CONTRACT DOCUMENTS

AND

SPECIFICATIONS

FOR

PROJECT NO. SP 21-4
LACY PARK IMPROVEMENTS

ATTENDANCE AT PRE-BID CONFERENCE IS MANDATORY

PREPARED BY:
GH2 Architects, LLC
320 S. Boston, Ste. -100
Tulsa, OK 74103
918-587-6158 Ph
918-587-0357 fax

CITY OF Tulsa
A New Kind of Energy™

PAUL D. ZACHARY, P.E., DIRECTOR
ENGINEERING SERVICES DEPARTMENT

Account Numbers 7239000-541101-21D05; 7239000-541101-21D09;
7239000-541101-21D06; 7239000-541101-21D07

Engineering Services Department
2317 South Jackson Avenue
Tulsa, Oklahoma 74107
(918) 596-9565

CONTRACT DOCUMENTS

AND

SPECIFICATIONS

FOR

PROJECT NO. SP 21-4

LACY PARK IMPROVEMENTS

ATTENDANCE AT PRE-BID CONFERENCE IS MANDATORY

PREPARED BY

CHZ Architects, LLC

3315 E Skelly Drive

Tulsa, OK 74105

918-481-4158 PH

PAUL C. ZACHARY, P.E., DIRECTOR

ENGINEERING SERVICES DEPARTMENT

Account Numbers 72390-54110-21004, 72390-54110-21005

72390-54110-21004, 72390-54110-21005

Engineering Services Department

2317 South Jackson Avenue

Tulsa, Oklahoma 74107

(918) 596-9601

03/24/16

CONTRACT DOCUMENTS

PROJECT NO. SP 21-4
Lacy Park Improvements

ENGINEERING SERVICES DEPARTMENT

Published in the Tulsa World and The Oklahoma Eagle:
March 10, 13, 14, 15, 16 and 17, 2023.

NOTICE TO BIDDERS
SEALED BIDS FOR
PROJECT NO. SP 21-4

Notice is hereby given that pursuant to an order by the Mayor of the City of Tulsa, Oklahoma, sealed bids will be received in Room 260 of the Office of the City Clerk, City of Tulsa, 175 E. 2nd Street, Tulsa, Oklahoma 74103 until **8:30 a.m. the 14th day of April, 2023** for furnishing all tools, materials and labor and performing the work necessary to be done in the construction of the following:

PROJECT NO. SP 21-4 LACY PARK IMPROVEMENTS

The entire cost of the improvement shall be paid from Account No. 7239000-541101-21D05; 7239000-541101-21D09; 7239000-541101-21D06; 7239000-541101-21D07

A **MANDATORY** Pre-Bid Conference is scheduled for **Monday March 20, 2023 at 9:30 a.m**. and will be held through video conferencing with Microsoft Teams, invitation presented on the City of Tulsa's website at this link:
https://www.cityoftulsa.org/government/departments/engineering-services/construction-bids/

Attendance at the Pre-Bid Conference is MANDATORY. Bids will not be received from contractors who did not attend the Pre-Bid Conference.

Bids will be accepted by the City Clerk from the holders of valid pre-qualifications certificates from the City of Tulsa in one or more of the following classifications: **A, C or S**

Drawings, specifications and contract documents for construction of said public improvements of the said project have been adopted by the Mayor of said City. Copies of same may be obtained at the Office of the Director of Engineering Services at the City of Tulsa Engineering Services, 2317 South Jackson, Room 103, North Building, for a non-refundable fee in the amount of **$50.00** made payable to the City of Tulsa by check or money order.

Contract requirements shall include compliance as required by law pertaining to the practice of non-discrimination in employment.

The overall aspirational Small Business Enterprise utilization goal for this project is **ten (10)** percent.

Attention is called to Resolution No. 18145 of August 23, 1988, requiring bidders to commit to the goal of employing on the project at least fifty percent bona fide residents of the City of Tulsa and/or MSA in each employment classification.

Attention is called to Resolution 7404 of November 8, 2006, requiring bidders, their subcontractors and their lower-tier subcontractors to hire only citizens of the United States.

The City of Tulsa itself is exempt from the payment of any sales or use taxes, and pursuant to Title 68 O.S. Section 1356(10), direct vendors to the City are also exempt from those taxes. A bidder may exclude from his bid appropriate sales taxes, which he will not have to pay while acting for and on behalf of the City of Tulsa.

A Certified or Cashier's Check or Bidders Surety Bond, in the sum of 5% of the amount of the bid will be required from each bidder to be retained as liquidated damages in the event the successful bidder fails, neglects or refuses to enter into said contract for the construction of said public improvements for said project and furnish the necessary bonds within thirty days from and after the date the award is made.

