt cement used.
 - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
 - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.03 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 - 4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
 - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

3.04 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F, or higher temperature as required by the grade of asphalt cement used.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.05 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus, except as noted in 3.5 C ADA related construction
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 1/8 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
- C. ADA related construction:
 - 1. Parking spaces and adjacent access aisles shall not exceed 2 percent in any direction regardless of tolerances noted above

3.06 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 30 mils. To be applied in two 15 mil coats.
 - 1. Broadcast glass spheres uniformly into wet pavement markings at a rate of 6 lb/gal.

3.07 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to AASHTO T 168.
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.08 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow excavated materials to accumulate on-site.

END OF SECTION

SECTION 321313
CONCRETE PAVING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Driveways and roadways.
 - 2. Curbs and gutters.
 - 3. Walkways.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.
 - 3. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.

1.03 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.04 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Qualification Data: For manufacturer.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
1. Cementitious materials.
 2. Steel reinforcement and reinforcement accessories.
 3. Fiber reinforcement.
 4. Admixtures.
 5. Curing compounds.
 6. Applied finish materials.
 7. Bonding agent or epoxy adhesive.
 8. Joint fillers.
- F. Minutes of preinstallation conference.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.06 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 PRODUCTS

2.01 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.02 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- C. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.
- D. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- E. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
- F. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.
- G. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
- H. Plain Steel Wire: ASTM A 82.
- I. Deformed-Steel Wire: ASTM A 496.
- J. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, deformed.
- K. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- L. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain steel bars.
- M. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- N. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
- O. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.

- P. Zinc Repair Material: ASTM A 780.

2.03 CONCRETE MATERIALS

- A. Cementitious Material: Use one of cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement
- B. Normal-Weight Aggregates: ASTM C 33, Class coarse aggregate, uniformly graded. Conform to ODOT specifications for highway construction. Provide aggregates from a single source.
- C. Water: ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures as allowed by ODOT specifications for highway construction.

2.04 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Reducer: Monomolecular film
 - 1. Representative Products:
 - a. Confilm, Masterbuilders, Inc.
 - b. E-con evaporation control, L& MConstruction Chemicals, Inc.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
 - 1. Products: Conform to ODOT.
- F. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.
 - 1. Products: Conform to ODOT.

2.05 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
 - 1. Color: As indicated by manufacturer's designation Match Architect's sample As selected by Architect from manufacturer's full range.

- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:
 - 1. Types I and II, non-load bearing IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.
 - 1. Products: Conform to ODOT.

2.06 PAVEMENT MARKINGS

- A. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952E, Type II, with drying time of less than 45 minutes.
 - 1. Color: As indicated.

2.07 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.25-0.44.
 - 3. Slump Limit: 2 inches plus or minus 1 inch.
 - a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 9 inches after adding admixture at plant - or site-verified, 2 to 3-inch slump.
 - 4. Air Content: 6.5 percent plus or minus 1.5 percent for 3/4-inch (19-mm) nominal maximum aggregate size
- C. Calcium Chloride shall not be permitted in concrete mixtures.
- D. Chemical Admixtures: Conform to ODOT specifications for highway construction.

1. Use water-reducing admixture high-range, water-reducing admixture high-range, water-reducing and retarding admixture plasticizing and retarding admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- A. Cementitious Materials: Conform to the ODOT specifications for highway construction Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.
1. Fly Ash or Pozzolan: 15 percent.
 2. Ground Granulated Blast-Furnace Slag: 25 percent.
 3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 40 percent, with fly ash or pozzolan not exceeding 15 percent.

2.08 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete mixes larger than 1 cu. yd, increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 50 tons.
 3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/4 inch require correction according to requirements in Division 31 Section "Earth Moving."
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.02 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.
- B. Precautions to protect fresh concrete from developing plastic shrinkage cracks must be taken in advance of concrete placement when evaporation rate due to any combination of temperature, humidity, and wind velocity is expected to approach 0.2 lb./sq. ft./hr. as determined by Figure 2.1.5 of ACI 305. Acceptable precautions to reduce the rate of evaporation include use of wind breaks, monomolecular film evaporation retarders, fog spray, covering with polyethylene sheeting, or wet cover.

3.03 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.04 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- F. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.05

JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.
 - 3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 5. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when

cutting action will not tear, abrade (within 12 hours of concrete pour), or otherwise damage surface and before developing random contraction cracks.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated and at construction joints. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an 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 dislocating reinforcement, dowels, and joint devices.
- H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
- I. Screed pavement surfaces with a straightedge and strike off.
- J. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

- K. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- L. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- M. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- N. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F , uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- O. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
 - 4. Take precautions to prevent development of plastic shrinkage cracks.
- P. Wind:
 - 1. Take precautions to prevent development of plastic shrinkage cracks.

3.07 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.

- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 - 2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
 - 3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.08 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.09 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 - 1. Elevation: 1/4 inch .
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
 - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
 - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.10 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete pavement to cure for 21 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

- C. Protect concrete from damage. 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.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 321373

CONCRETE PAVING JOINT SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Expansion and contraction joints within cement concrete pavement.
 - 2. Joints between cement concrete and asphalt pavement.
- B. Related Sections include the following:
 - 1. Division 07 Section "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.
 - 2. Division 32 Section "Asphalt Paving" for constructing joints between concrete and asphalt pavement.
 - 3. Division 32 Section "Concrete Paving" for constructing joints in concrete pavement.

1.03 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- C. Qualification Data: For Installer.
- D. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Submit not fewer than four pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a 36-month period preceding the commencement of the Work.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 - 2. When joint substrates are wet or covered with frost.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.02 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

2.03 COLD-APPLIED JOINT SEALANTS

- A. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.
 - 1. Products:
 - a. Crafcro Inc.; Road Saver Silicone SL.
 - b. Dow Corning Corporation; 890-SL.

2.04 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.
- D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.05 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of backer materials.
 - 2. Do not stretch, twist, puncture, or tear backer materials.
 - 3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.
- G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.04 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION

SECTION 323100
ORNAMENTAL FENCES AND GATES

PART 1 – GENERAL

1.01 WORK INCLUDED

The contractor shall provide all labor, materials and appurtenances necessary for installation of the welded ornamental steel fence system defined herein.

1.02 SYSTEM DESCRIPTION

The manufacturer shall supply a total fence system of Montage II® **Welded and Rackable** (ATF – All Terrain Flexibility) Ornamental Steel, Majestic design. The system shall include all components (i.e., panels, posts, gates and hardware) required.

1.03 QUALITY ASSURANCE

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.04 REFERENCES

- ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
- ASTM D523 - Test Method for Specular Gloss.
- ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.
- ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
- ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
- ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.05 SUBMITTAL

The manufacturer's literature shall be submitted prior to installation.

1.06 PRODUCT HANDLING AND STORAGE

Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

1.07 PRODUCT WARRANTY

- A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.
- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufacturer's warranty shall be guaranteed for five (5) years from date of original purchase.

PART 2 – MATERIALS

2.01 MANUFACTURER

The fence system shall conform to Montage II® **Welded and Rackable** (ATF – All Terrain Flexibility) Ornamental Steel, Majestic design, flush picket bottom rail treatment, 3-Rail style manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.

2.02 MATERIAL

- A. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft² (276 g/m²), Coating Designation G-90.
- B. Material for pickets shall be 1" square x 14 Ga. tubing. The rails shall be steel channel, 1.75" x 1.75" x .105". Picket holes in the rail shall be spaced 4.715" o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 1.

2.03 FABRICATION

- A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).
- C. The manufactured panels, gates and posts shall be subjected to an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be Black. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).
- D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.
- E. Rolling gates shall be fabricated shop fabricated per the sized indicated on the Construction Drawings.

PART 3 – EXECUTION

3.01 PREPARATION

All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 FENCE INSTALLATION

Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of

freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

3.03 FENCE INSTALLATION MAINTENANCE

When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.04 GATE INSTALLATION

Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations.

