PROJECT MANUAL

OWNER:

TULSA

PUBLIC SCHOOLS

INDEPENDENT SCHOOL DISTRICT NO. ONE
OF TULSA COUNTY
3027 South New Haven Avenue
Tulsa, OK 74114

TULSA PUBLIC SCHOOLS
INDEPENDENT SCHOOL DISTRICT NO. ONE OF TULSA COUNTY

GRISSOM ELEMENTARY SCHOOL NEW DROP-OFF / PICK-UP DRIVE & PARKING LOT

6646 SOUTH 73RD EAST AVE., TULSA OK 74135

ARCHITECT:

GS HELMS + ASSOCIATES

ph: 918.298.7257
wb: gshelms.com

424 e. main st.
jenks, ok 74037

CIVIL ENGINEERING CONSULTANT:

wallace design collective

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

ISSUE:
CONSTRUCTION DOCUMENTS

PROJECT NOS.: 26-00400

SET NUMBER:

ISSUE DATE:
MARCH 13, 2026

PROJECT MANUAL
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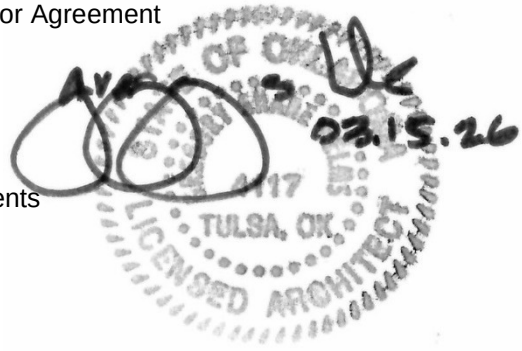

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SECTION 000010
SOLICITATION AND NOTICE FOR BIDS

Sealed Bids in duplicate for **TULSA PUBLIC SCHOOLS – GRISSOM ELEMENTARY SCHOOL – NEW DROP OFF / PICK UP DRIVE & PARKING LOT** project will be received and publicly opened and read aloud by INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY, OKLAHOMA, hereinafter referred to as "Owner," in Conference Room 600, Education Service Center, 3027 S. New Haven Ave, Tulsa, OK, 74114 until 10**:00am, APRIL 24, 2026.**

The bidding process will be in compliance with the Public Competitive Bidding Act of 1974 and "Local Bid Preference" per Oklahoma Statutes. Bids must be accompanied by a bid security in the amount of 5% of the bid. By this notice, all provisions of the act apply to this project and are incorporated into notice by reference.

Upon receipt of an acceptable bid, the contract will be awarded within thirty days after the opening of bids and the written contract executed within sixty days thereafter.

A non-mandatory Pre-Bid Conference will be held on Tuesday, March 14, 2026 at 3:30pm at the project site. Grissom Elementary, 6646 S 73rd E Ave Tulsa, OK

Attention is called to the fact that a designated completion date for this project site will be established based on the number of calendar days, as stated in the accepted bid, required to complete the Project work. There will be a $2500 Liquidated Damages Clause for each day the contract is not completed. The scheduled completion date will be a very significant and material factor to the owner when selecting the Lowest Responsible Bid. Each Bidder must include (in the space provided on the Bid Form) the number of calendar days, which the Bidder will be required to complete the specified Project within.

Failure to comply with the above bid requirements will result in return of unopened Bid Proposal.

Architect for the project is GSHELMS & Associates, LLC

Bid Documents may be obtained from the Architect

Owner reserves the right to reject any or all bids and to waive informalities or minor irregularities in any bid.

INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY OKLAHOMA

By Ms. Susan Lamkin, Board President

ATTEST:

By Sarah Bozone, Board Clerk

SECTION 000020

INSURANCE REQUIREMENTS

Contractor shall obtain insurance of the types and in the amounts described below. The insurance shall be written by insurance companies and on forms acceptable to Owner.

1). Commercial General and Excess Liability or Umbrella Liability Insurance:

Contractor shall maintain commercial general liability (CGL) and, if necessary, commercial excess liability or umbrella insurance with a limit of not less than $2,000,000 each occurrence. CGL insurance should contain a general aggregate with a $2,000,000 limit, and should apply separately to the Project.

a) CGL insurance shall be written on an ISO occurrence form and shall cover liability arising from premises, operations, independent contractors, at a minimum, contractual liability equivalent to an intermediate form of contractual liability insurance, products/completed operations and personal injury and advertising injury;
b) Owner shall be included as an injured CGL, using ISO Additional Insured Endorsement CG 20101185 or a substitute providing equivalent coverage, and under the commercial excess liability or umbrella, if any. This insurance, including insurance provided under the commercial excess liability or umbrella, if any, shall apply as primary insurance with respect to any other insurance or self insurance programs afforded to or maintained by Owner;
c) There shall be no endorsement or modification of the CGL limiting the scope of coverage for liability arising from pollution, explosion, collapse or underground property damage;
d) **Waiver of Subrogation**. Contractor waives all rights against Owner and its agents, officers, directors and employees for recovery of damages to the extent these damagers are covered by the commercial general liability, excess liability or umbrella liability insurance maintained pursuant to this agreement.

2). Business Auto and Excess Liability or Umbrella Liability Insurance:

Contractor shall maintain business auto liability and, if necessary, excess liability or umbrella liability insurance with a limit of not less than $2,000,000 each accident.

a) Such insurance shall cover liability arising out of any auto (including owned, hired and non-owned autos);
b) Business auto coverage shall be written on an ISO form. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01;
c) If the Contract Documents require Contractor to remove and haul hazardous waste from the project site or if the Project involves such similar environmental exposure, pollution liability coverage equivalent to that provided on the ISO Pollution Liability Broadened Coverage for Covered Autos Endorsement (CA 99 48) shall be provided, and the Motor Carrier Act Endorsement (MCS 90) shall be attached;
d) **Waiver of Subrogation**. Contractor waives all rights against the Owner and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the business auto liability, excess liability or umbrella liability insurance obtained by Contractor pursuant to this Agreement or under any applicable auto physical damage coverage.

3). Workers Compensation Insurance

Contractors shall maintain workers compensation and employers liability insurance.

a) The employers liability, and if necessary excess liability or umbrella insurance limits shall not be less than $2,000,000 each accident for bodily injury by accident or $2,000,000 each employee for bodily injury by disease;
b) The alternate employer endorsement (WC 00 03 01 A) shall be attached showing Owner in the schedule as the alternate employer.

4). Property Insurance

a) Owner may choose to purchase and maintain in force property insurance for the entire Work. Such insurance shall be written in an amount at least equal to the initial contract sum as well as subsequent modifications of that sum. The insurance shall apply on a replacement cost basis. If the insurance obtained in compliance with the Paragraph is Builders Risk insurance, coverage shall be written on a completed value form;
b) The insurance as required in subparagraph (a) shall name as insured the Owner, Contractor and all subcontractors and sub-subcontractors on the Project. The insurance policy shall contain a provision that the insurance will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Contractor;
c) The insurance as required in Subparagraph (a) shall cover the entire Work as outlined in the project specifications and shall also cover portions of the Work located away from the site but intended for use at the site and shall also cover portions of the Work in transit. The policy shall include as insured property scaffolding, false work and temporary buildings located at the site. The policy shall cover the cost of removing debris, including demolition, as any is made legally necessary by the operation of any law, ordinance or regulation.
d) Owner shall purchase and maintain boiler and machinery insurance required by the contract documents or by law, covering insured objects during installation and until final acceptance by Owner. This insurance shall name as insured Owner, Contractor and all subcontractors and sub-subcontractors in the Work;
e) The insurance as required by this Paragraph shall be written to cover all risks of physical loss except those specifically excluded in the policy and shall inure at least against the perils of fire, lightning, explosion, windstorm or hail, smoke, aircraft or vehicles, riot or civil commotion, theft, vandalism, malicious mischief and collapse;
f) Any deductible applicable to the insurance purchased in compliance with this Paragraph shall be paid by Owner;
g) Before the commencement of Work, Owner shall provide Contractor a copy the insurance policy obtained in compliance with this Paragraph;
h) Before the commencement of Work, Owner shall declare to Contractor any decision on its part not to obtain any or all of the insurance coverage as required in this Paragraph. Upon such declaration, Contractor shall then have the right to obtain insurance equivalent in coverage to that required in this Paragraph 4 and by appropriate change order, charge the cost of such insurance to Owner. If Contractor is damaged by the failure of Owner to comply with the requirements of this Paragraph, then Owner shall bear all reasonable costs properly attributable to that failure.
i) **Waiver of Subrogation**. Owner and Contractor waive all rights against each other and each of their subcontractors, sub-subcontractors, officer, directors, agents and employees for recovery for damages caused by fire and other perils to the extent covered by builders risk or property insurance purchased pursuant to the requirements of this Paragraph 4 or any other property insurance applicable to the Work.
j) Partial occupancy or use of the Work shall not commence until the insurance company or companies providing insurance as required in this Paragraph have consented to such partial occupancy or use. Owner and Contractor shall take reasonable steps to obtain consent of the insurance company or companies and agree to take no action, other than upon mutual written consent, with respect to occupancy or use of the Work that could lead to cancellation, lapse or reduction of insurance;

5). Evidence of Insurance

Prior to commencing the Work, Contractor shall furnish Owner with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, setting out compliance with the insurance requirements set forth above.

a) All certificates shall provide for 30 days written notice to Owner prior to the cancellation or material change of any insurance referenced to herein;
b) The work "endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" shall be deleted from the cancellation provision of all certificates provided by the Contractor;
c) Failure of Owner to demand such certificate or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence that is provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance;
d) Owner shall have the right, but not the obligation to prohibit Contractor or any subcontractor from entering the Project site unit such certificates or other evidence that insurance has been placed in the complete compliance with these requirements is received and approved by the Owner;
e) Failure to maintain the insurance in this Insurance Requirement Section shall constitute an event of default pursuant to this Agreement and shall allow Owner to terminate this Agreement to Owner's option. If Contractor fails to maintain the insurance set forth herein, Owner shall have the right, but not the obligation, to purchase said insurance at Contractor's expense;
f) Contractor shall provide certified copies of all insurance policies required above within 10 working days of Owner's written request for said copies.

6). General Insurance Provisions

a) No Representation of Coverage Adequacy. By requiring the insurance as set out in the Insurance Requirement Section, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to Owner in this Agreement or any other provision of the Contract documents;
b) Cross Liability Coverage. If Contractor's liability policies do not contain the standard ISO separation of insureds provision or a substantially similar clause, they shall be endorsed to provide cross liability coverage;
c) The insurance requirements set out in this Insurance Requirement Section are independent from all other obligations of Contractor under this Agreement and apply whether or not required by any other provision of this Agreement;
d) Subcontractor's Insurance. Contractor shall cause each subcontractor employed by Contractor to purchase and maintain insurance of the type specified in the Insurance Requirement Section. When requested by the Owner, Contractor shall furnish to Owner copies of certificates of insurance evidencing coverage for each subcontractor.

END OF SECTION

SECTION 000100

INSTRUCTIONS TO BIDDERS

SCOPE:

1. GENERAL CONDITIONS:

Standard form "General Conditions of the Contract for Construction," The American Institute of Architects, Document A201 - 2017, ("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 Independent School District Number One of Tulsa County, Oklahoma, a public corporation.

(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.

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(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 Clerk of Independent School District Number One of Tulsa 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 $25,000.00 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. Copies of the affidavit form may be obtained from the Facilities Bond Office Room 201 South, Charles C. Mason Education Service Center, 3027 South New Haven Avenue, Tulsa, Oklahoma, 74147.