The bidder to whom a contract is awarded will be required to furnish public liability and workmen's compensation insurance; Performance, Statutory, and Maintenance bonds acceptable to the City of Tulsa, in conformity with the requirements of the proposed contract documents. The Performance, Statutory, and Maintenance bonds shall be for one hundred percent (100%) of the contract price.

All bids will be opened and considered by the Bid Committee of said City at a meeting of said Committee to be held in the City Council Room of City Hall in said City at 9:00 a.m. on the 14th day of April 2023.

Dated at Tulsa, Oklahoma, this 10th day of March 2023.

(SEAL)

Christina Chappell
City Clerk

INSTRUCTIONS TO BIDDERS

B-1. BIDS

Each bid Proposal shall be completed electronically on the electronic media provided, then printed, signed and submitted along with the electronic media and the complete bound copy of the contract documents. In the event of a discrepancy between the pricing on the electronic media and hard copy of a Proposal, the hard copy pricing will govern. If electronic media is not provided and the bid Proposal is manual, the bid Proposal shall be submitted in ink. The written words shall govern over the figures if there is a difference between the two. No alterations, additions, or erasures shall be made on the Proposal. Erroneous entries shall be lined out, initialed by the bidder, and the correct entry inserted. The unit price bid must cover all expense for furnishing the labor, materials, tools, equipment, and apparatus of every description to construct, erect, and furnish all work required by and in conformance with the Drawings and Specifications.

Each bid shall be enclosed in a sealed envelope addressed to the City of Tulsa, 175 E. 2nd Street, Room 260, City Hall, Tulsa, Oklahoma, identified on the outside with the words:

PROJECT NO. SP 21-4 LACY PARK IMPROVEMENTS

Pre-qualification Certificate Number _____,

And shall be filed with the City Clerk in Room 260, City Hall.

All addenda to the contract documents, properly signed by the bidder, shall accompany the bid when submitted.

B-2. BID SECURITY

Each bid shall be accompanied by a cashier's check, a certified check, or bidder's bond, in the amount of five percent (5%) of the total amount bid.

The bid security shall be made payable, without condition, to the City of Tulsa, Oklahoma. The bid security may be retained by and shall be forfeited to the City as liquidated damages if the bid is accepted, a contract based thereon is awarded, and the bidder fails to enter into a contract in the form prescribed, with legally responsible sureties, within thirty (30) days after such award is made by the City.

B-3 RETURN OF BID SECURITY

The bid security of each unsuccessful bidder will be returned when his bid is rejected. The bid security of the bidder to whom the contract is awarded will be returned when he executes a contract and files satisfactory bonds. The bid security of the second lowest responsible bidder may be retained for a period of

time not to exceed sixty (60) days pending the execution of the contract and bonds by the successful bidder.

B-4 WITHDRAWAL OF BIDS

No bidder may withdraw his bid for sixty (60) days after the date and hour set for the opening. A bidder may withdraw his bid any time prior to expiration of the period during which bids may be submitted by making a written request signed in the same manner and by the same person who signed the Proposal.

B-5 REJECTION OF BIDS

Bids received more than ninety-six (96) hours before the time set for opening bids, excluding Saturdays, Sundays, and holidays, as well as bids received after the time set for opening bids, will not be considered and will be returned unopened.

The City of Tulsa reserves the right to reject any and all bids when such rejection is in the best interest of the City of Tulsa. All bids are received subject to this stipulation and the City reserves the right to decide which bidder shall be deemed lowest responsible bidder.

A violation of any of the following provisions by the bidder shall be sufficient reason for rejecting his bid, or shall make any contract between the City of Tulsa and the Contractor that is based on his bid, null and void: divulging the information in said bid before the bids have been opened; submission of a bid which is incomplete, unbalanced, obscure, incorrect, or which has conditional clauses, additions, or irregularities of any kind not in the original proposal form, or which is not in compliance with the Instruction to Bidders and published Notice to Bidders, or which is made in collusion with another bidder. The City shall have the right to waive any immaterial defects or irregularities in any bid received.

B-6 DISQUALIFICATION OF BIDDERS

No contract will be awarded to any person or persons, firm, partnership, company, or corporation which is in arrears to the City upon any debt of contract, or in default as surety or otherwise upon any obligation to the City.