3.05 CLEANING

The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

Table 1 – Minimum Sizes for Montage II Posts			
<u>Fence Posts</u>		<u>Panel Height</u>	
2-1/2" x 12 Ga.		Up to & Including 6' Height	
3" x 12 Ga.		Over 6' Up to & Including 8' Height	
<u>Gate Leaf</u>	<u>Gate Height</u>		
	<u>Up to & Including 4'</u>	<u>Over 4' Up to & Including 6'</u>	<u>Over 6' Up to & Including 8'</u>
Up to 4'	2-1/2" x 12 Ga.	3" x 12 Ga.	3" x 12 Ga.
4'1" to 6'	3" x 12Ga.	4" x 11 Ga.	4" x 11 Ga.
6'1" to 8'	3" x 12 Ga.	4" x 11 Ga.	6" x 3/16"
8'1" to 10'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
10'1" to 12'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
12'1" to 14'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
14'1" to 16'	6" x 3/16"	6" x 3/16"	6" x 3/16"

Table 2 – Coating Performance Requirements		
Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

Table 3 – Montage II – Post Spacing By Bracket Type										
Span	For INVINCIBLE® 8' Nominal (91-1/2" Rail)				For CLASSIC, GENESIS, & MAJESTIC 8' Nominal (92-5/8" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Industrial Flat Mount (BB301)*		Industrial Line 2-1/2" (BB319) 3" (BB320)		Industrial Universal 2.5" (BB302) 3" (BB303)		Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± 1/2" O.C.	94-1/2"	95"	94-1/2"	95"	96"	96-1/2"	96"	96-1/2"	*96"	*96-1/2"
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel. When using the BB301 flat mount bracket for Invincible style, rail may need to be drilled to accommodate rail to bracket attachment.										

END OF SECTION

SECTION 323113

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized Fence System: Framework, fabric, fittings, gates and accessories.
- B. PVC-Coated Fence System: Framework, fabric, gates and accessories.
- C. Excavation for post bases.
- D. Concrete anchorage for posts and center drop for gates.

1.2 RELATED SECTIONS

- A. Section 033000 – Cast-In-Place Concrete
- B. Electrical distribution as it relates to gate operators and accessories
- C. Low voltage and access control as it relates to gate operators and accessories

1.3 REFERENCES

- A. ASTM A123 – Zinc (Hot Galvanized) Coatings of Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips.
- B. ASTM B429 – Aluminum-Alloy Extruded Structural Pipe and Tube.
- C. ASTM F567 – Installation of Chain Link Fence
- D. ASTM F668 – PVC-Coated Steel Chain Link Fence Fabric.

1.4 SUBMITTALS

- A. Submit shop drawings and product data in accordance with Section 016000.
- B. Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorages, schedule of components, finish and installation instructions.
- C. Submit samples of fence fabric finish.

PART 2 PRODUCTS

2.1 GALVANIZED STEEL FENCE MATERIALS

- A. Fabric: ASTM F668, Class 1, with the following requirements:
 - 1. Nine gauge Standard Industrial, 2 inch mesh (before PVC coating).
 - 2. PVC Coating extruded over zinc-coated steel wire **before** weaving.
 - 3. Top selvage knuckled finish; bottom selvage twisted and barbed finish.
 - 4. All framework, posts and rails; gates and accessories which follow shall receive 15 mil. PVC coating. Framework & accessories, with their 15 year warranty, is approved.

- B. Posts and Pipes: Steel, hot-dipped galvanized, ASTM A120, Table 1
- C. Post Sizes: Fences 4'-0" high and over.
 - 1. Line Posts: 2.375 inch O.D.
 - 2. Terminal and Corner Posts: 2.875 inch O.D.
 - 3. Gate Posts:
 - a. 2.375 inch O.D. for gates to 3 feet wide or double to 6 feet wide.
 - b. 2.875 inch O.D. for gates to 6 feet wide or double to 12 feet wide.
 - c. 4 inch O.D. for gates to 13 feet wide or double to 26 feet wide.
 - d. 6.625 inch O.D. for gates to 18 feet wide or double to 36 feet wide.
- D. Top Rail: 1.660 inch O.D.
- E. Braces: 1.660 inch O.D. space midway between top rail and ground, and extend from terminal and / or corner posts to first adjacent line post. Fasten to posts with pressed steel connection; then truss from line post back to terminal post with 3/8 inch galvanized rod complete with truss tightener.
- F. Fittings: Hot-dip galvanized or malleable iron, cast iron or pressed steel.
- G. Fabric Ties: 9 gauge galvanized or aluminum. Space minimum at 24 inch on top rail and 14 inch on posts. Connect fabric to terminal posts with galvanized bars, 3/4 inch by 3/16 inch and approved type galvanized tension bands fabricated for bolts or lock pins.
- H. Tension Wire: 7 gauge galvanized coilwires; tie to fence fabric with 11 gauge galvanized hog rings on 12 inch centers or by other approved method; tie to posts separate from fabric with 9 gauge galvanized wire ties.
- I. Post Tops: Galvanized.
- J. Gates: Design for no-sag operation.
 - 1. Frames: Hot-dip galvanized pipe, ASTM A120, Table 1; 1.660 inch O.D.
 - 2. Corner Ells: Pressed steel, malleable iron or welded corners all hot-dipped galvanized after fabrication.
 - 3. Internal Bracing: 1.660 inch O.D. hot-dip galvanized pipe, ASTM A120, Table 1 with 3/8 inch galvanized adjustable truss rods.
 - 4. Fabric: Same as fence.
 - 5. Sizes: Match the size and style of gates indicated on Construction Drawings.
 - 6. Hardware: Furnish gates complete with the following approved galvanized hardware:
 - a. Malleable iron ball and socket hinges of type to allow 105 degree swing.
 - b. Locking pintle and latch to secure gate in closed position.
 - c. Stops and catches, set in concrete, to secure drive gates in open position.
 - d. Self-draining stops and rests for double gates.

2.2 CONCRETE

- A. Concrete shall be 3,500 psi, air entrained.

PART 3 EXECUTION

3.1 POSTS

- A. Space line posts a maximum of 10 feet on center. Set plumb, centered in holes and to lines shown on drawings. Place in concrete with bottom 6 inch above bottom of hole; thoroughly puddle and support plumb until concrete is set. Crown top of concrete in an approved manner.

- B. Fasten top rail with couplings at approximately 20 feet centers. Pass rail through line post tops to form a continuous brace.
- C. Minimum sizes of footings for fences 60 inches in height and above.
 - 1. Line Posts: 12 inch diameter, 42 inch deep.
 - 2. Terminal, Brace and Corner Posts: 14 inch diameter, 42 inch deep.

3.2 FABRIC

- A. Do not stretch until concrete is 5 days old. Stretch slightly above tension recommended by fence manufacturer, for season or year applied, and allow to slack away slightly when pullers are released. Attached pullers to fabric full width and tie in at least 7 places on each post before releasing. If desired, pulls may be made from two ways and jointed by inserting on picket. Set post braces before placing fabric. Fasten fabric to line posts with fabric bands spaced 14 inch apart and to top rail with tie wires spaced 24 inch apart. Place tension wires after plan size of fabric is installed.

END OF SECTION

SECTION 323115
VEHICULAR SLIDE GATE OPERATOR

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electric gate operators.
 - 1. DoorKing Model 9100.
- B. Parking gates and operators.
- C. Sensors and controls.

1.2 RELATED SECTIONS

- A. Section 323119 – Steel Ornamental Fence System
- B. Division 26 – Requirements for electrical connections.

1.3 REFERENCES

- A. Underwriters Laboratories (UL): UL 325 – Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.
- B. Canadian Standards Association (CSA): CSA C22.2 No. 247.
- C. Underwriters Laboratories (UL): UL 991 – Standard for Tests for Safety Related Controls Employing Solid-State Devices.
- D. American Society Testing Materials (ASTM): ASTM F2200 – Standard Specification for Automated Vehicular Gate Construction.
- E. National Electrical Manufacturers Association (NEMA): NEMA ICS 6 – Industrial Control Systems: Enclosures.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000 – Administrative Requirements.
- B. Product Data: Manufacturers data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements.
 - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, edge connections, and accessories.
 - 1. Operation, installation, and maintenance manuals including wire diagrams.
 - 2. Risers, layouts, and special wiring diagrams showing any changes to standard drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials and products in strict compliance with manufacturer's instructions and industry standards.

- B. Store products indoors in manufacturer's original containers and packaging with labels clearly identifying product name and manufacturer. Protect from damage.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Substantial transformation and final assembly shall occur in the United States of America per Section 1605 of the ARRA-09.
- B. Installer Qualifications: Installation performed by factory authorized dealer contractor specifically trained in gate operator systems of the type found within this section.
 - 1. Provide documentation of maintenance and repair service availability for emergency conditions.
 - 2. Provide quarterly maintenance for one year following Substantial Completion of the Project.

1.7 WARRANTY

- A. Manufacturers standard five (5) year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: DoorKing, Inc.; 120 S. Glasgow Ave; Inglewood, CA 90301; Toll-Free Tel: 800-826-7493; Tel: 310-645-0023; Fax: 310-641-1586; Email: ghendrix@doorking.com; Web: doorking.com.
- B. Substitutions: Submit alternate manufacturers and products a minimum of 10 days prior to bidding for Architect's review and consideration.