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, which can be obtained from 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, in its sole discretion, 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 five (5) 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 000110

SPECIAL CONDITIONS OF THE CONTRACT

The following conditions also apply to this contract:

1. WORK COVERED UNDER THE CONTRACT:

The scope of the work consists of all new materials, tools, equipment, labor and services, to complete the **TULSA PUBLIC SCHOOLS – GRISSOM ELEMENTARY SCHOOL NEW DROP-OFF / PICK-UP DRIVE & PARKING LOT** project listed in the "Solicitation and Notice for Bids" in accordance with the "Form of Proposal" and as indicated by the Drawings and by the Specifications included in this Project Manual.

2. MATERIALS AND EQUIPMENT:

All material and equipment utilized shall be in conformance with these Specifications and with good Standards of practice and shall meet or exceed the latest applicable industry standards such as A.S.T.M., Standards and Specifications along with all applicable local and national codes and ordinances, including ICC, N.E.C. and N.F.P.A.

Failure to comply with the terms and conditions of this solicitation or to deliver equipment, supplies or services identified in the Solicitation and Contract at the discount quoted will void the contract award. In the case of failure to deliver goods or provide services in accordance with the contract terms and conditions, Owner, after due oral or written notice, may procure them from other sources and hold the contractor responsible for any resulting additional purchase and administrative costs.

3. CONTRACT METHOD:

The method of Contract and Management shall be in accordance with the Owner's requirements and guidelines set forth at the time the Contract is signed and a Work Order issued.

4. CONTRACT ADMINISTRATOR:

This individual shall serve as the monitor of the conditions of the contract and shall work directly with the contractor to schedule and coordinate the performance of services and to provide general direction under the resulting contract. The following individual is identified to use all powers under the contract to enforce its faithful performance for the Owner: **Sue Ann Bell**, Project Supervisor, **(918) 833-8085**.

5. PRIORITIES AND WORK SEQUENCE:

The priority will be furnished by the Owner to the successful bidder at the Issuance of the Work Order. Completion of the project(s) in a timely manner is critical. The bidder is required to give the actual number of days to complete each project. Timing will be a consideration in determining the successful bidder.

6. CONTRACTOR'S USE OF PREMISES:

The contractor shall also furnish a schedule of intended workdays to the owner through the Department of Building Planning prior to commencing the work at any site and keep all

parties informed of any adjustments made necessary by changes of shipping schedules or other causes.

Permission must be obtained from the Owner for temporary use of electric power, water, toilet facilities or other utilities. The Owner's approval must also be obtained for the exact on-site location of any storage of materials, tools or equipment. Owner assumes no responsibility for items stored on school property.

Demolition items and/or debris shall be hauled away from the site after each day's activity and the site always maintained in a clean condition free of any build-up of objectionable scraps, waste material or refuse.

7. OWNER OCCUPANCY AND PROTECTION OF PROPERTY:

The owner's Site-based Personnel may occupy the site. Therefore, it may be necessary to erect a system of barricades or markers to direct traffic away from the area of each day's operations. The Contractor shall protect and safeguard against damage to all adjacent or nearby surfaces, materials, hardware, glass, furnishings, signage or other site improvements and/or vehicles if in the area of intended loading and unloading operations.

8. SALES TAX: (None Required)

The Owner will issue such Documents as necessary to exempt the sales tax upon execution of a contract for the Project(s); therefore the Contractors are advised to omit the State Sales Tax when preparing their Bid.

9. PROJECT START-UP:

The contractor is advised to notify the Owner well in advance of commencing the work on the site.

10. KNOWLEDGE OF SITE AND SCOPE OF WORK REOUIREMENTS:

All Contractors shall visit the site on which work is proposed and become thoroughly familiar with the existing conditions and with the Bid Documents and the Scope of the Work included prior to submitting their bid. Sign in at the main office when visiting the site(s).

11. SUBMITTALS AND CLOSING PROCEDURES:

(Other than Start-up Contract Requirements such as Certificates of Insurance, Bonds, Etc.)

A. Submit Schedules of intended workdays and activity planned for each Site after receiving Owner's Project Priority list prior to commencing work. **Shop drawings and/or product data and samples** shall be submitted to Tulsa Public Schools' Building Planning department covering all Items in the Scope of Work **for approval prior to manufacture** shipment and installation at the project site. Submit the number of copies, which the contractor requires plus one copy, which will be retained by Tulsa Public Schools' Building Planning Department. Furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

B. Unless the contract stipulates "Payment upon Completion" of the project or another method of payment; during Progress of the work, submit a separate "Application

and Certificate for Payment"-AIA Document G702 on or about the 25th day of each month for work performed in that same month. A 5% retainage shall be calculated and withheld from each Pay Application until the project is completed and accepted by Owner.

C. Upon Final Completion and Final Acceptance by Owner, submit the following prepared and properly signed Closing Documents:

1. Certificate of Substantial Completion
(AIA Document G704)

2. Final Application and Certificate for Payment
(AIA Document G702)

3. Contractor's Affidavit of Payment of Debts and Claims
(AIA Document G706)

4. Contractor's Affidavit of Release of Liens
(AIA Document G706A)

5. Consent of Surety Company to Final Payment
(AIA Document G707)

6. Contractor's Affidavit Pursuant to Title 61
O.S.- Optional in lieu of items 3 above.

7. Contractor's Written Warranty for one (1) year against defects in Material or Workmanship.

12. SUBSTITUTIONS AND DEVIATIONS FROM THE SPECIFICATIONS:

Substitutions prior to Bid are covered under Paragraph 6 "Instructions to Bidders". Any substitution or deviation from the specifications must be by Owner's prior approval and accepted by an approved change order stipulating the change in price and change in construction time, if any.

13. OWNER'S RIGHT TO REJECT BIDS:

The Owner reserves the right to reject any or all bids and to waive minor irregularities in any bid. In addition, Bidders should recognize the right of the Owner to reject a bid if said bidder fails to provide any data required in the bid or if the bid is in any way incomplete.

14. FINAL CLEANING:

A. Execute prior to final inspection.

B. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances and polish transparent and glossy surfaces. Clean equipment and fixtures, sweep and vacuum interior areas and rake clean exterior areas. Remove waste and surplus materials, rubbish and construction facilities from the Project and from the site.

15. SPECIAL TERMS AND CONDITIONS:

15.1 Testing and Inspections: Owner reserves the right to conduct any test or inspection it may deem advisable to assure supplies and services conform to specifications.

15.2 Proprietary Indemnity: Bidder warrants that the system, each part of the system, and all other products and services used by or furnished by bidder, do not infringe upon or violate any patent, copyright, trade, secret, trademark, or any other proprietary right of any third party. In the event of claim against Owner, Owner shall promptly notify vendor and vendor shall defend and indemnify Owner against any loss, cost expense, claim, or liability arising out of such claim, whether or not such claim is successful.

15.3 Patent and Copyright Materials: Unless otherwise expressly provided in a contract, bidder shall be solely responsible for clearing the right to use any patented or copyrighted materials in the performance of this contract.

15.4 Audit: Contractor hereby agrees to retain all books, records and other documents relative to this contract for five (5) years after final payment or until audited by the owner, whichever is sooner. Owner, its authorized agents and/or auditors reserve the right to perform or have performed an audit of contractor's records and therefore shall have full access to the right to examine any of said materials within those five years.

15.5 Open Records: Ownership of all data, materials and documentation originated and prepared for the owner pursuant to this bid shall belong exclusively to Owner and be subject to inspections in accordance with the Oklahoma Open Records Act.

15.6 Contractor Compliance: Contractor shall comply with all procedural instructions that may be issued from time to time by Owner; however, the terms and conditions of the contract will not change:

16. Lead based paint, contractors shall be certified and follow work practices established under the EPA Renovations, Repairing, and Painting Program applicable to schools when performing any work which will disturb interior or exterior lead-based surface coatings in buildings constructed before 1997/8. All such work shall be performed in compliance with 40 CFR Part 745.

END OF SECTION

SECTION 000120

SUPPLEMENTAL CONDITIONS TO THE CONTRACT

(References are to Articles, Paragraphs, Subparagraphs and Clauses of the General Conditions of the Contract for Construction, AIA Document A201, 2017 Edition)

2.2.5 **Delete** entire Subparagraph, and substitute the following:

"The Owner shall furnish Contractor with an electronic copy of Drawings and Project Manual. Hard copies needed by the Contractor shall be provided and paid for by the Contractor."

4.3.1 **Delete** entire Subparagraph, and substitute the following:

"Definition"

"A Claim is any demand or assertion by the Contractor that it should be paid more money than the Contract Sum, as adjusted under the Change Order provisions herein, by the Owner because of action or inaction on the part of Owner, Program Manager, Architect, or any party for whom Owner is responsible, or any party with whom Owner has separately contracted for other portions of the Project, including, but not limited to, any demand or assertion that Contractor's performance has been delayed, interrupted or interfered with, that Contractor's performance has been accelerated or suspended, that Contractor's performance has been wrongfully terminated, that the Contract Documents have been misinterpreted, that there has been a failure of payment, that Contractor has encountered concealed or unknown conditions, that Contractor has encountered hazardous materials, that there are problems with the Contract Documents, or the timing of Architectural approvals or decisions, that actions of the Owner have been intentionally wrongful or deceptive, that Owner is directly or indirectly guilty of negligence or an intentional tort related in any way to the Work, that the amount of time or money granted in a Construction Change Directive is inadequate, that an item treated as a minor change in the Work should have been treated as a Change Order, that a time extension grant was inadequate, or that Contractor is entitled to any other relief, on any legal theory, related to the Work and the Contract."

"Notice Requirement"

"Within five (5) days of the first occurrence of an event that Contractor has any reason to believe might result in a Claim, or within five (5) days of Contractor's discovery of the first occurrence of an event that Contractor has any reason to believe might result in a Claim, if the first occurrence of the event was willfully hidden from the Contractor, the Contractor shall file a written document clearly captioned "Notice of Claim" with Tulsa Public Schools, Program Manager and the Architect. The notice shall clearly set out the specific matter of complaint, and the impact or damages which may occur or have occurred as a result thereof, to the extent the impact or damages can be assessed at the time of the notice. If the impact or damages cannot be assessed as of the date of the notice, the notice shall be amended at the earliest date this is reasonably possible."

Add the following Subparagraph:

"Any claim or portion of a Claim that has not been made the specific subject of a notice strictly in accordance with the requirements of this section shall be waived. It is imperative that Owner have timely, specific notice of any subject, the impact of which Owner may be in a position to mitigate."

4.3.3 **Add** the following sentences:

"Claims Handling During Construction. After receipt of a Notice of Claim, the Owner may elect to refer the matter to the Architect, Program Manager or another party for review. Contractor will attend meetings called to review and discuss the Claims and mitigation of the problem, and shall furnish any reasonable factual backup for the Claim requested. The Owner may also elect to defer consideration of the Claim until the Work is completed, in which case the same review options shall be available to the Owner at the completion of the Work. At any stage the Owner is entitled to refer a Claim to mediation under the Construction Industry Mediation Rules of the American Arbitration Association, and if this reference is made Contractor and the Owner will take part in the mediation process. The filing, mediation or rejection of a Claim does not entitle Contractor to stop performance of the Work. The Contractor shall proceed diligently with performance of the Contract."

4.3.6.1 **Add** the following Subparagraph:

"Calculating Claim Amount"

"In calculating the amount of any Claim the following standards will apply:

.1 No indirect or consequential damages will be allowed.

.2 All damages must be directly and specifically shown to be caused by a proven wrong. No recovery shall be based on a comparison of planned expenditures to total actual expenditures, or on estimated losses of labor efficiency, or on a comparison of planned manloading to actual manloading, or any other analysis that is used to shown damages indirectly.

.3 Damages are limited to extra costs specifically shown to have been directly caused by a proven wrong.

.4 The maximum daily limit on any recovery for delay shall be the amount estimated by the Contractor for job overhead costs divided by the total number of calendar days of Contract Time called for in the original Contract."

.5 No monetary costs shall be allowed for delay.