B-7 SIGNATURE OF BIDDERS

Each bid shall be properly signed with the full name of the company or individual submitting the bid, the bidder's address, and the name and title of all persons signing printed below their signature lines. Bids by partnerships shall be signed with the partnership name followed by the signature and title of one of the partners. Bids by corporations shall be signed with the name of the corporation followed by the signature and title of the president, vice president, chairman, or vice chairman of the Board of Directors with attestation by the corporate secretary or assistant corporate secretary. **Resolution must be dated no more than 30 days prior to date of signature of the contract/ bond etc.** Bids by joint ventures shall be signed by each participant in the joint venture. Bids by

limited liability companies shall be signed with the name of the limited liability company followed by the signature and title of the Manager or Managing Member. Bid by limited partnerships shall be signed with the name of the limited partnership followed by the signature of
the general partner. Note: The signature requirements listed above are for Oklahoma entities; entities organized in other states must follow the law of the state in which they are organized.

A bid by a person who affixes to his signature the word "President", "Manager", "General Partner", "Agent", or other title, without disclosing the name of the company for which he is signing, may be held to be the bid of the individual signing.

B-8 INTERPRETATION OF CONTRACT DOCUMENTS

If any person who contemplates submitting a bid is in doubt as to the true meaning of any part of the drawing, specifications, or other proposed contract documents, he may submit to the Engineer a written request for interpretation thereof. The person submitting the request shall be responsible for its prompt delivery. Interpretation of the proposed contract documents will be made only by addendum. A copy of each addendum will be mailed or delivered to each person obtaining a set of contract documents from the Engineer. The City will not be responsible for any other explanations or interpretations of the proposed contract documents.

B-9 LOCAL CONDITIONS AFFECTING WORK

Each bidder shall visit the site of the work and shall completely inform himself relative to construction hazards and procedure, labor, and all other conditions and factors, local and otherwise, which would affect prosecution and completion of the work and its cost. Such considerations shall include the arrangement and condition of existing structures and facilities, the procedure necessary for maintenance of uninterrupted operation of existing structures and facilities, the availability and cost for labor, and facilities for transportation, handling, and storage of materials and equipment. All such factors shall be properly investigated and considered in the preparation of the bid. There will be no subsequent financial adjustment for lack of such prior information.

B-10 TIME OF COMPLETION

The time of completion is an essential part of the contract and it will be necessary for each bidder to satisfy the City of his ability to complete the work within the allowable time set forth in the Bid Form. In this connection, attention is directed to the provisions of the General Conditions and Special Conditions relative to delays, extension of time, and liquidated damages.

B-11 QUALIFICATION OF BIDDERS

No bid will be received and filed by the City Clerk of the City of Tulsa unless the person submitting the bid has been pre-qualified as provided by ordinance, and

is the holder of a current certificate of Pre-qualification in force and effect on the date such bid is to be submitted and filed.

B-12 TAXES AND PERMITS

Attention is directed to the requirements of the General Conditions regarding payment of taxes and obtaining permits. Contractor shall comply with all zoning ordinances of the City, as provided in the Tulsa Zoning Code, Title 42 Tulsa Revised Ordinances and conform with all zoning requirements established by the Tulsa Metropolitan Area Planning Commission and the Board of Adjustment. Contractor can call the Indian Nations Council of Governments (INCOG) at (918) 584-7526, to determine if any zoning requirements must be met.

B-13 OKLAHOMA LEGAL REQUIREMENTS

The Contractor must comply with the Oklahoma Scaffolding Law, 40 Oklahoma Statues, Sections 174 - 177, which cover erection and use of scaffolds, hoists, cranes, stays, ladders, supports, or other mechanical contrivances.

In accordance with Oklahoma Statutes, Title 68, Section 1701-1707, before commencing any work pursuant to this contract, any nonresident contractor shall give written notice by certified mail, return receipt requested, to the Oklahoma Tax Commission, the Oklahoma Employment Security Commission, the Workers Compensation Court, and the county assessor of each county in which work will be performed. The notices shall comply with the requirements set forth in said statute.

B-14 BONDS

The bidder to whom a contract is awarded will be required to furnish bonds as follows:

a. Performance Bond – A Performance Bond to the City in an amount equal to one hundred percent (100%) of the Contract price.

b. Statutory Bond – A Statutory Bond to the State of Oklahoma in an amount equal to one hundred percent (100%) of the contract price.

c. Maintenance Bond – A Maintenance Bond to the City in an amount equal to one hundred percent (100%) of the contract price.

The bonds shall be executed on the forms included in the contract documents by a surety company authorized to do business in the State of Oklahoma and acceptable as Surety to the City of Tulsa.

Accompanying the bonds shall be a "Power-of-Attorney" authorizing the attorney-in-fact to bind the Surety Company and certified to include the dates of the bonds.