2.2 SLIDING GATE OPERATORS

- A. Microprocessor based solid-state control board interacting with card readers, RF transmitters, access control systems, ticket machines, other activating devices as required, external devices (photo-eyes, contact edges) for entrapment protection and vehicle (loop) sensing systems. Control board shall include built-in close timer (1-25 seconds), built-in ports for two (2) plug-in loop detectors, partial open input, programming switches to set various operating modes, inherent magnetic pulse obstruction sensing reverse system. System shall employ Fail-Safe operation upon primary (AC) power outage.
 - 1. Compliance: Compliant to UL 325, UL 991 and CSA C22.2 No. 247 and listed by Intertek Testing Laboratories NA, Inc. (ETL), a Nationally Recognized Testing Laboratory.
 - a. This model is intended for use in Class I, II, III and IV vehicular slide gate applications.
 - 2. Warranty: Five (5) year manufacturer's standard warranty.
 - 3. Gate Length: Refer to drawings.
 - 4. Maximum Gate Weight: 1000 Lbs.
 - 5. Operator speed: approximately 11-inches per second.
 - 6. Enclosure:
 - a. 12 gage, 0.108 inch (2.6 mm) G90 hot-dipped galvanized steel, finished with polyester powdercoat, exterior grade semi-gloss texture gray.
 - b. Polypropylene, 0.157 (4 mm) texture gray, conforms to UL746C, UV (f1) and V0 flame rating.

7. Configuration: Left or right hand mount; front, center or rear mounting configurations.
8. Mounting: Pad mount.
9. Electrical Power Requirements: 115 VAC.
10. Motor: 1/2 HP, continuous duty.
11. Dead Bolt Lock: Solenoid dead bolt engages if an attempt is made to force the gate open.
12. Fail-Safe Operation: Upon loss of primary (AC) power, system shall automatically be transferred to a fail-safe mode allowing the gate to be pushed open without the use of special knowledge, keys or other releasing mechanisms.
13. Primary Reduction: Adjustable clutch, single cog belt drive train.
14. Pulling Medium: #40 roller chain
15. Magnetic Limit Switches: Automatic setting with no mechanical switches to set, wear out or break.
16. Operating Switches: Built-in power (on-off), reset and operating switches.
17. Convenience Outlets: Two (2) 115 VAC for accessory transformers.
18. Entrapment Protection
 - a. Photo-electric eye (non-contact sensor).
 - b. Sensing edge (contact sensor).
19. Accessories: Provide the optional accessories listed below.
 - a. Chain tray kit – to support roller chain on long gates.
 - b. Fail-Secure Lock Kit – requires a key lock to open the gate upon primary (AC) power loss.
 - c. Plug-in loop detectors.
 - d. Electric reversing edge – reverses direction of gate on contact with an obstruction.
 - e. Photo-electric beams – reverses direction of gate if the light beam is obstructed.
 - f. Backup power inverter – allows system to remain operation upon loss of primary (AC) power.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. It is required, that this product be installed by a qualified technician who is certified by either the Accreditation and Certification Institute (ACI) or the Institute of Door Dealer Education and Accreditation (IDEA).
- B. Model 9100 shall be mounted, firmly secured, plumb and level, as required.
- C. Wiring shall be uniform and in accordance with national electric codes and manufacturer's instructions.
- D. All splices shall be in easily accessible junction boxes or on terminal boards.
- E. All cable runs in all junction boxes shall be tagged and identified.
- F. Coordinate all work with other effected trades and contractors.

3.2 SYSTEM INITIALIZING AND PROGRAMMING

- A. System shall be turned on and adjustment made to meet requirements of specifications and on-site conditions.
- B. System shall function as specified.

3.3 SYSTEM TEST PROCEDURES

- A. System shall be completely tested to assure that all components and accessories are hooked-up and in working order.
- B. System shall be pre-tested by contractor and certified to function in accordance with plans and specifications.
- C. System shall be tested in presence of owner's representative.

3.4 OWNER INSTRUCTIONS

- A. Installation contractor shall conduct up to (1) hour of instruction in use and operation of the system to designated owner representatives, within (10) days of acceptance.
- B. Installation contractor shall conduct up to (1) hour of technical training, in troubleshooting and service of the system, to designated owner representatives within (10) days of system acceptance.

3.5 MANUALS AND DRAWINGS

- A. Contractor shall provide owner with (2) copies of standard factory prepared operation, installation and maintenance manuals. Manuals shall include typical wiring diagrams.
- B. Contractor shall provide owner with (2) copies of any risers, layouts, and special wiring diagrams showing any changes to standard drawings, if required on project.

3.6 MAINTENANCE

- A. Contractor shall provide, and include in Bid, maintenance at one (1), three (3) and twelve (12) month intervals as described in the installation and maintenance manual.
- B. Contractor shall provide checking of external reversing devices once a month for first 12 months.

END OF SECTION

SECTION 32 3223
SEGMENTAL RETAINING WALLS

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 SUMMARY

- A. This Section includes single-depth segmental retaining walls with soil reinforcement.
- B. Related Sections include the following:
 - 1. Section 312000 "Earth moving" for excavation for segmental retaining walls.
 - 2. Section 321313 "Concrete Paving" for retaining wall footings.

1.03 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide segmental retaining walls capable of withstanding the effects of gravity loads due to soil pressures resulting from grades indicated, and determined according to NCMA's "Design manual for Segmental Retaining Walls."
 - 1. Include the effects of sloped backfill as indicated on Drawings.
 - 2. Include the effects of superimposed loads (surcharge) as indicated on Drawings.
- B. Seismic Performance: Provide segmental retaining walls capable of withstanding the effects of earthquake motions determined according to NCMA's "Segmental Retaining Walls—Seismic Design Manual.
- C. Drainage: Provide segmental retaining wall drainage system capable of preventing accumulation of groundwater in retained soils and in retaining wall foundations soils.

1.04 SUBMITTALS

- A. Samples for Initial Selection: For concrete units.
- B. Samples for Verification: For each color and texture of concrete unit required. Submit full size units.
 - 1. Include one full-size unit for each type of concrete unit required.
- C. Qualification Data: For Installer.
- D. Shop Drawings:
 - 1. Include plans, elevations, sections and details signed and sealed by a Licensed Professional Engineer in the State of Oklahoma.
 - 2. Profile Drawings: Show wall system in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet and vertical scale of not less than 1 inch equals 5 feet.
- E. Preconstruction Test Reports: For segmental retaining wall system.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by the manufacturer and witnessed by a qualified testing agency, for segmental retaining wall units and soil reinforcement.

1. Include test data for freeze-thaw durability of segmental retaining wall units.
- G. Product Certificates: For segmental retaining wall units and soil reinforcement, signed by product manufacturer.
 1. Include test data for shear strength between segmental retaining wall units according to NCMA SRWU-2.
 2. Include test data for connection strength between segmental retaining wall units and soil reinforcement according to NCMA SRWU-1.

1.05 QUALITY ASSURANCE

- A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform the following preconstruction testing:
 1. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 2. Test soil reinforcement and backfill materials for pullout behavior according to GRI GG5 or GRI GT6.
 3. Test soil reinforcement and backfill materials for coefficient of friction according to ASTM D 5321.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle concrete units and accessories to prevent deterioration or damage due to moisture, temperature changes, contaminants, breaking, chipping, or other causes.
- B. Store geosynthetics in manufacturer's original packaging with labels intact. Store on elevated platforms, protected from moisture, sunlight, chemicals, flames, temperatures above 160 degrees F (71 deg C) or below 32 deg F (0 deg C), and other conditions that might damage them. Verify identification of geosynthetics before using and examine them for defects as material is placed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Segmental Retaining Wall Units:
 - a. Licensees of Keystone Retaining Wall Systems, Inc.
 - b. Licensees of Tensar Earth Technologies, Inc.
 - c. Licensees of Versa-Lok Retaining Wall Systems; a division of Kiltie Corp.
 2. Soil Reinforcement:
 - a. Civil Engineering Fabrics; a division of BP Amoco Chemicals. TC Mirafi.
 - b. Tensar Earth Technologies, Inc.
 - c. Versa-Lok Retaining Wall Systems; a division of Kiltie Corp.