5.2.1 In the first sentence, delete "as soon as practicable" and substitute "within seventy-two (72) hours."

5.2.5 **Add** this new Subparagraph:

"The Contractor shall not sublet the work as a whole. The approval of Subcontractors in no way relieves the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents."

5.3.1 **Delete** the remainder of the second sentence beginning with the words "and shall allow to the Subcontractor."

5.4.2 **Delete** entire Subparagraph and substitute the following:

"Owner shall only be responsible for compensating Subcontractors for work done or materials furnished after the date Owner gives written notice of its acceptance of the subcontract agreement."

5.5 **Add** this new Paragraph:

5.5 "RESPONSIBILITY"

5.5.1 "Contractor shall be fully responsible for the performance of its Subcontractors.

6.1.1 **Delete** the entire Subparagraph, and substitute the following:

"The Owner reserves the right to perform other construction work, maintenance and repair work and school program operations at the site and near the site during the time period of the Work. Owner may perform other work with separate contractors or with its own forces. On renovation/addition projects, the Owner shall have access to the site and all buildings on the site at all times. On new construction, the Owner shall have access to the site and all buildings during normal business hours."

10.1.2 **Add** this new Subparagraph:

"The Contractor shall be responsible for the protection and security of the Work and the Project, until he receives written notification that the Substantial Completion of the work has been accepted by the Tulsa Public Schools."

10.2.8 **Add** this new Subparagraph:

"In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner, Program Manager and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 4.3 and Article 7."

10.3.1 **Delete** entire Subparagraph and substitute the following:

"Contractor is responsible for reviewing all Asbestos Hazard Emergency Act Management Plans on file with Owner and for obtaining sign-off from Tulsa Public Schools Hazardous Materials Bureau prior to commencing the Work. In no event shall the Contractor engage in the disturbance or removal of asbestos or polychlorinated biphenyl (PCB). In the event the Contractor encounters on the site material reasonably believed to be asbestos or PCB which has not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to the Architect in writing. If the portion of the Work that is stopped is critical to overall completion, the Contractor shall reschedule the Work, if possible, to minimize the impact of the stoppage. The work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or PCB and has not been rendered harmless. The work in the affected area shall be resumed when the asbestos or polychlorinated biphenyl (PCB) has been removed, or when it has been rendered harmless. If the Work is stopped due to the presence of such materials, Owner shall arrange for the removal and/or rendering harmless of such materials prior to Contractor being allowed to proceed. The Owner shall have the option of arranging for removal by a qualified, adequately insured third party tendered to Contractor, and mutually agreed to by both parties, as a Subcontractor in which case a Change Order will be issued for the cost of this subcontract. Any tendered Subcontractor must indemnify the Contractor and the Owner with regard to its work. In the case of such a tender, Owner will not hold Contractor responsible for the work or other actions of the tendered Subcontractor, and Contractor's approval of tendered Subcontractor shall not be unreasonably withheld. In those instances in which the presence of such materials was set forth in the Hazardous Materials documents or in which Contractor had other notice of such through information given to Contractor by Owner or its representative prior to the commencement of the Work, Contractor shall not be entitled to a Claim for any delays, disruption or interference it encounters. In those instances of work stoppage due to the existence of such hazardous materials which were not set forth in the

Hazardous Materials Control plans and of which Contractor had no other prior notice, Contractor may be entitled to a Claim for extension of time due to the work stoppage."

11.4 PROPERTY INSURANCE

11.4.1 **Delete** entire Subparagraph, and substitute the following:

"Until the Work is completed and accepted by the Owner, the Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. The property insurance shall also cover portions of the Work stored off site after written approval of the Owner of the value established in the approval, and also portions of the Work in transit. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage including flood and earthquake and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. The insurance shall cover reasonable compensation for Architect's and Program Manager's services and expenses required as a result of an insured loss. This "all risk" policy shall be written incorporating Actual Completed Value Form and General Change Endorsement incorporating the following language:

"Permission is given for the Project insured hereunder to become occupied, the insurance remaining in full force and effect until such time as the Project has been accepted by the Owner, all as currently approved by the Laws for the State of Oklahoma."

"The policy shall include coverage for Explosion, Collapse and Underground (XCU). Such insurance shall be evidenced by the kind of policy which does not have to be adjusted or reported upon periodically but provides constant insurance at full one hundred percent (100%) of all insurable values as they are created during construction by performance of the Contract. The Certificate of Insurance must include the names of the insured Contractor and the Tulsa Public Schools."

11.4.1.2 **Delete** entire Clause, and substitute the following:

"Loss under such All Risk Builder's Risk Insurance shall be made payable jointly to the Tulsa Public Schools and to the Contractor by name (and, if separate mechanical contracts are awarded to each, by name, of the plumbing, heating, ventilating and electric contractors)."

11.4.1.3 **Delete** entire Clause, and substitute the following:
"In the case of loss under the risks covered, and of collection by insured, the Owner shall act as trustee for all parties concerned as their interests may appear."

12.1.3 **Add** this new Clause:

"Where nonconforming work is found, the entire area of work involved shall be corrected unless the contractor can completely define the limits to the Architect's satisfaction. Additional testing, sampling, or inspecting needed to define nonconforming work shall be at the Contractor's expense. He shall employ the Owner's testing laboratory if such services are reasonably required by the Architect. All connected work shall be retested at the contractor's expense. Extra Architectural or Program Manager Services required to analyze nonconforming work shall be paid for by the Contractor."

13.1.1 **Delete** entire Subparagraph, and substitute the following:

"District Court in and for the County of Tulsa, State of Oklahoma shall have sole jurisdiction in any action brought under this contract."

14.2.5 **Add** this new Subparagraph:

"If a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, the Surety shall promptly remedy the default by completing the Contract in accordance with its terms and conditions, or by obtaining a bid or bids in accordance with its terms and conditions. Upon determination by the Owner and the Surety of the lowest responsible bidder, the Surety will arrange for a contract between such bidder and the Owner, and make available as work progresses sufficient funds to pay the cost of completion less the balance of the Contract Sum, but not exceeding the Penal Sum of the bond and other costs and damages for which the Surety may be liable under the bond. The phrase 'balance of the Contract Sum' as used herein shall mean the total amount payable by the Owner to the Contractor under the Contract and amendments thereto less the amount previously paid by the Owner to the Contractor."

END OF SECTION

SECTION 000125

GEOTECHNICAL INFORMATION

See Attached ***Geotechnical Engineering Report*** performed by
AimRight Testing & Engineering

Report #4860318 April 27, 2018

Report was performed for Classroom Wing Addition located adjacent to proposed project.

AIMRIGHT
TESTING & ENGINEERING

Construction Materials Testing • Special Inspections • Geotechnical Engineering

GEOTECHNICAL ENGINEERING REPORT

AIMRIGHT Project No. 4860318
April 27, 2018

Grissom Elementary School Classroom Addition

6646 South 73rd East Avenue
Tulsa, OK 74133

Prepared for:

Tulsa Public Schools
P.O. Box 470208
Tulsa, OK 74147

200 East Center Street • Collinsville, OK 74021 • (918) 371-3205 • www.aimrighttesting.com

April 27, 2018

Tulsa Public Schools
P.O. Box 470208
Tulsa, OK 74147

Attn: Mr. Gregory Helms, A.I.A.
(918) 298-7257
greg.helms@gshelms.com

Re: Geotechnical Engineering Report
Grissom Elementary School Classroom Addition
6646 South 73rd East Avenue, Tulsa, OK 74133
AIMRIGHT Project No. 4860318

It has been a pleasure serving you on this project. AIMRIGHT is pleased to submit this Geotechnical Engineering Report for the proposed construction planned at the referenced site. This report presents the findings of the geotechnical exploration and presents recommendations for design for the project.

We appreciate the opportunity to provide geotechnical consultation services for the subject project. We look forward to serving as your geotechnical engineer and construction materials testing laboratory on the remainder of this and future projects. Please do not hesitate to contact us with any concerns or questions regarding this report.

Respectfully submitted,

AIMRIGHT Testing & Engineering, LLC
CA No. 5794 (exp. 6/30/18)

Justin J. Boyd Jr., P.E.
Engineering Manager
jboyd@aimrighttesting.com

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Boring Location Plan
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1.0 PROJECT SCOPE AND PROCEDURES

1.1 Project Location and Description

The project is located at 6646 South 73rd East Avenue in Tulsa, Oklahoma. We understand that a new one-story building (~ 7,500 sf) and new parking/drive areas will be constructed on the referenced site. The site is developed with existing structures, various pavement areas, grass-cover with few trees and shrubbery as well as above and below-grade infrastructure.

The topography is generally level with minimal elevation differences across the site. Cut/fill depths have not been finalized; however, we estimate that a minimum cut/fill of less than 1 to 2 feet will be required to reach the final site elevations.

The structure is anticipated to be supported by a concrete slab-on-ground and shallow or deep foundation system. Information regarding estimated structural loading conditions was provided; and, we utilized estimated maximum column loads of 180 kip and wall loads of 15 kip per linear foot in our engineering analyses.

The new parking/drive areas will more than likely be constructed with a flexible or rigid surface and aggregate base course overlying a properly prepared subgrade. We estimate that traffic volume to be equal to less than 25,000 (medium duty) and 50,000 (heavy duty) equivalent 18-kip single-axle loads (ESALs) over a 20-year period.

1.2 Scope of Services

The primary purpose of this report is to provide geotechnical engineering recommendations for the proposed site development. Our Scope of Services consisted of the following:

- Drilling six (6) soil test borings (borings) to depths of 5 to 25 feet or 5 feet into rock, whichever occurred first;
- Performing laboratory testing of selected soil samples obtained from the borings; and
- Providing engineering analysis and preparation of this report discussing, in general, project description, our scope, exploration, testing, analysis, and recommendations.

The Boring Location Plan, Boring Logs, and other supporting data are presented in the Appendices to this report. Our Scope of Services did not include a survey of boring locations and elevations, rock coring, quantity estimates, preparation of plans or specifications, or the identification and evaluation of environmental aspects of the project site.

1.3 Field Exploration

AIMRIGHT located the borings in the field by making measurements from known existing site features. The boring elevations were interpreted from the provided contour elevations on the current project grading plan. No claim is made as to the accuracy of the boring locations and elevations shown on the Boring Logs and Boring Location Plan, respectively, and they should be considered approximate.

The borings were advanced using a CME 550 ATV-mounted drill rig equipped with an automatic hammer and 6-inch diameter augers. Representative soil samples were obtained using a standard 2-inch outside diameter split-barrel sampler in general compliance with the Standard Penetration Testing (SPT) method of the American Society of Testing and Materials (ASTM) D1586 standard to evaluate the consistency and general engineering properties of the subsurface soils.

The number of blows required to drive the split-barrel sampler three (3) consecutive 6-inch increments is recorded and the blows of the last two 6-inch increments are added to obtain the SPT N-value in blows per foot (bpf) representing the penetration resistance of the soil. At regular intervals within the borings, split-spoon samples were visually classified based on texture and plasticity. During the drilling process, all encounters with groundwater, if any, were recorded. Upon completion of drilling, all borings were backfilled per OWRB requirements.

1.4 Laboratory Testing

The samples obtained from the geotechnical exploration were transported to the AIMRIGHT laboratory where representative samples were selected for testing. Testing consisted of Atterberg limits, sieve analysis and determination of moisture content in general accordance with the ASTM testing procedures.

2.0 SUBSURFACE CONDITIONS

2.1 Subsurface Findings

The subsurface conditions illustrated in the table below represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. The transitions between soil strata are usually less distinct than shown on the Boring Logs.