B-15 BOUND COPY OF CONTRACT DOCUMENTS

The Bid Form or other pages shall not be removed from the bound copy of contract documents. The copy of contract documents filed with each bid shall be complete and shall include all items in the Table of Contents and all addenda.

B-16 EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS

Each bidder agrees to comply with the terms of Title 5, Chapter 1, Section 111, of the Tulsa Revised Ordinances relating to Non-Discrimination.

B-17 BASIS FOR AWARD OF CONTRACT

The basis for award of a contract shall be the total base bid submitted by the lowest responsible bidder unless otherwise directed in the form of proposal. The City of Tulsa reserves the right to withhold the awarding of a contract for a reasonable period of time from the date of opening of bids. The awarding of a contract upon a successful bid shall give the bidder no right or action or claim against the City of Tulsa upon such contract until the same shall have been reduced to writing and duly signed by the contracting parties. The award of a contract will not be completed until the contract is duly executed and the necessary bonds and insurance approved.

B-18 TIME FOR AWARDING OF CONTRACT

The awarding of a contract to the lowest responsible bidder will be made within thirty (30) days after the opening of bids unless the City of Tulsa by formal recorded action and for good cause shown, provides for a reasonable extension to that period, which extension period shall not in any event exceed fifteen (15) days where only state or local funds are involved, or not to exceed ninety (90) days on any award of contract for the construction of public improvements where funds are utilized which are furnished by an agency of the federal government.

B-19 SAFETY AND HEALTH REGULATIONS

Bidders should note that they are subject to "Safety and Health Regulations for Construction", Chapter XVII of Title 29, CFR, Part 1926 and that compliance, review and enforcement are the responsibility of the U.S. Department of Labor.

The Contractor is fully responsible for the safety of the work site and is expected to train their employees in all applicable safety issues. This should include but not be limited to: trench safety, confined space entry, head protection, etc. In accordance with construction contracts with the City, Authority, Board, or Commission, all applicable Labor and OSHA safety regulations must be followed.

Work sites must be monitored by the Contractor and safety provisions enforced. Contractors are asked to ensure that all employees are properly informed and trained in construction, work site safety.

B-20 VENDORS AND SUBCONTRACTOR IDENTIFICATION

Where Vendor and Subcontractor Identification Questionnaires are included in the bid documents, each bidder shall submit the Questionnaire directly to the Engineer no later than 5:00 p.m. on the first working day following the bid opening. Failure to submit the questionnaire may render the bid unresponsive and not eligible for award. The award of the Contract will be subject to the acceptability of the vendors and subcontractors listed. If an award is made, the vendors and subcontractors listed on the questionnaire shall be used on the project. No changes in the vendor and subcontractor list will be permitted unless prior consent is obtained from the Engineer.

B-21 U.S. ENVIRONMENTAL PROTECTION AGENCY NPDES REQUIREMENTS FOR STORMWATER DISCHARGES

The bidder's attention is directed to U.S. Environmental Protection Agency (EPA) NPDES requirements for stormwater discharges. The Contractor shall be responsible for filing a Notice of Intent and development and implementation of a Stormwater Pollution Prevention Plan (PPP).

B-22 AMERICANS WITH DISABILITIES ACT

The Contractor shall take the necessary actions to ensure its facilities are in compliance with the requirements of the Americans with Disabilities Act (ADA). It is understood that the program of the Contractor is not a program or activity of the City of Tulsa. The Contractor agrees that its program or activity will comply with the requirements of the ADA. Any costs of such compliance will be the responsibility of the Contractor. Under no circumstances will the Contractor conduct any activity, which it deems non-compliant with the ADA.

RESOLUTION NO. 18145

A RESOLUTION REQUIRING THE INCLUSION IN PLANS AND SPECIFICATIONS FOR PUBLIC IMPROVEMENT CONTRACTS OF PROVISIONS PROVIDING FOR THE EMPLOYMENT OF BONA FIDE RESIDENTS OF THE CITY OF TULSA; AND/OR THE MSA; ALSO PROVIDING THAT AT LEAST OF FIFTY PERCENT (50%) OF EACH CLASS OF EMPLOYEES USED ON A PROJECT BE BONA FIDE RESIDENTS OF THE CITY OF TULSA AND/OR THE MSA; THAT THE DIRECTOR OF THE DEPARTMENT OF HUMAN RIGHTS IS CHARGED WITH ENSURING THAT ALL BIDS FOR PUBLIC CONSTRUCTION CONTRACTS COMPLY WITH THIS RESOLUTION; AND DECLARING AN EMERGENCY.