2.02 SEGMENTAL RETAINING WALL UNITS

- A. Concrete Units: ASTM C 1372, Normal Weight, except that units shall not differ in height more than plus or minus 1/16 inch (1.6 mm) from specified dimension.
 - 1. Provide units that comply with requirements for the freeze-thaw durability.
 - 2. Provide units that interlock with courses above and below by means of integral lugs or lips, pins or clips.
- B. Colors: As selected by Owner from manufacturer's full range.
- C. Shapes: Provide units of basic shape and dimensions indicated with machine-split textured exposed faces.
- D. Shapes: Provide units matching basic shape, dimensions, and face texture indicated by referencing manufacturer's pattern design.
- E. Shapes: Provide units of any basic shape and dimensions that will produce segmental retaining walls of dimensions and profiles indicated without interfering with other elements of the Work and as follows:
 - 1. Exposed Face: Machine-split textured, flat face.
 - 2. Batter: Provide units that offset from course below to provide at least 1:24 batter.
- F. Cap Units: Provide cap units of same shape as other units with smooth, as-cast top surfaces without holes or lugs.
- G. Special Units: Provide corner units, end units, and shapes as needed to produce segmental retaining walls of dimensions and profiles indicated and to provide texture on exposed surfaces

2.03 INSTALLATION MATERIALS

- A. Pins: Product supplied by segmental retaining wall unit manufacturer for use with units provided made from nondegrading polymer reinforced with glass fibers.
- B. Clips: Product supplied by segmental retaining wall unit manufacturer for use with units provided, made from nondegrading polymer reinforced with glass fibers.
- C. Cap Adhesive: Product supplied or recommended by segmental retaining wall unit manufacturer for adhering cap units to units below.
- D. Leveling Base: Comply with requirements in Section "Earthwork" for base material.
- E. Drainage Fill: Comply with requirements in Section "Earthwork".
- F. Reinforced Soil Fill: Comply with requirements in Section "Earthwork" for satisfactory soil.
- G. Reinforced Soil Fill: ASTM D 2487; GW, GP, SW, SP, and SM soil classification groups or a combination of these groups; free of debris, waste, frozen materials, vegetation, and other deleterious matter; meeting the following gradation according to ASTM C 136:20 to 100 percent passing No. 4 sieve, 0 to 60 percent passing No. 40 sieve, 0 to 35 percent passing No. 200 sieve; and with fine fraction having a plasticity index of less than 20.
- H. Nonreinforced Soil Fill: Comply with requirements in Section "Earthwork" for satisfactory soils.
- I. Drainage Pipe:
 - 1. PVC Sewer Pipe and Fittings: ASTM D 3034, SDR 35, bell-and-spigot ends, for gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seal.

2. ABS Sewer Pipe and Fittings: ASTM D 2751.
 - a. Solvent Cement: ASTM D 2235.
 - b. Gaskets: ASTM F 477, elastomeric seal.
- J. Soil Reinforcement: Geosynthetic reinforcement shall consist of geogrids or geotextiles manufactured as a soil reinforcement element. The manufacturers/suppliers of the geosynthetic reinforcement shall have demonstrated construction of similar size and types of segmental retaining walls on previous projects. The geosynthetic type must be approved one week prior to bid opening. Geosynthetic currently approved for this project are:
- K. VERSA-Grid Geogrids

2.04 SOURCE QUALITY CONTROL

- A. Direct manufacturer to test and inspect each roll of soil reinforcement at factory for minimum average roll values for geosynthetic index property tests including the following:
 1. Weight.
 2. Roll Size.
 3. Grab or single-rib strength,
 4. Aperture opening.
 5. Rib or yarn size.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for excavation tolerances, condition of subgrades, and other conditions affecting performance of segmental retaining walls.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 RETAINING WALL INSTALLATION

- A. General: Place units according to NCMA's "Segmental Retaining Wall Installation Guide" and segmental retaining wall unit manufacturer's written instructions. Lay units in running bond.
 1. Form corners and ends by using special units, cutting units with motor-driven saw or splitting units with mason's hammer and chisel
- B. Leveling Base: Place and compact base material to thickness indicated and with not less than 95 percent maximum dry unit weight according to ASTM D 698
 1. At Contractor's option, unreinforced lean concrete may be substituted for upper 1 to 2 inches (25 to 50mm) of base. Compact and screed concrete to smooth level surface.
- C. Leveling Course: Place unreinforced lean concrete over base course to thickness indicated; compact and screed to a smooth level surface.
- D. First Course: Place first course of segmental retaining wall units on leveling base/course for full length of the wall. Place units in firm contact with each other, properly aligned and level.
 1. Tamp units into leveling base as necessary to bring tops of units into a level plane.
 2. Place and compact fill, either drainage or soil fill as indicated, to top of first course.

3. Place fill on both sides of the wall at same time without disturbing alignment of units.
 4. Fill voids between and within units with drainage fill.
- E. Subsequent Courses: Remove excess fill and debris from tops of units in course below. Place units in firm contact, properly aligned, and directly on course below.
1. For units with lugs designed to fit into holes in adjacent units, lay units so lugs are accurately aligned with holes, and bedding surfaces are firmly seated on beds of units below.
 2. For units with lips at the front of the unit, slide units as far as possible for firm contact with lips of units below.
 3. For units with pins, install pins and align units according to manufacturer's written instructions.
 4. For units with clips, install clips and align units according to manufacturer's written instructions.
 5. Place fill on both sides of wall at same time, where both sides are indicated to be filled.
 6. Fill voids between and within units with drainage fill.
- F. Cap Units: Place cap units and secure with cap adhesive according to manufacturer's written instructions.

3.03 FILL PLACEMENT

- A. General: Comply with requirements in Division 2 Section "Earthwork", NCMA's "Segmental Retaining Wall Installation Guide", and segmental retaining wall unit manufacturer's written instructions.
- B. Place, spread, and compact fill in uniform lifts for full width and length of embankment as wall is laid. Begin at back of wall and place and spread fill toward embankment.
1. Use only hand-operated compaction equipment within 48 inches (1200 mm) of wall, or one-half of height above bottom of wall, whichever is greater.
 2. Compact drainage fill to not less than 95 percent maximum dry unit weight according to ASTM D 698.
 3. Compact reinforced soil fill to not less than 95 percent maximum dry unit weight according to ASTM D 698.
 - a. In areas where only hand-operated compaction equipment is allowed, compact to not less than 90 percent maximum dry unit weight according to ASTM D 698.
 4. Compact non-reinforced soil fill to comply with Division 2 Section "Earthworks".
- C. Place a layer of drainage fill at least 12 inches (300 mm) deep behind wall to within 12 inches (300 mm) of finished grade. Place a layer of filter fabric between drainage fill and soil fill.
1. Wrap drainage pipe with filter fabric and place in drainage fill as indicated.
 2. Place impervious fill over top edge of drainage fill layer.
- D. Place soil reinforcement in horizontal joints of retaining wall where indicated and according to soil reinforcement manufacturer's written instructions. Embed reinforcement a minimum

of 8 Inches (200 mm) into retaining wall and stretch tight over compacted backfill. Anchor soil reinforcement before placing fill on it.

1. Place additional soil reinforcement at corners and curved walls to provide continuous reinforcement and to comply with manufacturer's written instructions.
2. Place geosynthetics with seams, if any, oriented perpendicular to segmental retaining walls.
3. Do not dump fill material directly from trucks onto geosynthetics.
4. Place at least 6 inches (150 mm) of fill over reinforcement before compacting with tracked vehicles or 4 inches (100 mm) before compacting with rubber-tired vehicles.
5. Do not turn vehicles on fill until first layer of fill is compacted and second layer is placed over each soil-reinforcement layer.

3.04 CONSTRUCTION TOLERANCES

- A. Variation from Level: For bed-joint lines along walls, do not exceed 1-1/4 inches in 10 feet (32 mm in 3 m), 3 inches (75 mm) maximum.
- B. Variation from Indicated Batter: For Slope of wall face, do not vary from indicated slope by more than 1-1/4 inches in 10 feet (32 mm in 3 m).
 1. Variation from Indicated Wall Line: For walls indicated as straight, do not vary from straight line by more than 1-1/4 inches in 10 feet (32 mm in 3 m)

3.05 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Comply with requirements in Section 31 2000 "Earth Moving" for in-place compaction testing.
- C. In each compacted backfill layer, perform at least 1 field in-place compaction test for each 150 feet (50 mm) or less of segmental retaining wall length.

3.06 ADJUSTING AND CLEANING

- A. Remove and replace segmental retaining wall construction of the following description:
 1. Broken, chipped, stained, or otherwise damaged units. Units may be repaired if methods and results are approved by Architect.
 2. Segmental retaining walls that do not match approved Samples.
 3. Segmental retaining walls that do not comply with other requirements indicated.
- B. Replace units so segmental retaining wall matches approved Samples and mockups, complies with other requirements, and shows no evidence of replacement.