Stratum	Boring Nos.	General Depth Interval	Description of Conditions
Surface	All	3 to 4 inches	organic laden soils (topsoil) sampled as silty sand/sandy silt with organics and root matter
Native Soils	All	0.25 to 18.5 feet	below the surface, generally moist, soft to hard, lean clay with varying amounts of clay, silt, sand, and small rock fragments
Weathered Rock	B-1 to B-4	8.5 to 18.5 feet	below the native soils, generally moist, highly to slightly weathered, soft to hard, shale and limestone

Auger refusal was encountered in boring B-2 at a depth of approximately 13.5 feet. Auger refusal is defined as material that could not be penetrated with the drill rig equipment used on the project. Auger refusal material may be caused by large boulders, rock ledges, lenses, seams, or the top of parent bedrock.

2.2 Groundwater

Groundwater was encountered in boring B-2 during and at the completion of drilling at depths of approximately 8.5 and 13 feet, respectively. Groundwater was not encountered during or at the completion of drilling in any of the remaining borings. Water traveling through soil and rock is often unpredictable and may be present at shallow depths. Due to the seasonal changes in groundwater and the unpredictable nature of groundwater paths, groundwater levels will fluctuate. As such, groundwater levels at other times of the year may be different than those described in this report.

Generally, the highest groundwater levels occur in late winter and early spring and the lowest levels in late summer and fall. Therefore, it is necessary during construction to be observant for groundwater seepage in excavations to assess the situation and make necessary changes. Where applicable, the contractor should determine the actual groundwater levels at the time of construction.

3.0 RESULTS OF LABORATORY TESTING

Laboratory tests were conducted on selected samples in general accordance with ASTM standards. The laboratory testing performed for this project consisted of Atterberg Limits (ASTM D4318), Moisture Content (ASTM D2216) and Sieve Analysis – No. 200 Wash Method (ASTM D1140) testing. The test results are presented on the Boring Logs and are summarized in the table below.

Boring No.	Sample Depth Interval (ft)	In-place Moisture Content (%)	Finer than No. 200 Sieve (%)	Atterberg Limits ASTM D4318		
				Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
B-1	1.5 to 3.5	21.6	57.5	37	17	20
	3.5 to 5	22.5	53.9	36	18	18
B-2	0 to 1.5	22.5	53.9	34	18	16
B-3	1.5 to 3	17.7	50.5	35	18	17
B-4	0 to 1.5	21.0	52.7	35	18	17
	6 to 7.5	25.7	73.0	41	17	24
P-1	0 to 1.5	19.1	56.7	33	17	16
P-2	0 to 1.5	15.6	56.1	31	17	14

Note: Sample depth is the measured depth from the existing surface grades.

4.0 ENGINEERING ANALYSIS

The following recommendations are based on our observations at the site, interpretation and analysis of the field and laboratory data obtained during this exploration, assumed loads, and our experience with previous exploration and testing with similar projects. Soil penetration data have been used to estimate an allowable bearing pressure and associated settlement using established correlations. Subsurface conditions in unexplored locations may vary from those encountered. If structure location, loadings, or elevations are changed, we request that we be advised so that we may re-evaluate our recommendations. In the event changes are made in the proposed design/construction plans, the recommendations presented in this report shall not be considered valid unless reviewed by AIMIRIGHT and modified or verified in writing.

Determination of an appropriate foundation system for a given structure is dependent on the proposed structural loads, soil conditions, and construction constraints such as proximity to other structures, etc. The subsurface exploration aids the geotechnical engineer in determining the soil stratum appropriate for structural support. This determination includes considerations regarding both allowable bearing pressure and compressibility of the soil strata. In addition, since the method of construction greatly affects the soils intended for structural support, consideration must be given to the implementation of suitable methods of site preparation, fill compaction, and other aspects of construction.

Provided the recommendations outlined in this report are followed throughout the design and construction phases of this project, it is our opinion that the proposed site is suitable for the planned construction and a concrete slab-on-ground in conjunction with a deep foundation design may be used to support the building structure as outlined in the following recommendations:

Building Structure Foundation

OPTION 1 – Deep Foundation

To reduce settlement risk and provide strengthened and more uniform bearing support conditions, AIMRIGHT recommends a deep foundation system comprised of grade beams and drilled piers bearing in the underlying weathered shale and limestone be utilized for design. Our exploration indicates that a stratum of highly weathered rock (limestone and/or shale) exists below the native soils at depths of approximately 8.5 to 13.5 feet.

OPTION 2 – Shallow Foundation Support with Ground Improvement

Alternatively, the structure may be supported by a shallow foundation system bearing on ground improvement techniques such as rammed aggregate piers or vibro-piers. This option will require design by an approved design consultant and recommendations are not provided in this report. AIMRIGHT would be pleased to discuss these options with you in more detail, if applicable.

Building Structure Slab-on-ground and Parking/Drive Areas

The building and parking/drive area footprints generally consist of near surface conditions that are generally suitable for support of the anticipated loads. However, soft, or other unsuitable conditions may be encountered in some locations and remediation of these soils shall be required during site preparation and earthwork while following the recommendations outlined in this report. Although moderately to highly plastic clay capable of moderate shrink/swell potential not encountered in our borings, AIMRIGHT recommends conducting additional soil sampling and laboratory testing of the final soil subgrades during grading activities to verify native soil characteristics prior to beginning slab or pavement construction.

5.0 ENGINEERING RECOMMENDATIONS

5.1 Site Preparation and Earthwork

Before proceeding with construction, AIMRIGHT recommends conducting a pre-grading meeting to discuss recommendations as outlined in this report. As such, any structures, foundations, driveways, topsoil, moderately to highly plastic soils, wet, soft, or loose soils and any other deleterious non-soil materials should be removed to a minimum distance of 2 feet beyond the proposed parking/drive area footprints and 5 feet beyond the structure footprints.

Existing utility lines beneath the existing or proposed structure, where applicable, should be located and properly abandoned; or, should be removed and backfilled with properly compacted engineered fill as outlined in this report.

Upon completion of required excavations, proof-rolling of the subgrade with a 20 to 30-ton loaded truck or other pneumatic-tired vehicle of similar size and weight should then be performed. Proof-rolling should be performed during a time of good weather and not while the site is wet, frozen, or severely desiccated. The proof-rolling observation is an opportunity for the geotechnical engineer to locate inconsistencies intermediate of our boring locations in the existing subgrade.

Any unsuitable materials observed during the evaluation and proof-rolling operations should be undercut and replaced with compacted fill or stabilized in place. The possible need for, and extent of undercutting and/or in-place stabilization required can best be determined by the geotechnical engineer at the time of construction.

The upper 8 inches of the existing subgrade in construction areas shall then be scarified, moisture-conditioned and re-compacted to at least ninety-five percent (95%) of the maximum dry density and within ±2 percentage points of the optimum moisture content as determined by a Standard Proctor (ASTM D698). The moisture content and compaction shall be maintained prior to beginning any fill or aggregate placement and/or construction.

At the time of the investigation, the site soils were generally moist. If dry weather conditions exist prior to and during construction, the near surface soils may need moisture-conditioning to sufficiently enable adequate scarifying and compaction. However, if wet conditions exist at the time of construction, then care shall be taken to assure proper surface water drainage. If these soils do get wet, they must be dried or treated prior to further compaction efforts.

5.2 Site Drainage

An important aspect to consider during development of this site is surface water control. During the initiation of grading operations, we recommend that the grading contractor take those steps necessary to enhance surface flow and promote rapid clearing of rainfall and runoff water following rain events. It should be incumbent on the contractor to maintain favorable site drainage during construction to minimize deterioration of otherwise stable subgrades.

Permanent positive drainage should be provided around the perimeter of the structures to minimize moisture infiltration into the foundation and/or subgrade soils. We recommend landscaped areas adjacent to the structures be provided with a fall of at least 6 inches for the first 10 feet outward from the structure areas. All grades must provide effective drainage away from the structures during and after construction. Water permitted to pond next to the structures can result in unacceptable differential floor slab movements and cracked slabs and/or walls.

Exposed ground should be sloped at a minimum 5 percent away from the buildings for at least 10 feet beyond the perimeter of the buildings. After building construction and landscaping, AIMRIGHT recommends verifying final grades to document that effective drainage has been achieved. Grades around the structures should also be periodically inspected and adjusted as necessary, as part of the structure's maintenance program.

Planters located within 10 feet of the structures should be self-contained to prevent water accessing the building subgrade soils. Sprinkler mains and spray heads should be located a minimum of 5 feet away from the building lines. Low-volume, drip style landscaped irrigation should not be used near the building. Roof runoff should be collected in drains or gutters. Roof drains and downspouts should be discharged onto pavements which slope away from the buildings or downspouts should be extended a minimum of 10 feet away from the structures.

5.3 Fill Material

A sample of each material type should be submitted to the geotechnical engineer for evaluation. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

All fill material in structural areas (including utility backfill) should be placed in continuous, horizontal lifts having a maximum pre-compacted thickness of 9 inches. Aggregate base should have a maximum pre-compacted thickness of 6 inches; and fill compacted with hand-held or smaller-sized equipment having a maximum pre-compacted thickness of 4 to 6 inches.

Each lift should be compacted to at least ninety-five percent (95%) of the maximum dry density and within ±2 percentage points of the optimum moisture content as determined by a Standard Proctor (ASTM D698), unless noted otherwise. The moisture content and density shall be maintained throughout construction activities.

A minimum of two (2) field tests to determine in-place density and moisture content should be performed per lift for each 2,000 and 5,000 sf within building structure and parking/drive footprints, respectively.

Engineered fill should consist of approved materials that are free of organic matter and debris, exhibit a plasticity index (PI) of 8 to 18 and contain at least 15% fines (material passing the No. 200 sieve, based on dry weight) with a maximum rock size of 1.5 inches.

Native soils could be used as fill or final subgrade; whereby, upon re-use, the soils meet the requirements for engineered fill as stated in this report. AIMRIGHT recommends conducting additional sampling and laboratory testing during the earthwork and grading activities to determine the presence of materials not meeting the engineered fill requirements, where applicable.

Aggregate base shall meet the requirements for ODOT Type A and beneath pavements, shall be compacted to at least ninety-five percent (95%) of the maximum dry density and within ±2 percentage points of the optimum moisture content as determined by a Modified Proctor (ASTM D1557).

5.4 Deep Foundation Design

Straight-sided drilled piers bearing into the weathered rock stratum (shale and limestone) may be used to support the proposed structure. Grade beams along the perimeter should extend at least 24 inches below the lowest final adjacent grade to provide frost protection. Grade beams should be designed to span the piers without deriving support from the soil between the piers. The project structural engineer should determine the final foundation sizes based on the actual design loads, building code requirements, and other structural considerations. The following may be utilized to assist in drilled pier design.

Axial Load Design		
Maximum Structural Loads (Provided)	15 kip/ft (wall); 180 kip (column)	
Bearing Material	weathered shale and limestone	
Bearing Material Depth	~ 8.5 to 13.5 feet	
Allowable End Bearing Capacity (FS = 3.0)	15,000 psf	
Allowable Unit Side Resistance[1] (FS = 2.0)	1,250 psf	
Minimum Pier Diameter	18 inches	
Minimum Pier Length	10 feet or 4 pier ⌀ (whichever is greater); 3 ≤ L/D ≤ 30	
Minimum Pier Embedment Depth	2 feet or 1 pier ⌀, (whichever is greater)	
Estimated Maximum Settlement	≤ ¾ inch (total); ≤ ½ inch (differential)	
Earthquake Loads Site Class[2]	C	
Lateral Load Design[3]		
L-Pile Layer Type	*Weak Rock*	*Stiff to Hard Clay*
Unit Weight, γ	135 pcf	100 to 125 pcf
Friction Angle, Φ	38°	N/A
Undrained Cohesion, c_u	N/A	1 to 4 ksf
Horizontal Subgrade Modulus, k	N/A	100 to 2,000 pci
Strain Factor, ε_{50}/k_{rm}	0.0005	0.01 to 0.004
Rock Quality Designation, RQD	≤ 20%	
Uniaxial Compressive Strength	100 to 500 psi	N/A
Initial Modulus of Rock Mass	7.5 to 35 ksi	

1. Unit side resistance (skin friction) between the pier and surrounding bearing material can be used to develop pier capacity in compression. The pier weight and a maximum allowable unit side resistance (for that portion of the pier extending more than 2 feet into the recommended bearing material) may be utilized to resist structural upward loadings.

2. 2015 International Building Code (IBC) Section 16, a weighted average of the soil penetration resistance conditions recorded (limited N-value of 100 bpf) and estimated for the upper 100 feet of the site was calculated.

3. A lateral load analysis was not performed; however, a range of parameters are provided for analysis assistance in general accordance with typical L-Pile recommendations.

5.5 Deep Foundation Construction Considerations

Installation of the drilled piers and placement of concrete within the piers should be performed in accordance with the most recent ACI Specifications and installation monitoring shall be observed under supervision by AIMRIGHT. A representative of the geotechnical engineer should observe the drilled pier installation to verify that the recommend bearing materials are encountered and sufficiently penetrated and to observe the concreting techniques.

We anticipate the near-surface soils at the site can be excavated using conventional drill rigs with sufficient torque and ability. Our experience indicates rock in a weathered, boulder, and/or massive form may vary erratically in location and depth within the referenced site. Therefore, there is always a potential that these materials could be encountered at shallower depths between the boring locations and should be anticipated during construction.

Furthermore, auger refusal was encountered in boring B-2 at a depth of approximately 13.5 feet. Auger refusal is defined as material that could not be penetrated with the drill rig equipment used on the project. Auger refusal material may be caused by large boulders, rock ledges, lenses, seams, or the top of parent bedrock. The drilling rig should be equipped with an earth and rock augers and other necessary tools to excavate, clean and level rock bottoms properly, and without construction delay. The contractor should assess the subsurface conditions prior to mobilizing and should be prepared to utilize other techniques such as rock coring to reach planned pier bottom depths.

Following drilling, loose, or disturbed materials and any accumulated water should be removed from the bottom of the drilled piers prior to concrete placement. To facilitate construction, reinforcing steel should be ready and on site, and concrete should be available within a very short period for placement after excavation is completed. Drilled pier excavations must not set overnight prior to placing concrete.

Groundwater was encountered during and at the completion of drilling in boring B-2. Therefore, the need for casings may be required. Water traveling through soil and rock is often unpredictable, however, and may be present in other areas at shallow depths. Due to the seasonal changes in groundwater and the unpredictable nature of groundwater paths, groundwater levels can fluctuate. The contractor should determine the actual groundwater levels at the time of construction.

Where casings are used, it is recommended that the concrete have a slump in the range of 5 to 7 inches to reduce the potential of arching when removing the casing. When removing the casing, the concrete inside the casing should be maintained at a sufficient level to reduce any earth and hydrostatic pressure outside the casing during removal. Concrete slump should be at least 5 inches, and generally in the range of 5 to 7 inches; however, a higher slump may be used to increase fluidity if appropriate for the concrete mix used. An uninterrupted supply and placement of concrete is recommended to produce a monolithic shaft. The maximum size of the concrete aggregate should not exceed one-third of the minimum clear spacing between individual reinforcing bars or bundles.

5.6 Slab-on-ground Design

The structure subgrades should be prepared as described in this report. The building footprint area generally consist of near surface conditions that are suitable for support of the anticipated loads. However, soft, or other unsuitable conditions will be encountered in some locations within the footprint. Remediation of these soils shall be required during site preparation and earthwork while following the recommendations outlined in this report.

Four (4) inches or more of granular base should be placed over the final soil subgrade and shall meet the requirements outlined in the table below. The modulus of subgrade reaction, k, value illustrated in the table below is based on 30-inch diameter plate load test.

Minimum Percent Finer than 1 ½-inch Sieve	Maximum Percent Finer than No. 200 Sieve	Maximum Plasticity Index	Modulus of Subgrade Reaction, k w/ 4 inches of Granular Base (pci)	Modulus of Subgrade Reaction, k w/ 8 inches of Granular Base (pci)
100	15	6	125	150

At the time of concrete placement, the granular base should be moist, but free of any self-draining water. If floor coverings are susceptible to moisture damage by moist floor conditions (capillary moisture), a vapor retarder should be placed below the slab-on-ground in accordance with the most recent addendum to ACI 302.1R-04 / 302.2R-06 and other current industry recommendations for use and placement of vapor retarders.

5.7 Pavement Design

These recommendations are based on our discussions with you, interpretation of the field and laboratory data, assumed traffic loading conditions, review of the provided documents, our experience with similar projects and utilization of the 1993 AASHTO Pavement Design Guidelines. AIMRIGHT recommends that governing authorities (i.e. city, county, or other recognized officials) be contacted to discuss appropriate pavement section requirements with respect to this project. The project architect or engineer of record should design the final pavement section. We utilized the design parameters as illustrated below.

Estimated Traffic, ESALs	**Light Duty**	25,000	**Overall Standard Deviation**	**Asphalt**	0.40
	Heavy Duty	50,000		**Concrete**	0.35
Subgrade Resilient Modulus (M_r), psi		3,000		**Initial (Asphalt)**	4.2
Modulus of Subgrade Reaction (K), pci		100	**Serviceability**	**Initial (Concrete)**	4.5
Concrete Modulus of Rupture (R), psi		650		**Terminal**	2.0
Load Transfer Coefficient		3.2		**Asphalt Wearing**	0.44
Drainage Coefficient		1.0	**Layer Coefficients**	**Asphalt Base**	0.40
Reliability, %		85		**Aggregate Base**	0.14

It is our opinion the following minimum sections overlying a properly prepared subgrade as outlined in this report may be utilized for construction:

Pavement Type	Section	Light Duty (inches)	Heavy Duty (inches)
Concrete[1, 2]	Concrete (≥ 4,000 psi, air-entrained)	4.0	6.0
	ODOT Type A Aggregate Base	4.0	
	Engineered Fill or Lime Stabilized Subgrade[3]	8.0	
Asphalt[1]	ODOT Type B, S4	2.0	2.0
	ODOT Type A, S3	2.0	4.0
	ODOT Type A Aggregate Base	6.0	8.0
	Engineered Fill or Lime Stabilized Subgrade[3]	8.0	

1. Constructed in accordance with Oklahoma Department of Transportation (ODOT) and city or county governing specifications and applicable American Concrete Institute (ACI) guidelines.
2. A minimum thickness of 7 inches of concrete and 6 inches of aggregate base should be provided in front of and beneath dumpster areas or any other areas subjected to continuous concentrated truck wheel loading.
3. Per Section 5.1, 5.3, and 5.8.

5.8 Pavement Construction Considerations

The parking/drive areas generally consist of near surface conditions that are suitable for support of the anticipated loads. However, soft, or other unsuitable conditions will be encountered in some locations within the footprint. Remediation of these soils shall be required during site preparation and earthwork while following the recommendations outlined in this report.

Although moderately to highly plastic clay capable of moderate shrink/swell potential not encountered in our borings, AIMRIGHT recommends conducting additional soil sampling and laboratory testing of the final soil subgrades during grading activities to verify native soil characteristics prior to beginning slab or pavement construction.

In general, long-term pavement performance requires good drainage, performance of periodic maintenance activities, and attention to subgrade preparation. We emphasize that good base course drainage is essential for successful pavement performance and should be maintained in a drained condition at all times.

Consideration for proper drainage design should be carefully evaluated where unequal minimum pavement sections meet (i.e. light to heavy duty). Depending on drainage flow design, it may be necessary to deepen the aggregate base course for the thinner section requirement.

Water build-up in the base course could result in premature pavement failures. Sub-drains are typically utilized beneath a pavement where water may enter the pavement from below or above. Based on the results of the borings, we do not anticipate that sub-drains are required for this site. However, site drainage problems may be revealed during construction that requires sub-drains.

Proper drainage may be aided by grading the site such that surface water is directed away from pavements and by construction of swales adjacent to the pavements. All pavements should be graded such that surface water is directed towards the outer limits of the paved areas or to catch basins located such that surface water does not remain on the pavement.

6.0 CONSTRUCTION QUALITY CONTROL

We recommend that all earthwork construction be monitored by an experienced engineering technician of AIMRIGHT. Monitoring should include site preparation, subgrade earthwork, engineered fill earthwork, structure foundation systems, conventional and/or structural slabs.

Monitoring will allow AIMRIGHT to confirm the soil conditions on site and evaluate the recommendations presented within this report. If at the time of construction, our recommendations are inappropriate for the project, monitoring will allow us to remediate the recommendations at that time to better serve the project.

Monitoring during construction will also allow for the testing of all construction materials for the project. This includes but is not limited to:

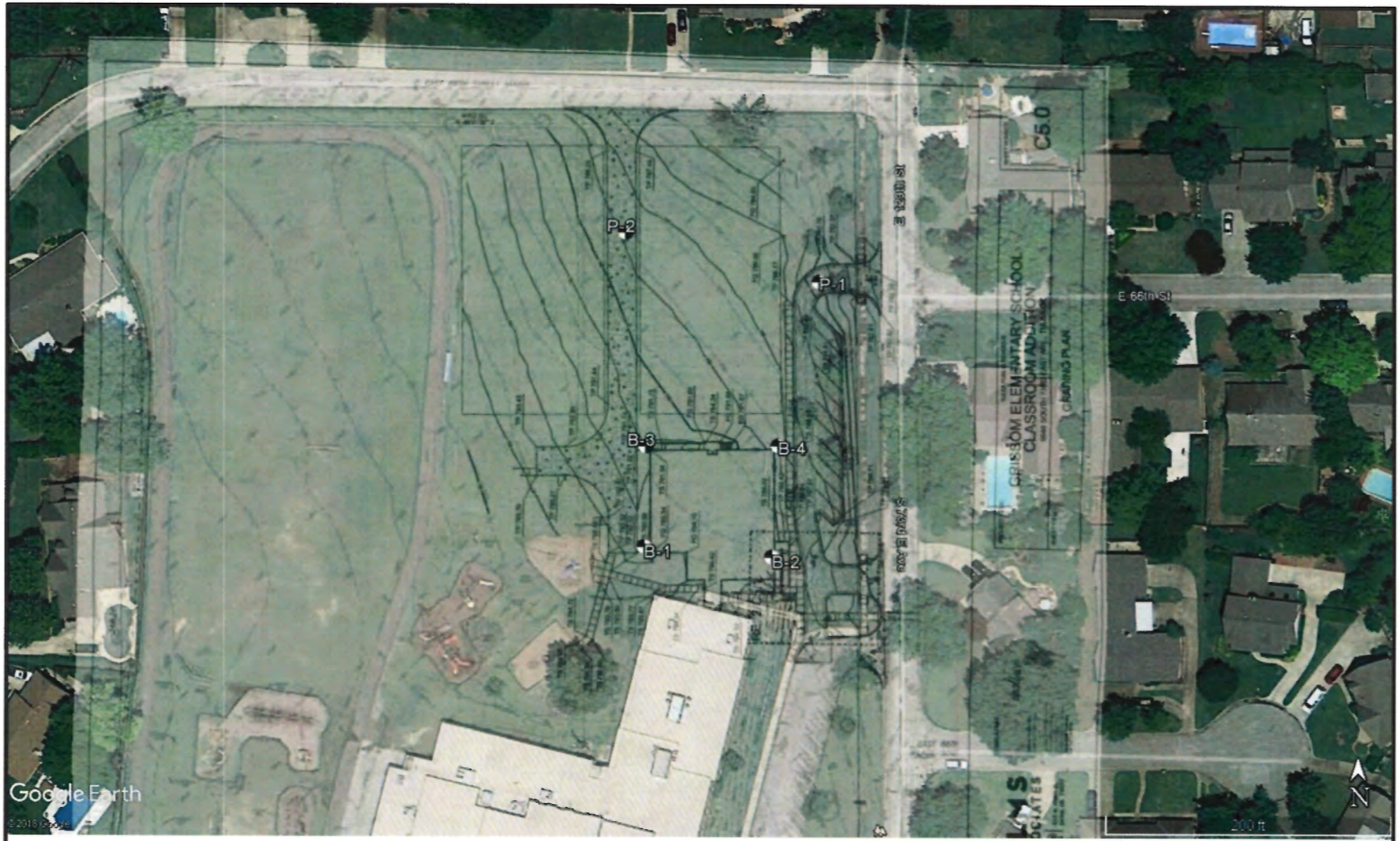
- ✓ subgrade inspection and density testing,
- ✓ structural area fill placement density testing,
- ✓ foundation bearing grade observations and testing,
- ✓ structural and reinforcing steel inspection,
- ✓ concrete testing, and
- ✓ asphaltic concrete testing, as applicable.