END OF SECTION

SECTION 328400

UNDERGROUND SPRINKLER SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Design and installation of automatic lawn and shrub sprinkler system providing uniform moisture coverage.
- B. Furnishing of materials and installation of a complete automatic lawn and shrub sprinkler system providing uniform moisture coverage. The work shall include all materials, equipment and labor required to complete the project as outlined in the project drawings, documents and this specification.
- C. Installation of backflow preventer, pressure regulator, irrigation lines (pressurized), automatic control valves, valve boxes, control and common wiring, lateral lines, sprinkler heads, automatic controller as shown on the project drawings and irrigation plan.
- D. Excavation and backfill.
- E. Tests including system pressure and performance test.
- F. Pipe and fittings.
- G. Sprinkler heads.
- H. Control system and connection to electrical supply.
- I. Trenching, installation of system and connection to water source; testing and backfilling.
- J. Sleeves under paving.

1.2 RELATED WORK

- A. Section 329223 - Sodding
- B. Section 329343 - Trees

1.3 REFERENCES

- A. ANSI/ASTM D2564 - Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.
- B. ASTM D2241 - Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-PR).
- C. ASTM – American Society of Testing Materials
- D. AWWA – American Water Works Association
- E. NSF – National Sanitary Foundation

F. NEC – National Electric Code

1.4 DESCRIPTION

- A. Electric solenoid controlled underground sprinkler system consisting of PVC plastic pipe and fittings, with fixed spray and variable arc rotary pop-up heads in a multi-station electric control system, programmed as approved by Owner's Representative.

1.5 SUBMITTALS

- A. Submit the irrigation design for review and approval by Architect and Owner's Representative no less than six (6) weeks prior to commencing installation operations. The design shall include the piping layout, location and coverage of sprinkler heads, plant and landscaping features, site structures, list of fittings to be used, and control system and wiring diagrams and data; and shall note water pressure at the project site.
- B. Provide (3) copies of manufacturer's product data for each type of sprinkler head, swing joint assemblies, electric control valves, automatic and manual drain valves, isolation valves, valve boxes, pipe, fittings including tapping tees and saddles, control wire, waterproof wire connectors, irrigation controller, backflow preventer, and rain and freeze sensors proposed for use.
- C. Determine and submit static water pressure at meter and/or other designated points of connection at least two (2) weeks prior to beginning of installation. Contractor shall receive Architect's approval if static pressure is less than 65 PSI.
- D. Provide manufacturer's product data for each type of sprinkler head and valve proposed for use.
- E. Upon completion and final review of system by Owner's Representative, Contractor shall provide record or as-built drawings (reproducible) of completed facilities as installed. Drawings shall be provided to Architect in a) electronic form (AutoCad 2015 format or later) b) in a reproducible form of mylar or vellum and c) three (3) copies of the as-built drawing in blueline or photocopy form. As-built drawing shall show the measured distance from easily identified, fixed locations to isolation valves, electric control valves, manual drain valves and wire splices. Two dimensions from fixed points per location are required.
- F. Upon completion and final review of system by Architect and Owner's Representative, Contractor shall provide three (3) binders containing manufacturer's installation, operation and maintenance instructions as well as a parts breakdown and catalog for each piece of equipment installed on the project. As a minimum the binders shall include information for the irrigation controller, backflow preventer, pressure regulators, isolation valves, electric control valves, drain valves, air relief valves, all spray and rotary sprinkler heads, rain and freeze and moisture sensors.
- G. Upon completion and final review of system by Architect and Owner's Representative, Contractor shall provide a plastic laminated (sealed) reduced drawing of the irrigation system indicating the areas or zones of the irrigation system controlled by each electric control valve. For clarity, drawing may be divided into two sections and shown on both sides of the laminated sheet. Reduced drawing shall be placed on the inside of the controller door. Drawing shall be approved for clarity by Architect prior to acceptance of system.

1.6 OPERATION/MAINTENANCE DATA AND DEMONSTRATION

- A. Provide instructions for operation and maintenance of system and controls, and manufacturer's parts catalog.
- B. Provide schedule indicating length of time each valve is required to be open to provide determined amount of water.
- C. Provide a recommended schedule for run times and frequency of watering for the first two weeks, the first two months and the first twelve months (including all seasonal change requirements) after completion of the installation.
- D. Instruct Owner's personnel in operation and maintenance of system, including adjusting of sprinkler heads.

1.7 EXTRA STOCK

- A. Provide the following extra stock items:
 - 1. Two sprinkler heads of each type and size.
 - 2. Two valve keys for manual valves.
 - 3. Two keys for valve markers.
 - 4. Two wrenches for each type head core and for removing and installing each type head.
 - 5. Two couplers for each size of quick coupling valve.

1.8 SYSTEM SERVICE

- A. Inspect system at two and four weeks after Date of Substantial Completion and make necessary adjustments.

1.9 WARRANTY

- A. Entire sprinkler system will be unconditionally guaranteed against defects in material and workmanship, including repair of settling of backfilled areas below grade and adjusting heads to proper level for a period of one year from Date of Substantial Completion.
- B. Minor adjustments, any defective electrical controls, valves, sprinkler heads or other working parts will be repaired or replaced without cost to the Owner for a period of one year from the date of acceptance.
- C. Damage by others during the one-year guarantee period will be Owner's responsibility.
- D. Warrant sprinkler system to have uniform moisture coverage of areas shown to be sprinkled.

PART 2 PRODUCTS

2.1 MATERIALS- GENERAL

- A. The specific materials to be used shall be as designated on the contract drawings and this specification. All materials to be incorporated in this work shall be new and of the best quality, meeting the requirements for such materials and for the purpose intended.

The irrigation lines on the contract drawings are diagrammatic. The Contractor shall be responsible for computing and supplying the required pipe, fittings, control wires and electrical accessories required to complete the project.

B. ACCEPTABLE MANUFACTURERS

1. Weather-matic
2. Rainbird.
3. Hunter.
4. Toro.

C. SUBSTITUTIONS: All material shall be supplied and installed according to this specification and the specifications of the equipment and material manufacturers.

2.2 PIPE AND FITTING MATERIALS

- A. Pressurized Main Line Pipe: All 2 1/2" and smaller main line pipe shall meet the latest requirements of ASTM D 1785 Standard Specification for Schedule 40 Poly (vinyl chloride) PVC pipe with size as shown on the project drawings. Solvent-weld sockets.
- B. Lateral Pipe: All lateral pipe, downstream of the control valves, shall be have solvent weld joints and shall meet the latest requirements of ASTM D 2241 Standard Specification for Poly (vinyl chloride) (PVC) Plastic Pipe with standard dimension ratio (SDR) of 21 and a Pressure Rating (PR) of 200 PSI.
- C. Sleeving Pipe: All sleeving (straight sections) to protect pipe or control wires at roads, sidewalks or below grade crossings shall be PVC Schedule 40. All sleeves (curved sections) to protect pipe or control wires at sidewalks and below grade crossings shall be high-density polyethylene with a working pressure of 160 psi. Sleeves shall be a minimum of two (2) times the diameter of the crossing pipe or that shown on the project drawings. Minimum sleeve size shall be 2" diameter. All irrigation control wires shall be routed in a separate sleeve.
- D. Fittings:
1. Tees attaching the electric control valves and quick coupling valves onto the mainline (2 1/2" and smaller) shall be PVC Schedule 80 solvent welded or threaded fittings and shall meet ASTM D 2467 and ASTM D 2464 respectively. PVC Schedule 80 fittings and nipples shall be used on all fittings required between the mainline tap and the electric control valve as well as the threaded connection between the electric control valve and the lateral piping. Schedule 80 fittings shall be Spears Manufacturing or approved equal. Contractor shall use manufacturer's recommended sealing compounds and/or Teflon tape according to manufacturer's recommended practice for the specific application.
 2. Mainline fittings (2 1/2" and smaller) at all points of direction change such as 22.5, 45, tees, or 90 degree turns shall be solvent weld with a minimum of Schedule 40 dimensions and shall meet the requirements of ASTM Specification D 2466-78. Schedule 40 fittings shall be Spears Manufacturing or approved equal.
 3. Lateral line Fittings - Solvent welded fittings shall be Schedule 40 dimensions and wall thickness and shall meet the requirements of ASTM Specification D 2466 and shall be used on all piping downstream of electric control valves.
- E. Solvent Cement: ANSI/ASTM D2564 for PVC pipe and fittings.
- F. All 1/2" inlet spray heads shall be connected to the irrigation piping utilizing 1/2" thick

- walled polyethylene tubing (Rain Bird Model SPX-100) and appropriate insert fittings (Rain Bird Models SBE-050, SBE-075, SBA-050, SBA-075). Sufficient lengths of flexible pipe shall be used to form a sweeping arc to insure that spray heads are supported properly and allow for vertical adjustment and movement during service.
- G. All 1" inlet quick coupling valves shall be installed on prefabricated, manufactured swing joint assembly rated for 315 psi with pre-lubricated buttress threads and O'ring seals equal to Spears Manufacturing Co. Series 5807-01012.
 - H. Swing Joints: Prefabricated, schedule 80 PVC, equal to Spears. Use for quick-coupler valves.
 - I. Drip Irrigation: Pipe and fittings equal to Netafin U.S.A.

2.3 SPRINKLER HEADS AND NOZZLES

- A. Sizes and types required to provide complete, even coverage with minimum overspray.
- B. Turf Spray Heads: Equal to 4" Pop-up – Rainbird 1804-SAM-PRS with internal check valve and pressure regulator incorporated into stem.
- C. Shrub/Ground Cover Beds: Equal to Rainbird Model 1812 PRS-SAM with 1800-EXT extensions as needed.

2.4 VALVES

- A. Automatic Control Valves: Remote, electrically operated, normally closed, diaphragm globe valves. The valve shall have a 200 psi CWP rating. Flow control stem shall be non-rising. The valve cover shall be secured to the body with stainless steel threaded studs and nuts. Bleeding of water during manual operations shall be either internal or external. Control valves shall be contamination resistant, glass filled high strength nylon body and bonnet. Equal to Rain Bird PEB Series.
- B. Automatic Control Valves for Low Flow Zones. Remote, electronically operated, normally closed, diaphragm globe valve, equal to Medium Flow Commercial Control Zone Kit with Pressure Regulating Basket Filter XCZ-100-PRB-MC as supplied by Rainbird.
- C. Gate Valves (Isolation Shut Off Valves): 2 1/2" and smaller - shall be bronze, threaded, screw-in bonnet with non-rising stem rated for a 125 psi WSP and 200 psi non-shock WOG. The valve shall be of domestic manufacture, shall meet Federal Specifications MSS SP-80 equal to Hammond Model IB645.
- D. Automatic Drain Valves: Equal to King Technology, Inc. Model 22, 1/2" inlet.
- E. Manual Drain Valve: Bronze body, angle type 150 psi class, with cross-type operating handle designed to receive a valve operating key.
- F. Quick Coupling Valves: Equal to Rainbird 5LRC with locking rubber cover with 55DK keys w/ bronze hose swivel adapters, Buckner model 45002. Quick coupling valve shall be prevented from rotation with Leemco Model LS-120 valve stabilizer.
- G. Backflow Preventer And Cover: Reduced pressure device equal to Wilkens Model 975XL meeting the requirements of the irrigation system used. The backflow preventer shall be installed using Type L copper pipe and shall incorporate two (2) unions for ease of construction. The backflow preventer shall be installed inside the Closet where indicated

on drawings, and protected from freezing using thermostatically controlled "heat tape".

- H. Pressure Regulator: Pressure regulation valve shall be 1 1/2" as manufactured by Wilkens Model 500HR-1.5" rated for a maximum pressure of 300 psi and shall have an adjustable spring range between 75 psi and 125 psi.

2.5 WATER METER

- A. New 2" turbine style.

2.6 CONTROLLER

- A. Electronic, compatible with valves, multi-station, programmable, in U.L. approved rainproof housing, w/ pedestal mount.

2.7 VALVE BOXES AND MARKERS

- A. For Automatic Control Valves: Equal to Carson Industries Inc. model 1419-3 with 1419-6X extensions as required.
- B. For Manual Drain Valve: Equal to Carson Industries Inc. model 910-10 w/ corrugated plastic pipe for extension.
- C. For Quick Coupling Valves: Equal to Carson Industries Inc. model 1419-3 with 1419-6X extensions as required.
- D. For Above Grade Backflow Preventers In Exterior Locations: Fiberglass enclosure equal to "Hot Box" manufactured by Northeast Florida Enterprises, Inc. 1/800-736-0238. Place on concrete slab and anchor with 4 bolts. Size to fit backflow preventer. Provide electrical connection and heater or heater cable as recommended by enclosure manufacturer.

2.8 CONTROL VALVE WIRING

- A. Wire: Type AWG-1UF, bearing U.S. approval, minimum 14 gauge. One common wire, No. 12 UF is required for each controller.
- B. Splicing Materials: Sta-Kon no. P7-70 connector and Scotchlok no. 3576 sealing pack. Scotchcote sealer for splices.

2.9 ENVIRONMENT CONDITION SENSORS

- A. Rain Sensor - Equal to Mini-Click II manufactured by Glen-Hilton Products, Inc.
- B. Freeze Sensor - Equal to Freeze-Click manufactured by Glen-Hilton Products, Inc.

PART 3 EXECUTION

3.1 PREPARATION

- A. Design system to provide coverage of turf and planting beds on separate zones. Route piping to avoid plants and structures. All planting beds with sun exposure shall be zoned separately from shaded planting bed areas. All planting beds with shrubs and perennial plantings shall be zoned separately from beds with annual or seasonal planting. Turf rotor heads to be zoned separately from turf spray heads.

- B. Piping within driplines of existing trees will be located to minimize damage to trees. Location of piping within driplines of existing trees to be flagged and approved by Owner's Representative prior to installation.

3.2 IRRIGATION DESIGN

- A. Spray heads shall be spaced no further than for "Head to Head" coverage based on the sprinkler head performance published by the head manufacturer. Rotary heads (3/4" inlet) shall be spaced no further than 85 percent of the published radius for the design pressure.
- B. Valves shall be sized according to the flow through the valve as follows:
 - 3-18 GPM - 1" Valve
 - 28-54 GPM - 1 1/2" Valve
 - 55-80 GPM - 2" Valve
- C. All components of the irrigation system are to be designed and specified to maintain the design pressure and performance at the sprinkler heads with a fluctuation of static water pressure of plus or minus ten percent.
- D. Pressurized main line pipe shall have maximum velocities of five (5) feet per second.
- E. Lateral line pipe shall have maximum water velocities of five (5) feet per second.
- F. The maximum pressure differential between the sprinkler head nearest the control valve and the sprinkler head furthest from the control valve shall not exceed 10 percent of the pressure at the control valve.
- G. Review layout requirements with other affected work. Location of heads to be coordinated with planting bed and lawn edges. Verify location and installation of sleeves (under paving and other improvements) to accommodate system.
- H. Protect landscaping and other features remaining as final work.

3.3 TRENCHING

- A. Trench for sprinkler system to provide proper grades and slopes to drain points.
- B. Keep trenches free of debris, material or other obstructions that may damage pipe.

3.4 INSTALLATION

- A. Install sleeves under paving and other improvements prior to construction. Install where required to accommodate piping at proper depth to prevent damage by other construction activities and to provide specified burial depth for irrigation pipe. Location of sleeves to be recorded and marked.
- B. Install pipe, valves, controls and sprinklers in accordance with manufacturer's instructions. Connect to water and electrical service. All work to be accomplished in accordance with applicable codes.
- C. All main line piping to be installed with a minimum of 18 inches cover and lateral piping with 12 inches minimum cover.
- D. Bed pipe on solid base free from rocks and other deleterious materials.

- E. Set sprinkler heads and valve box covers at finish grade. Valve boxes shall be placed in groundcover areas where possible. Rectangular valve boxes to be placed parallel to nearby curbs and walks or other improvements.
- F. Provide for thermal movement.
- G. Install automatic drain valves at all low sections of lateral piping (lines downstream from valves) to insure complete drainage of system when not in use. Wrap each valve with approved filter fabric.
- H. Install manual drain valves at all low sections of mainline (upstream lines) piping to permit complete drainage of system when not in use. Provide 12-inch depth gravel sump below each valve.
- I. Install all heads on approved swing-joints or nipple connections.
- J. Spray nozzles in shrub or other planting bed to be installed on risers of specified materials unless otherwise noted. Height of riser to be sufficient to provide complete coverage and allow for 1 to 2 years of plant growth.
- K. Install drip irrigation in locations indicated on plans and in accordance with manufacturer's recommendations. All such tubing to be completely concealed from view by covering with mulch.
- L. Install control wiring.
 - 1. Place the excess wire in a 10 inch expansion coil at each valve to which controls are connected and at 100 foot intervals. Control wiring may be installed in the same trenches with the irrigation piping. Wiring shall be bundled and taped with electrical tape at 10 foot intervals the entire length of each run. Wiring shall be installed on the north or east side of the pipes. Wire shall not be taut in the trench and expansion loops shall be provided to prevent the wire from being tensioned by backfilling or other subsequent construction. The side of the trench in which the wires are located shall be free of stones and other hard material which might injure the wire insulation. Backfill material placed against the wires shall be select material especially free from stones or other material which might injure the insulation.
 - 2. A minimum of 24" of wire for an expansion loop shall be allowed at each valve for contraction of wire or tightening of wire due to back-filling of trenches or possible valve service or replacement.
 - 3. Splices outside of valve locations are not allowed. All connections at the electric control valves shall be water-proofed with the system specified in Section 2.08 "Wiring".
 - 4. Install four (4) additional control wires from the controller to the furthest points along the main line with two wires on each side of the main. Terminate the wires with waterproof connections at the furthest valve-box location from the controller and note location on the as-built drawing.
- M. After piping is installed, before sprinkler heads are installed and backfilling commences, open valves and flush system with full head of water.
- N. Backfill trench and compact to finish grade elevation. Fill material placed within 12 inch of pipe to contain no rock or gravel particles greater than 1/2 inch in diameter. Protect piping from displacement. All settlement after backfill to be repaired.
- O. Arrange and coordinate installation of water meter. Cost paid by Contractor.