We recommend that AIMRIGHT be retained to provide these services based upon our current familiarity with the project subsurface conditions, and the provided intent of the geotechnical recommendations pertaining to the proposed development.

7.0 REPORT LIMITATIONS

The recommendations provided are based in part on project information provided to us and they only apply to the specific project and site discussed in this report. If our statements or assumptions concerning the location and design of this project contain incorrect information, or if additional information is available, you should convey the correct or additional information to us and retain us to review our recommendations. We can then modify our recommendations if they are inappropriate for the proposed project.

Regardless of the thoroughness of the geotechnical exploration, there is always a possibility that subsurface conditions will be different from those at a specific boring location and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations to solve the problems created. The conclusions and recommendations presented in this report were derived in accordance with standard geotechnical engineering practices and no other warranty is expressed or implied.



APPROXIMATE BORING LOCATIONS

BORING LOCATION PLAN

CLIENT: Tulsa Public Schools

PROJECT: Grissom Elementary School Classroom Addition

PROJECT NO.: 4860318

SOURCE: Site Plan and Aerial Imagery

AIMRIGHT TESTING & ENGINEERING

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LOG OF BORING B-1

PROJECT: Grissom Elementary School Classroom Addition
CLIENT: Tulsa Public Schools **PROJECT NO.:** 4860318
PROJECT LOCATION: 6646 South 73rd East Avenue, Tulsa, OK 74133
LOCATION: see Boring Location Plan **ELEVATION:** 793
DRILLER: B. Parks **LOGGED BY:** J. Woods **DRILLING RIG:** CME 550 ATV-Mounted
DRILLING METHOD: Rotary 6-inch Diameter Augers **DATE:** 4/6/48
DEPTH TO WATER> INITIAL: N/A **AT COMPLETION:** N/A **CAVING>** C N/A

Depth (feet)	Sampler Type	Description	Graphic	USCS Symbol	SPT N-value (bpf)	Groundwater	Moisture Content	% < #200	Liquid Limit	Plastic Limit	Plasticity Index
0 – 793		TOPSOIL - 4 inches									
		0.333			7						
1 – 792		SANDY LEAN CLAY stiff to soft, dark brown, moist									
2 – 791				CL	2		21.6	57.5	37	17	20
3 – 790											
4 – 789				CL	8		22.5	53.9	36	18	18
5 – 788											
6 – 787		LEAN CLAY w/ trace sand, limestone fragments hard, light brown, moist			38						
7 – 786											
8 – 785											
		8.5									
9 – 784		LIMESTONE highly weathered soft, light brown, moist			50/4.5						
10 – 783											
11 – 782											
12 – 781											
13 – 780											
					50/3.0						
		Boring terminated at 13.75 ft.									

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

AIMRIGHT TESTING & ENGINEERING

LOG OF BORING B-2

PROJECT: Grissom Elementary School Classroom Addition
CLIENT: Tulsa Public Schools **PROJECT NO.:** 4860318
PROJECT LOCATION: 6646 South 73rd East Avenue, Tulsa, OK 74133
LOCATION: see Boring Location Plan **ELEVATION:** 792
DRILLER: B. Parks **LOGGED BY:** J. Woods **DRILLING RIG:** CME 550 ATV-Mounted
DRILLING METHOD: Rotary 6-inch Diameter Augers **DATE:** 4/6/48
DEPTH TO WATER> INITIAL: ▽ 8.5 **AT COMPLETION:** ▽ 13 **CAVING>** ℄ N/A

Depth (feet)	Sampler Type	Description	Graphic	USCS Symbol	SPT N-value (bpf)	Groundwater	Moisture Content	% < #200	Liquid Limit	Plastic Limit	Plasticity Index
0 – 792		TOPSOIL - 3 inches (0.25)									
1 – 791		SANDY LEAN CLAY stiff, dark brown, moist		CL	7		22.5	53.9	34	18	16
2 – 790					9						
3 – 789											
4 – 788					10						
5 – 787											
6 – 786		LEAN CLAY w/ trace sand stiff, medium brown, moist			9						
7 – 785											
8 – 784											
9 – 783		LEAN CLAY w/ limestone fragments hard, light brown, moist			59	▽					
10 – 782											
11 – 781											
12 – 780											
13 – 779						▽					
		(13.5) LIMESTONE slightly weathered hard, light brown, moist Boring terminated at 13.52 ft.			50/0.25						

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

AIMRIGHT TESTING & ENGINEERING

LOG OF BORING B-3

PROJECT: Grissom Elementary School Classroom Addition
CLIENT: Tulsa Public Schools **PROJECT NO.:** 4860318
PROJECT LOCATION: 6646 South 73rd East Avenue, Tulsa, OK 74133
LOCATION: see Boring Location Plan **ELEVATION:** 792
DRILLER: B. Parks **LOGGED BY:** J. Woods **DRILLING RIG:** CME 550 ATV-Mounted
DRILLING METHOD: Rotary 6-inch Diameter Augers **DATE:** 4/6/48
DEPTH TO WATER> INITIAL: ▽ N/A **AT COMPLETION:** ▽ N/A **CAVING>** ⊏ N/A

Depth (feet)	Sampler Type	Description	Graphic	USCS Symbol	SPT N-value (bpf)	Groundwater	Moisture Content	% < #200	Liquid Limit	Plastic Limit	Plasticity Index
0 — 792		TOPSOIL - 3 inches (0.25)			9						
1 — 791		LEAN CLAY w/ SAND, trace limestone fragments stiff, dark and light brown, moist									
2 — 790		SANDY LEAN CLAY w/ trace limestone and sandstone fragments stiff, light brown, moist		CL	8		17.7	50.5	35	18	17
3 — 789											
4 — 788					8						
5 — 787											
6 — 786		LEAN CLAY w/ trace sand, limestone fragments stiff, light brown, moist			8						
7 — 785											
8 — 784											
9 — 783		(8.5) LIMESTONE highly weathered soft, light brown, moist			50/2.5						
10 — 782											
11 — 781											
12 — 780											
13 — 779					50/2.0						
		Boring terminated at 13.67 ft.									

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

AIMRIGHT TESTING & ENGINEERING

LOG OF BORING B-4

PROJECT: Grissom Elementary School Classroom Addition
CLIENT: Tulsa Public Schools **PROJECT NO.:** 4860318
PROJECT LOCATION: 6646 South 73rd East Avenue, Tulsa, OK 74133
LOCATION: see Boring Location Plan **ELEVATION:** 790
DRILLER: B. Parks **LOGGED BY:** J. Woods **DRILLING RIG:** CME 550 ATV-Mounted
DRILLING METHOD: Rotary 6-inch Diameter Augers **DATE:** 4/6/48
DEPTH TO WATER> INITIAL: ▽ 6.5 **AT COMPLETION:** ▽ N/A **CAVING>** ⌐ N/A

Depth (feet)	Sampler Type	Description	Graphic	USCS Symbol	SPT N-value (bpf)	Groundwater	Moisture Content	% < #200	Liquid Limit	Plastic Limit	Plasticity Index
0 — 790		TOPSOIL - 4 inches									
		0.333									
1 — 789		SANDY LEAN CLAY medium stiff, dark brown, moist		CL	5		21.0	52.7	35	18	17
2 — 788					6						
3 — 787											
4 — 786		LEAN CLAY w/ trace sand stiff, dark and medium brown, moist			10						
5 — 785											
6 — 784		LEAN CLAY w/ SAND medium stiff, dark and medium brown, moist to wet		CL	4	▽	25.7	73.0	41	17	24
7 — 783											
8 — 782											
9 — 781		LEAN CLAY w/ limestone fragments hard, light brown, moist			31						
10 — 780											
11 — 779											
12 — 778											
13 — 777											
		13.5									
14 — 776		SHALE highly weathered soft, dark gray, moist			50/4.75						
15 — 775											
16 — 774											
17 — 773											
18 — 772											
		18.5									
		LIMESTONE slightly weathered hard, light brown, moist to dry Boring terminated at 18.54 ft.			50/0.50						

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

ATMRIGHT
TESTING & ENGINEERING

LOG OF BORING P-1

PROJECT: Grissom Elementary School Classroom Addition
CLIENT: Tulsa Public Schools **PROJECT NO.:** 4860318
PROJECT LOCATION: 6646 South 73rd East Avenue, Tulsa, OK 74133
LOCATION: see Boring Location Plan **ELEVATION:** 785
DRILLER: B. Parks **LOGGED BY:** J. Woods **DRILLING RIG:** CME 550 ATV-Mounted
DRILLING METHOD: Rotary 6-inch Diameter Augers **DATE:** 4/6/48
DEPTH TO WATER> INITIAL: N/A **AT COMPLETION:** N/A **CAVING>** N/A

Depth (feet)	Sampler Type	Description	Graphic	USCS Symbol	SPT N-value (bpf)	Groundwater	Moisture Content	% < #200	Liquid Limit	Plastic Limit	Plasticity Index
0 — 785		TOPSOIL - 4 inches (0.333)									
1 — 784		SANDY LEAN CLAY stiff, dark brown, moist		CL	9		19.1	56.7	33	17	16
2 — 783					8						
3 — 782											
4 — 781		LEAN CLAY w/ trace sand, sandstone fragments stiff, dark and medium brown, moist			10						
		Boring terminated at 5 ft.									

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

AIMRIGHT TESTING & ENGINEERING

LOG OF BORING P-2

PROJECT: Grissom Elementary School Classroom Addition

CLIENT: Tulsa Public Schools **PROJECT NO.:** 4860318

PROJECT LOCATION: 6646 South 73rd East Avenue, Tulsa, OK 74133

LOCATION: see Boring Location Plan **ELEVATION:** 790

DRILLER: B. Parks **LOGGED BY:** J. Woods **DRILLING RIG:** CME 550 ATV-Mounted

DRILLING METHOD: Rotary 6-Inch Diameter Augers **DATE:** 4/6/48

DEPTH TO WATER> INITIAL: ▽ N/A **AT COMPLETION:** ▽ N/A **CAVING>** C N/A

Depth (feet)	Sampler Type	Description	Graphic	USCS Symbol	SPT N-value (bpf)	Groundwater	Moisture Content	% < #200	Liquid Limit	Plastic Limit	Plasticity Index
0 — 790		TOPSOIL - 4 inches (0.333)									
1 — 789		SANDY LEAN CLAY stiff, dark brown, moist		CL	8		15.6	56.1	31	17	14
2 — 788		LEAN CLAY w/ SAND, trace limestone fragments very stiff, light brown, moist			16						
3 — 787											
4 — 786					14						
		Boring terminated at 5 ft.									