- P. Set valve box covers level at finish grade. Rectangular valve boxes to be placed parallel to nearby curbs and walks or other improvements. Valves and valve boxes shall be installed where shown or directed, and shall be set plumb. Valve boxes shall be centered on the valves. Where feasible, valves shall be located outside the area of natural walkways or paths and shall be placed in groundcover areas where possible. Earth fill shall be carefully tamped around each valve box. Valve boxes should be supported or blocked such that any surface loads on the valve boxes will not be transmitted below to the pipe or valves. Washed gravel sumps shall be provided below all valve boxes to permit drainage of water away from valves. Minimum depth of gravel sump is 8 inches.
- Q. Install at least two (2) automatic drain valves per zone at all low points sections of lateral piping (lines downstream from valves) to insure complete drainage of system when not in use.
- R. All sprinklers shall be installed on flexible connections or swing joints as specified in Section 2.02 "Pipe and Fitting Materials" and shall be set plumb and level with the final turf grade.
- S. All trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, soft shale, or other approved materials, free from large clods of earth or stone. Rock, broken concrete or pavement, and large boulders shall not be used as backfill material. The backfill shall be thoroughly compacted and evened off with the adjacent soil level. Selected fill dirt or sand shall be used if soil conditions are as discussed above. The fill dirt or sand shall be used in filling four (4) inches above the pipe. The remainder of the backfill shall contain no lumps or rocks larger than one (1) inch. The top six (6) inches of backfill shall be free of rocks or gravel particles over one-half (1/2) inch in diameter, subsoil or trash. Open trenches or partially backfilled trenches shall be kept to a minimum and effort shall be made to completely backfill that trench opened each day. The Contractor will be responsible for restoration of all settlement for a period of one year from acceptance.
- T. The irrigation controller shall be mounted inside the specified cabinet securely, level and plumb at the specified location shown on the contract drawings according to manufacturer's recommendations. Electrical conduit PVC sweep ells shall be used for the entering and exiting of the 24 volt control wires into the conduit entering the controller. Controllers shall be connected to the appropriate valves as indicated on the contract drawings. Electrical power supply to the controller shall be installed according to local electrical codes and shall be provided by contractor.
- U. Rain and freeze sensors shall be installed according to manufacturer's recommendations and shall be installed at locations approved by Owner.
- V. Clean area and remove all debris and excess materials from site.
- W. Install pre-fabricated enclosure over backflow preventer. Place on 4" thick concrete pad sized to accommodate attachment per manufacturer's requirements. Provide electrical connection and install heater or heat cable.

3.5 TESTS

- A. Static Pressure Test
 - 1. The entire main line system shall be constructed to successfully withstand, when completed, a full static pressure or 100 psi (whichever is greater) for a period of 6

hours with no resulting flow or pressure loss.

2. The testing for leakage shall be conducted with the observation of the Owner and all pipe, joints and appurtenances will be inspected while the system is under test pressure and leaks corrected as directed. The testing shall extend over a period of up to six (6) hours to allow for a complete inspection.

B. Performance Test

1. Upon completion of the irrigation system installation including all pressure tests, Contractor shall conduct a performance test of the complete system to insure that all components are functioning properly. Performance test shall consist of operating the system through a complete irrigation cycle per day for two (2) consecutive days. Contractor shall be at the site to monitor the performance tests and make any adjustments and corrections as needed during the testing period.
2. The Contractor shall balance and adjust the various components of the system so that overall operation of the system is most efficient. This includes adjustments to pressure regulators, part-circle sprinkler heads and individual station adjustments on the controllers.
3. Repair grades and re-dress mulch in planted areas disturbed by final testing and adjustment.

END OF SECTION

SECTION 329343

TREES

PART 1 GENERAL

1.01 SUMMARY

- A. Deciduous and Evergreen Trees
- B. Topsoil backfill
- C. Mulch
- D. Maintenance service

1.02 QUALITY ASSURANCE

- A. All materials shall be labeled with name tags.
- B. All plants and planting material not meeting these specifications shall be rejected.
- C. Submit letter from topsoil supplier stating that topsoil provided meets specified requirements.
- D. All planting work shall be done under the direction and supervision of personnel with at least 5 years of horticultural and planting experience and conform to best Horticultural Practices.

1.03 SUBMITTALS

- A. Samples of mulch, topsoil and tree accessories must be submitted in accordance with Section 013000.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Lift trees by ball or container only.
- B. Do not accept trees whose surrounding earth is cracked or has been frozen.
- C. Do not deliver trees and groundcover until immediately prior to planting.

1.05 WARRANTY AND MAINTENANCE

- A. All planting material shall be warranted for a period of one year from date project is deemed Substantially Complete.
- B. All planting material shall be in a vigorous condition at end of warranty period.
- C. A new one year warranty period shall be provided for each specimen that must be replaced starting on the date that it is planted. Replanting shall not be performed until weather conditions allow.
- D. Replacement planting material shall meet the original specifications.
- E. Provide watering and maintenance of trees during the entire warranty period.

PART 2 PRODUCTS

2.01 TREES

- A. Trees shall be of quantity, size and species as scheduled.
- B. All trees shall be free of disease and insects.
- C. All trees shall be nursery grown.

2.02 TOPSOIL

- A. Topsoil shall be free of rocks, sticks and other debris.
- B. Provide topsoil with an acidity range of 6.0 to 7.0. Verify acidity level requirements with planting materials.
- C. Topsoil shall contain a minimum of 2% of humus.

2.03 MULCH

- A. Mulch shall be shredded cypress.
- B. Mulch shall be provided free of insects.

2.04 PLANTING SCHEDULE

- A. Trees shall have a caliper of 2" to 3" and be 6' to 8' in height.
- B. Tree species and locations shall be as specified on Construction Drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Do not proceed with installation of planting materials until weather conditions permit.
- B. Review locations of tree species with Architect prior to planting.
- C. Prune trees as required to improve form and remove any dead or broken branches.
- D. Provide fertilizer to trees and groundcover after planting as recommended by nursery.
- E. Install staking and guying as indicated on drawings.

END OF SECTION

SECTION 334100

STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes gravity-flow, nonpressure storm drainage outside the building, with the following components:
 - 1. Drains.
 - 2. Precast concrete manholes.

1.03 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene-monomer rubber.
- B. LLPE: Linear low-density, polyethylene plastic.
- C. PE: Polyethylene plastic.
- D. PVC: Polyvinyl chloride plastic.
- E. TPE: Thermoplastic elastomer.

1.04 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pisand joints shall be at least silt tight, unless otherwise indicated.

1.05 SUBMITTALS

- A. Product Data: For the following:
 - 1. Drains
 - 2. Pipe
 - 3. Junction Boxes and Inlets
- B. Shop Drawings: For the following:
 - 1. Catch Basins and Stormwater Inlets. Include plans, elevations, sections, details, and frames, covers, and grates.
- C. Field quality-control test reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle junction boxes, catch basins, and stormwater inlets according to manufacturer's written rigging instructions.

PART 2 PRODUCTS

2.01 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.