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

KEY TO SYMBOLS

Symbol	Description
Strata Symbols	
	Topsoil
	Low Plasticity Clay
	Limestone
	Shale
Misc. Symbols	
	Auger Refusal
	Water Table during Drilling
	Water Table at Boring Completion
Soil Samplers	
	Standard Penetration Test

SECTION 000130

BID FORM

PART 1 GENERAL

1.01 BIDDER

A. Bid From: _____

1.02 PROJECT

A. Project Name: **TULSA PUBLIC SCHOOLS**
GRISSOM ELEMENTARY
NEW DROP-OFF / PICK-UP DRIVE & PARKING LOT

1.03 OWNER

A. Submitted to: TULSA PUBLIC SCHOOLS
Independent School District No. One of Tulsa County, OK
3027 S. New Haven Ave.
Tulsa, OK 74114

1.04 AGREEMENTS

A. AWARD AND EXECUTION OF THE CONTRACT: The Bidder, if notified of the acceptance of the proposal within thirty (30) calendar days of the opening of bids, agrees to execute a Contract for the work accepted, in the form included in the Bid for signature, and that he will complete the work in accordance to the contract time.

B. REJECTION OF BIDS: The Bidder agrees that this bid shall be good and may not be withdrawn for a period of sixty (60) days after the scheduled closing time for receiving bids. This bid may be withdrawn at any time prior to the scheduled time for opening of bids, or any authorized postponement thereof, without penalty. The Bidder agrees that the Owner reserves the right to reject any or all bids and to waive informalities or minor irregularities in any bid.

C. ADDITIONAL WORK: The Bidder agrees to furnish all labor and materials for any additional work ordered by the Owner, for which no pre-agreed or lump -sum price has been fixed or agreed, as set forth below:

1. For additional work to be performed directly by the Contractor, the Contractor agrees to perform the work for the direct cost of such extra labor, material, and bonding costs, plus 15% for overhead and profit (as identified below).

2. For additional work to be performed by Subcontractor(s), the Contractor agrees to secure a reasonable price from the appropriate Subcontractor(s). The direct cost of such extra labor, material, bonding costs, plus 15% for combined Contractor and Subcontractor(s) overhead and profit.

Unless significant written justification is provided identifying, for the Owner's sole determination of acceptance, that such extraordinary circumstances exist as to warrant additional consideration for overhead and profit, the percentages identified above for overhead and profit on additional work are to be considered as inclusive of all necessary general expenses, overhead site charges and profit for the work. Bonding expense, for the Prime Contractor shall be listed as a line item to the cost of the work. Subcontractor bonding expense shall not be considered as a reimbursable cost of the work.

1.05 ACKNOWLEDGMENTS

A. Bidding and Contract Documents dated March 13, 2026 for the above Project have been received and thoroughly examined.

B. The Bidder, _____, hereby acknowledges receipt of the following Addenda:

Addendum No. _____ Dated _____;
Addendum No. _____ Dated _____;
Addendum No. _____ Dated _____;
Addendum No. _____ Dated _____;

C. The Bidder hereby acknowledges having visited and examined the site and conditions of the proposed work.

1.06 BID AFFIDAVITS, BID SECURITY & OTHER REQUIRED DOCUMENTATION

The following items must be submitted with the Bid:

A. Non-Collusion Affidavit

B. Business Relationship Affidavit

C. Non-Discrimination Affidavit

D. Felon Free Affidavit

E. Bid Security (5% of Bid Amount)

F. Contractor's Qualifications Statement

1.07 PROPOSED COST

A. BASE BID AND UNIT COST

We, the Contractor, propose to furnish all tools, appliances, equipment and specified materials and to perform all necessary labor in connection with said contract items, including bonds and insurance, in full accordance with plans and specifications.

B. BID FORM

Our Bid for completing the required work defined above and described in these bid documents is described below.

BID FORM

BASE BID (ALL WORK TO CONSTRUCT NEW DROP-OFF / PICK-UP DRIVE AND PARKING LOT PER PLANS AND SPECIFICATIONS):

$_____

Written: _____(Dollars)

CALENDAR DAYS TO COMPLETE:

_____

Respectfully Submitted,

_____

Company

_____

By

_____

Title

_____

Signature

_____

Address

_____

City, State, Zip Code

_____

Area Code and Telephone Number

NOTE: If the Bid is made by a Partnership, it shall contain the names of each partner and shall be signed by the name of the firm, following by the signature of the person authorized to sign. If the Bid is made by a Corporation, it shall be signed by the name of the corporation, followed by the signature of the officer authorized to sign, and the printed or typewritten designation of the office he holds in the corporation. All blank spaces in the Bid Form shall be properly filled in.

Seal if Bid is by Corporation

Subscribed and sworn to before me this _____ day of _____, 2026.

_____

Notary Public

My Commission Expires:

_____

[SEAL]

END OF SECTION

SECTION 000140

BID BOND

See Attached AIA Document A310 – Bid Bond

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

ADDITIONS AND DELETIONS:
The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)
Independent School District Number One of Tulsa Co
3027 S. New Haven Ave.
Tulsa, OK 74114

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Tulsa Public Schools - Grissom Elem Drop Off / Pick Up Lane & Parking Lot
6646 S. 73rd E. Ave.
Tulsa, OK 74113

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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User Notes: (69c43d954107075bf1172d39)

Signed and sealed this Twenty-fifth day of March . Two Thousand Twenty-Six

CONTRACTOR AS PRINCIPAL *(Signature)*	**SURETY** *(Signature)*
(Printed name and title)	*(Printed name and title)*
(Witness)	*(Witness)*

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User Notes: (69c43d954107075bf1172d39)

SECTION 000150

NON-COLLUSION AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

_____ , 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 _____, 2026.

_____
Company Representative

_____
Notary Public

My Commission Expires:

_____

SECTION 000160

BUSINESS RELATIONSHIP AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

_____ , 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 _____, 2026.

_____
Notary Public

My Commission Expires:

_____

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 _____, 2026.

_____

Notary Public

My Commission Expires:

_____

SECTION 000180

FELONY FREE AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

The undersigned, under the penalties of perjury, certifies to the Tulsa Public Schools ("School District") as follows:

1. The undersigned:

_____ has a contract with the School District; OR

_____ is the duly authorized representative of a business ("entity") having a contract with the School District,

to perform work on School District premises on a full-time or part-time basis.

2. The undersigned hereby certifies that neither the undersigned nor any employee of the undersigned or of the entity, or of any subcontractor of the undersigned or the entity, will perform work on School District premises on a full-time or part-time basis that would otherwise be performed by School District employees if such employee has been convicted in this State, the United States or any other state of any felony offense unless ten (10) years have elapsed since the date of the criminal conviction or the employee has received a pardon for the offense.

3. Neither the undersigned nor any employee of the undersigned, or the entity, or of any subcontractor of the undersigned or the entity, who performs any work on School District property is currently registered under the Oklahoma Sex Offenders Registration Act or the Mary Rippy Violent Crime Offenders Registration Act.

4. The undersigned, or the entity, has conducted a felony record search of all employees who will be assigned to work on a full-time or part-time basis on School District property.

5. This Affidavit is made and delivered pursuant to the requirements of **OKLA. STAT. tit. 70, § 6-101.48 (Supp. 2000)** and **OKLA. STAT. tit. 57, § 589 (Supp. 2004)** (the "Acts"). The undersigned further certifies to the School District that the undersigned and/or the entity are in full compliance with the requirements of the Acts.

EXECUTED AND DELIVERED this _____ day of _____, 2026.

_____
AFFIANT'S SIGNATURE

_____
(Print Name and Title)

Representing:

_____
(Name of Entity)

Subscribed and sworn to before me this ____ day of _____, 2026.

_____
Notary Public

(S E A L)

Notary Commission Number: _____

My Commission Expires: _____

SECTION 000190
ASBESTOS COMPLIANCE FORM

SHORT-TERM WORKER NOTICE

TO ALL SHORT-TERM WORKERS AT THIS LOCATION, NOT OTHERWISE CONSIDERED EMPLOYEES OF TULSA PUBLIC SCHOOLS

This is to advise you that this site has been inspected for asbestos-containing material. Please refer to the Asbestos Management Plan for the exact location. The Plan is available for your review in the administrative office of this building.

Please acknowledge that you have read this Notice by signing your name, the company you are representing and the date of your visit. Return copy to Tulsa Public Schools contact below.

If you have any questions, the contact person is:

Asbestos Specialist
Tulsa Public Schools.
Maintenance Department
1555 North 77 East Avenue
Tulsa, Oklahoma 74115
Telephone: 831-2400

Signed: _____

Date: _____

Company: _____

CERTIFICATION OF COMPLIANCE
WITH ASBESTOS RESTRICTIONS

STATE OF _____)
) SS.
COUNTY OF _____)

The undersigned Contractor, of lawful age, being first duly sworn, on oath says that:

A. Building materials or products incorporated or installed in the construction of _____ School addition and/or remodel will be free of asbestos containing materials or products of any kind.

B. Certification of Compliance with Asbestos Restrictions will be included in any sub-contract connected with the performance of work for this project.

C. Submit copy in O&M Manuals.

CONTRACTOR

By _____

_____
(Title)

SUBSCRIBED AND SWORN to before me this _____ day of _____ 2026.

_____
Notary Public

My Commission Expires:

_____

SECTION 000191

CONTRACTORS QUALIFICATIONS STATEMENT

This form must be submitted seven (7) days prior to the bid date. All questions must be answered, the data must be clear and comprehensive, and must be signed and notarized. If not previously on file.

1. Name of Bidder: _____

2. Permanent Main Office Address: _____

3. When organized: _____

4. If incorporated, when and where _____

5. How many years have you been engaged in the contracting business under your present firm or trading name? _____

6. List 5 projects of similar size work, references with telephone numbers, cost of project and year completed: _____

(1) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(2) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(3) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(4) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(5) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

7. Have you ever failed to complete any work awarded to you? Please explain.

8. Please state the size of your business:

   # of employee's (total):_____

9. Are any of your job Captains bilingual?

10. Financial Information:

    a. State the name of the bank with whom you do your principal business:

    Name of Bank Address City, State Phone Number

    _____

    b. State 5 trade references with whom you do business:

    1. _____

    2. _____

    3. _____

    4. _____

_____
President of Company

_____, _____
(Notary Public) (Date)

Affix Notary Seal

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 TULSA)

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 _____, 2026.

_____
Notary Public

My Commission Expires:

_____

[SEAL]

END OF SECTION

SECTION 000270

SAMPLE
OWNER / CONTRACTOR AGREEMENT

Bid Package No.

SAMPLE AGREEMENT BETWEEN

OWNER AND CONTRACTOR

#_____

AGREEMENT made as of the ___ day of _____, 2026;

BETWEEN the Owner: INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY, OKLAHOMA
3027 South New Haven
Tulsa OK 74114

and the Contractor:

The Project is: _____ @ Owner's _____

The Architect is: GSHELMS & ASSOCIATES, LLC
424 E. Main St.
Jenks OK 74037
(918) 298-7257

The Owner and Contractor agree as set forth below.

ARTICLE 1
THE CONTRACT DOCUMENTS

1.1 The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplemental and Other Conditions), Drawings, Specifications, Addenda issued prior to this Agreement, the Project Manual dated_____, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in ARTICLE 8.

ARTICLE 2
THE WORK OF THIS CONTRACT

2.1 The Contractor shall execute the entire Work described in the Contract Documents for the _____Project, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The date of commencement is the date from which the Contract Time in Paragraph 3.2 is measured, and shall be when Owner's Notice To Proceed (work order) is delivered to Contractor.

3.2 The Contractor shall achieve Substantial Completion of the entire Work in accordance with the time allotted in the Contractor's bid in order for the entire Project to be completed no later than_____ _____, subject to adjustments of this Contract Time as provided in the Contract Documents. Time is of the essence with respect to the Substantial Completion date.

ARTICLE 4
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of _____( ), subject to additions and deductions as provided in the Contract Documents.

4.2 The time of Substantial Completion is critical to Owner. Contractor's bid time for Substantial Completion has been a significant and material consideration in Owner's decision to award the Contract to Contractor.

ARTICLE 5
PROGRESS PAYMENTS

5.1 Based upon Applications for Payment submitted to the Architect by the Contractor and the Certificate of Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. Applications for Payment shall be delivered to the Architect promptly thereafter.