2.02 PE PIPE AND FITTINGS

- A. Corrugated PE Drainage Pipe and Fittings NPS 10 and Smaller: AASHTO M 252M, Type S, with smooth waterway for coupling joints.
 - 1. Silt tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
- B. Corrugated PE Pipe and Fittings NPS 12 to NPS 48: AASHTO M 294M, Type S, with smooth waterway for coupling joints.
 - 1. Silt tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.
- C. Corrugated PE Pipe and Fittings NPS 56 and NPS 60: AASHTO MP7, Type S, with smooth waterway for coupling joints.
 - 1. Silt tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2.03 PVC PIPE AND FITTINGS

- A. PVC Water-Service Pipe and Fittings: ASTM D 1785, Schedule 40 pipe, with plain ends for solvent-cemented joints with ASTM D 2466, Schedule 40, socket-type fittings.
- B. PVC Sewer Pipe and Fittings, NPS 15 (DN 375) and Smaller: ASTM D 3034, SDR 35 with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.
- C. PVC Sewer Pipe and Fittings, NPS 18 (DN 450) and Larger: ASTM F 679, T-[1] [2] wall thickness, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.
- D. PVC Profile Gravity Sewer Pipe and Fittings: ASTM F 794 pipe, with bell-and-spigot ends; ASTM D 3034 fittings, with bell ends; and ASTM F 477, elastomeric seals.

2.04 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, with bell-and-spigot or groove and tongue ends. Wall B.

- B. ASTM C 76, with groove and tongue ends and gasketed joints with ASTM C 443, rubber gaskets, "Omni-flex" or equal. Class III, Wall A

2.05 CPP PIPE AND FITTINGS

- A. CPP Sewer Pipe and Fittings: ASTM F2881, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals. Bell and spigot connections shall utilize a welded or integral bell and valley or inline gaskets meeting the watertight joint performance requirements of ASTM D3212.
- B. Polypropylene compound shall be impact modified copolymer meeting the material requirements of ASTM F2881, Section 5 and AASHTO M330, Section 6.1.
- C. ADS HP Storm Pipe, or approved equal

2.06 NONPRESSURE-TYPE PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.07 CLEANOUTS

- B. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 - 1. Top-Loading Classification(s): Extra-heavy duty.
 - 2. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2.08 PIPE OUTLETS

- A. Headwalls: Cast-in-place reinforced concrete, with apron and tapered sides.

2.09 MANHOLES

- A. Standard Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 - 1. Diameter: 48 inches minimum, unless otherwise indicated.
 - 2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 - 3. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
 - 4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 - 5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 - 6. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.

7. Steps: Individual FRP steps, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
8. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.
9. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.
10. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange and 26-inch-diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."

2.10 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:
 1. Cement: ASTM C 150, Type II.
 2. Fine Aggregate: ASTM C 33, sand.
 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious materials ratio.
 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

2.11 CATCH BASINS

- A. Standard Precast Concrete Catch Basins: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 2. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
 3. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 4. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 5. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.

6. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and grate.
7. Steps: Individual FRP steps, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
8. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

2.12 PIPE OUTLETS

- A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.

2.13 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

2.14 PIPING INSTALLATION

- A. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

2.15 PIPE JOINT CONSTRUCTION

- A. Basic pipe joint construction is specified in Division 33 Section "Common Work Results for Utilities." Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

2.16 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

2.17 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318/318R.

2.18 DRAINAGE SYSTEM INSTALLATION

- A. Assemble and install components according to manufacturer's written instructions.
- B. Install with top surfaces of components, except piping, flush with finished surface.
- C. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.
- D. Embed channel sections and drainage specialties in 4-inch (102-mm) minimum concrete around bottom and sides.
- E. Fasten grates to channel sections if indicated.

- F. Assemble channel sections with flanged or interlocking joints.
- G. Embed channel sections in 4-inch (102-mm) minimum concrete around bottom and sides.

2.19 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.

2.20 CLEANING

- A. Clean interior of piping of dirt and superfluous materials.

PART 3 EXECUTION

3.01 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.02 PIPING APPLICATIONS

- A. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
 - 1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.
 - a. Shielded flexible couplings for same or minor difference OD pipes.
 - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

2. Use pressure-type pipe couplings for force-main joints.
- B. Special Pipe Fittings: Use for pipe expansion and deflection. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- C. Gravity-Flow, Nonpressure Sewer Piping: Use any of the following pipe materials for each size range:
1. NPS 3: Corrugated PE drainage pipe and fittings, silt tight couplings, and coupled joints.
 2. NPS 3: NPS 4 PVC sewer pipe and fittings; gaskets; and gasketed joints.
 3. NPS 4 and NPS 6: Corrugated PE drainage pipe and fittings, silt tight couplings, and coupled joints.
 4. NPS 4 and NPS 6: PVC sewer pipe and fittings, gaskets, and gasketed joints.
 5. NPS 8 to NPS 12: Corrugated PE drainage pipe and fittings in NPS 8 and NPS 10 and corrugated PE pipe and fittings in NPS 12 couplings, and coupled joints.
 6. NPS 8 to NPS 12: PVC sewer pipe and fittings, gaskets, and gasketed joints.
 7. NPS 8 to NPS 12: PVC profile gravity sewer pipe and fittings, gaskets, and gasketed joints.
 8. NPS 8 to NPS 12: NPS 12 reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
 9. NPS 15: Corrugated PE pipe and fittings, silt tight couplings, and coupled joints.
 10. NPS 15: PVC sewer pipe and fittings, gaskets, and gasketed joints.
 11. NPS 15: PVC profile gravity sewer pipe and fittings, gaskets, and gasketed joints.
 12. NPS 15: Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
 13. NPS 18 to NPS 36: Corrugated PE pipe and fittings, silt tight couplings, and coupled joints.
 14. NPS 18 to NPS 36: Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
 15. NPS 42 to NPS 60: Corrugated PE pipe and fittings, silt tight couplings, and coupled joints.
 16. NPS 42 to NPS 60: Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.

3.03 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent

practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
 - 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
 - 3. Install piping with 36-inch minimum cover.
 - 4. Install piping below frost line.
 - 5. Install PE corrugated sewer piping according to CPPA's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
 - 6. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
 - 7. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

3.04 PIPE JOINT CONSTRUCTION

- A. Basic pipe joint construction is specified in Division 33 Section "Common Work Results for Utilities." Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
- B. Join gravity-flow, nonpressure drainage piping according to the following:
 - 1. Join corrugated PE piping according to CPPA 100 and the following:
 - a. Use silt tight couplings for Type 1, silt tight joints.
 - 2. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric gasket joints.
 - 3. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.

4. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints and proper tolerances for the Omni-flex gaskets.
 5. Join dissimilar pipe materials with nonpressure-type flexible couplings.
- C. Join dissimilar pipe materials with pressure-type couplings.

3.05 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
 2. Use medium-duty, top-loading classification cleanouts in paved foot-traffic areas.
 3. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
 4. Use extra-heavy-duty, top-loading classification cleanouts in roads areas.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.06 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
1. Use light-duty, top-loading classification drains in earth or unpaved foot-traffic areas.
 2. Use medium-duty, top-loading classification drains in paved foot-traffic areas.
 3. Use heavy-duty, top-loading classification drains in vehicle-traffic service areas.
 4. Use extra-heavy-duty, top-loading classification drains in roads areas.
- B. Embed drains in 4-inch minimum depth of concrete around bottom and sides.
- C. Fasten grates to drains if indicated.
- D. Set drain frames and covers with tops flush with pavement surface.

3.07 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections according to ASTM C 891.
- C. Construct cast-in-place manholes as indicated.
- D. Install PE sheeting on earth where cast-in-place-concrete manholes are to be built.

- E. Install FRP manholes according to manufacturer's written instructions.
- F. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.

3.08 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.09 STORMWATER INLET AND OUTLET INSTALLATION

- A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.
- B. Construct riprap of broken stone, as indicated.
- C. Install outlets that spill onto grade, anchored with concrete, where indicated.
- D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.
- E. Construct energy dissipaters at outlets, as indicated.

3.10 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318/318R.

3.11 STORMWATER DISPOSAL SYSTEM INSTALLATION

- A. Piping Systems: Excavate trenches of width and depth, and install piping system, filter fabric, and backfill according to piping manufacturer's written instructions.

3.12 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping."
 - 1. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- B. Connect to sediment interceptors specified in Division 22 Section "Sanitary Waste Interceptors."

3.13 IDENTIFICATION

- A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
 - 1. Use warning tape over piping and over edges of underground structures.

3.14 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.
 - 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
 - b. Option: Test plastic piping according to ASTM F 1417.
 - c. Option: Test concrete piping according to ASTM C 924.
 - d. Ductile-Iron Piping: Test according to AWWA C600, "Hydraulic Testing" Section.
 - e. PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.
- C. Leaks and loss in test pressure constitute defects that must be repaired.

- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.15 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water as required.

END OF SECTION