5.3 The Owner shall make payment to the Contractor within THIRTY (30) days after Owner's receipt of the Application for Payment approved by the Architect.

5.4 Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor in accordance with the Contract Documents. The Schedule of Values shall allocate the entire Contract Sum, except unauthorized allowances, among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This

Schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the month covered by the Application for Payment.

5.6 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.6.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the Schedule of Values, less retainage of ten percent (5%). The retainage will be reduced to five percent (5%) when the Work completed, as reflected in the Schedule of Values, equals fifty percent (50%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Subparagraph 7.3.7 of the General Conditions even though the Contract Sum has not yet been adjusted by Change Order;

5.6.2 Add that portion of the Contract sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (5%);

5.6.3 Subtract the aggregate of previous payments made by the Owner;

5.6.4 Subtract amounts, if any, for which the Architect has not approved payment; and

5.6.5 Subtract liquidated damages, if any.

5.6.7 At any time the Contractor has completed in excess of fifty percent (50%) of the total Contract Sum, retainage shall be reduced to five percent (5%) of the amount earned to date if the Owner or Architect determines that satisfactory progress is being made and upon written approval of Contractor’s surety.

ARTICLE 6
FINAL PAYMENT

6.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph 12.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than THIRTY (30) days after the issuance of the Architect’s final Certificate for Payment.

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate of six percent (6%) per annum.

ARTICLE 8
ENUMERATION OF CONTRACT DOCUMENTS

8.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

8.1.1 The Agreement is this Agreement Between Owner and Contractor.

8.1.2 The "General Conditions" are the General Conditions of the Contract for Construction, AIA Document A201, 2007 Edition, as amended.

8.1.3 The Special and other Conditions of the Contract contained in the Project Manual dated .

8.1.4 The Contractor's Proposal (Bid).

8.1.5 The Specifications contained in the Project Manual **and the Addenda.**

8.1.6 The Drawings:

8.1.7 The Addenda, as follows:

Number	Date

8.1.8 Other documents, if any, forming part of the Contract Documents are as follows:

8.1.8.1 Owner's Notice to Bidders

8.1.8.2 Owner's Instructions to Bidders

ARTICLE 9
BONDS, INSURANCE, INDEMNITY AND COMPLIANCE WITH LAWS

9.1 Before commencing the performance of its obligations hereunder, Contractor agrees to furnish Owner with the following at Contractor's expense: (i) a performance bond in an amount equal to

the Contract Sum; (ii) a warranty bond in an amount equal to the Contract Sum for a period of one year from the date of completion of the Work; and (iii) the payment bond in an amount equal to the Contract Sum, required by Oklahoma law in connection with contracts for the making of public improvements (tit. 61, (1991) O.S. § 1).

9.2 The surety providing the above bonds shall be listed in the most recent edition of *U.S. TREASURY CIRCULAR 570* and be fully authorized to do business in Oklahoma.

9.3 Contractor agrees to carry worker's compensation insurance at its expense. Before commencing the performance of its services hereunder, Contractor agrees to furnish Owner with certificates of insurance coverage, naming Owner and Architect as co-insureds as required by Article 11 of the Supplementary Conditions in the Project Manual. Each certificate shall require at least 30 days' notice to Owner and Architect before cancellation of the coverage for any reason. Contractor agrees to maintain said insurance coverage in force during the entire term of this Agreement. In addition to such insurance, and not in lieu thereof, Contractor agrees to indemnify and hold Owner and Architect and their respective agents, employees and officers harmless (including defense costs) against any claim, demand or action arising from or growing out of Contractor's performance of the Work.

9.4 Contractor agrees to comply with all city, county, state and federal laws applicable to the Project.

9.5 Contractor acknowledges that Federal Executive Orders number 11246 as amended; Vietnam Era Veteran Readjustment Assistance Ace, as amended (VEVRAA); and Section 503 of the Rehabilitation Act of 1973, as amended are incorporated herein by reference. Contractor shall not discriminate against any applicant for employment because of race, color, religion, gender, age, national origin, sexual preference, disability, veteran status or any other protected classification, and shall ensure that employees are treated during employment without regard to their race, color, religion, gender, age, national origin, disability, veteran status or any other protected classification. Contractor further agrees to fully comply with any and all laws, statutes, regulations, orders, and directives presently or hereafter imposed by local, state or federal governments, or any agencies thereof, with respect to nondiscrimination in employment, civil rights laws and fair employment practices, and mandated reporting requirements thereof.

9.6 Contractor shall take all safety precautions with respect to its Work as may be required by the U. S. Department of Labor Occupational Safety and Health Administration and shall be responsible for compliances with all safety rules and regulations in connection with all Work to be performed by Contractor on this project. Contractor shall indemnify Owner and Architect for any and all expenditures or obligations for expenditures made or imposed upon Owner for fines, penalties, counsel fees, expenses and costs of litigation and costs of corrective measures necessary to comply with rules, regulations or orders which result from acts of commission or omission by Contractor, its agents, employees, suppliers, Contractors, and assigns due to failure upon the part of any one or all of them to comply with such safety rules and regulations.

9.7 This Section has been removed from the Agreement

ARTICLE 10
EMPLOYEE CRIMINAL CONVICTIONS

10.1 The Contractor will not allow any employee to work on school premises on a full-time or part-time basis, which work would not otherwise be performed by Owner employees, if the employee is convicted in this state, the United States or another state of any felony offense, unless ten (10) years have

elapsed since the date of the criminal conviction or the employee has received a Presidential or Gubernatorial pardon for the criminal offense.

10.2 No employee of the Contractor who performs any Work on Owner's property is currently registered under the Oklahoma Sex Offenders Registration Act or the Mary Rippy Violent Crime Offenders Registration Act..

10.3 As a condition to payments, the Contractor will furnish a signed statement declaring that no employee working on Owner's property under the authority of the Contractor is in violation of the provisions of this Article. The signed statement referred to in this Section will be furnished as required from time to time by the Owner/District. Owner's form of the signed statement will be used.

10.4 **The Contractor agrees to obtain similar compliance statements from all Contractors on the Project with reference to employees of the Contractors.**

10.5 If the Contractor is convicted of a violation of tit. 57, O.S. (1998 Supp.) § 589, Owner may terminate this Contract.

□ □ □

This Agreement is entered into as of the date first above written.

CONTRACTOR:

_____

By_____

_____
Printed Name and Title

Contractor's Tax ID #:

_____

_____
Date of signature

OWNER:

INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY, OKLAHOMA

By_____
President

[OK as to Form: _____]

SECTION 011000

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Tulsa Public Schools – Grissom Elementary
New Drop-Off / Pick-Up Drive & Parking Lot
6646 S. 73rd E. Ave.
Tulsa, OK 74133

B. Owner: Tulsa Public Schools, ISD #1
3027 S. New Haven Ave.
Tulsa, Oklahoma 74114

C. Architect: GSHELMS & Associates, LLC
424 E. Main St.
Jenks, OK 74037
918-298-7257

D. Civil Engineer: Wallace Design Collective, PC
123 N. Martin Luther King Jr. Blvd.
Tulsa, OK 74103
918-584-5858

E. Pre-Bid Conference: Tuesday, April 14, 2026 at 3:30pm
at Project Site identified above.

E. The Project consists:
1. Sitework and Site Utilities
2. Concrete Pavement Drive
3. Asphalt Parking Lot
3. Concrete Sidewalks
4. Chain Link Fencing and Gate

1.02 OWNER OCCUPANCY

A. Owner will occupy the school facility during construction.

B. Project Areas are located adjacent to existing Classroom Buildings that shall be protected during construction.

C. This project shall be completed during the District's 2026 summer break (Monday, June 8, 2026 thru Monday, August 3, 2026. Contractors shall coordinate construction schedule / activities with Owner and Architect. Last day of school for Spring 2026 semester is May 29, 2026.

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.
2. Work by Owner.

C. Staging areas shall be coordinated with Owner and Architect.

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 Broken Arrow Public Schools.

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 Broken Arrow 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 10% 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

B. Section 017800 - Closeout Submittals: Project record documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Architect and Contractor will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Tulsa Public Schools' 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, Contractor 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 Tulsa Public Schools, Architect, Attendees and affected parties.

3.02 PROGRESS MEETINGS

A. Owner, Contractor and Architect shall schedule and administer meetings throughout progress of the Work at weekly intervals.

B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Tulsa Public Schools' Representative, Contractor, 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 Tulsa Public Schools, 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. 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 Tulsa Public Schools' 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, plus one copy to be retained by the Contractor.
   2. Larger Sheets, Not Larger Than 30 x 42 inches: Submit the number of opaque reproductions which Contractor requires, plus two copies which will be retained by Architect, plus one copy to be retained by the Contractor.

B. Documents for Information: Submit two copies.

C. Electronic Submittals: Electronic Submittals are acceptable for submittals of 11x17 sheet size and smaller. All submittals larger than 11x17 shall be made in hard-copy form.

D. Documents for Project Closeout: Make one reproduction of reviewed submittal. Submit one extra of submittals for information.

E. 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 and Architect 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

1.01 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.

1.02 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 -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 -control services required by Architect, 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

1.03 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 or Construction Manager.

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.
   1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

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.

1.04 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.

1.05 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.

1.06 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.

1.07 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.

1.08 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 jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that 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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

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.

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

3.01 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.

3.02 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."
   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.

B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

C. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

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.

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.

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 Tulsa Public Schools.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Tulsa Public Schools, 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 Tulsa Public Schools 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 Tulsa Public Schools 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 with Construction Manager 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 Tulsa Public Schools' occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Tulsa Public Schools' 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 Construction Manager 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 Construction Manager 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 two copies to Architect, Construction Manager, Tulsa Public Schools' Representative, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Promptly notify Construction Manager and 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 Construction Manager, 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 Tulsa Public Schools' personnel two weeks prior to date of Substantial Completion. Provide documentation stating Tulsa Public Schools' personnel was properly trained, and signed by the Tulsa Public Schools personnel who was 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 Tulsa Public Schools' 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.

B. Testing, adjusting, and balancing HVAC systems: See Division 15 and Section 01400.

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 and Construction Manager.

B. Notify Construction Manager and 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 Tulsa Public Schools occupied areas.

E. Notify Construction Manager and Architect when work is considered finally complete.

F. Complete items of work determined by Owner’s, Construction Manager’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 Construction Manager and 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. Construction Manager and 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 Tulsa Public Schools, 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 Construction Manager and 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 Tulsa Public Schools' 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 Tulsa Public Schools.

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, Construction Manager 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 Tulsa Public Schools' 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 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 respreading 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 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 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.

1.04 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. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.05 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. Pre-excavation 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 15 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. Over-excavate 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 within 2 percent 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 WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.06 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.

3.07 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. After stripping and completing any cuts, the subgrade shall be proof-rolled. 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 Proof-rolling 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 within 2 percent of the soils 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.

3.08 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.

3.09 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.

3.10 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 within 2 percent of the material’s optimum moisture content and recompacted 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 within 2 percent of 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. Backfill and fill soil materials shall be moisture conditioned to within 2 percent of the optimum moisture content.

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. Existing soils in pavement subgrade areas shall be stabilized with hydrated lime as described below:
    a. Lime treatment: 4 to 7 percent required to reduce the PI to 18 or less for areas exhibiting a PI of 18 or greater.
    b. Hydrated lime stabilization shall be performed according to ODOT specifications.

c. Hydrated lime 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 proof-rolling.

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 or 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 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: 0.45.

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: 6.0 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.

4. Fly Ash or Pozzolan: not allowed in City of Tulsa Right of Way pavements.

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. Crafco 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 323113

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. PVC-Coated Fence System: Framework, fabric, gates and accessories.

B. Excavation for post bases.

C. Concrete anchorage for posts and center drop for gates.

1.2 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.

1.3 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.

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 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, Non-pressure, 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 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

2.05 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

2.06 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, Non-pressure 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