WHEREAS, City of Tulsa, Oklahoma, desires to achieve a goal of full employment.

WHEREAS, it is necessary for the protection of the health, safety and welfare of all residents of the City of Tulsa, Oklahoma, to accomplish this goal.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COMMISSIONERS OF THE CITY OF TULSA, OKLAHOMA:

SECTION 1. The City of Tulsa is committed to the policy of achieving full employment of its citizens by encouraging the employment of bona fide Tulsa and MSA residents in public improvement contracts.

SECTION 2. Definitions. The definitions of certain terms used in this resolution are as follows:

a. "Bidding Documents" or "Bid" means the bid notice, plans and specifications, bidding form, bidding instructions, special provisions and all other written instruments prepared by or on behalf of an awarding public agency for use by prospective bidders on a public construction contract.

b. (i) "Bona Fide Residents" shall include only those persons who are either registered to vote in the City of Tulsa or who have resided within the city limits for at least six months, or who have purchased a permanent residence within the city limits or who have leased a residence for at least a six month term. Residency may be further determined by a valid Oklahoma driver's license, a current Oklahoma license tag, and a valid Oklahoma automobile inspection sticker. (ii) Bona fide residents of MSA shall include only those persons who are registered to vote in outlying MSA areas or who have resided within the outlying MSA area for at least six months, or who have purchased a permanent residence within the outlying MSA areas or who have leased a residence for at least a six month term. Residency may be further determined by a valid Oklahoma driver's license, a current Oklahoma license tag, and a valid Oklahoma automobile inspection sticker.

c. "Public Construction Contract" or "Contract" means any contract exceeding Seven Thousand Five Hundred Dollars ($7,500.00) in amount, awarded by the City of Tulsa for the purpose of making any public improvements or constructing any public building or making repairs to the same.

d. "Public Improvement" means any beneficial or valuable change or addition, betterment, enhancement or amelioration of or upon any real property, or interest therein, belonging to the City of Tulsa, intended to enhance its value, beauty or utility or to adapt it to new or further purposes. The term does not include the direct purchase of materials, equipment or supplies by the City of Tulsa.

CITY OF TULSA
FILED
AUG 23 1988
_____ A.M. _____ P.M.
Office of City Auditor
By _____

e. "MSA". All of the land areas composed of Creek County, Osage County, Rogers County, Tulsa County and Wagoner County.

SECTION 3. Residency Requirements of Contractor's Employees. Every employee and/or agent of the City of Tulsa, Oklahoma, charged or involved with the preparation of plans and specifications for any public impvement funded in whole or in part with funds of the City of Tulsa, is hereby charged to include in said plans and specifications the following provisions which shall be binding upon the successful bidders:

a. Each bid shall be accompanied by a sworn statement that the bidder is committed to the goal of employing at least 50% bona fide residents of the City of Tulsa and/or the MSA in each classification as determined by the Oklahoma Commissioner of Labor.

b. The successful bidder will be responsible for having like requirements placed upon any subcontractor.

c. The successful bidder will submit to the Director or his designated representative of the Department of Human Rights any compliance reports involving the bidder and its subcontractors required by Title 31, Chapter 1, Section 9, of the Tulsa Revised Ordinances. The reports shall include information about the residence of each employee in each laboring and trade class applicable to any City project.

SECTION 4. Unresponsive Bids. The failure to submit the documents required by Section 3 shall render a bid unresponsive. Said documents must be submitted prior to the opening of the bids. The Director of the Department of Human Rights Section of City Development is charged with ensuring that all bids comply with Section 3 prior to the bid opening date.

SECTION 5. Duty of Employees and/or Agents of the City of Tulsa. Any employee and/or agent of the City of Tulsa who fails to include the goals for residency requirements found in Section 3 in the plans and specifications for any public improvement may be subject to disciplinary action, including dismissal.

SECTION 6. Severability. The invalidity of any section, subsection, provision or clause or portion of this chapter, or the invalidity of the application thereof to any person or circumstance shall not affect the validity of the remainder of this chapter or the validity of its application to other persons or circumstances.

SECTION 7. Effect Date. This resolution shall take effect as of July 1, 1988.

SECTION 8. Emergency Clause. That an emergency exists for the preservation of the public peace, health and safety, by reason whereof this resolution shall take effect immediately upon its passage, approval and publication.

PASSED, with the emergency clause ruled upon separately and approved this 23rd day of August, 1988.

APPROVED, this 23rd day of August, 1988.

Rodger Randle

Mayor

ATTEST: Philip W. Wood

Philip W. Wood
City Auditor

APPROVED: Neal E. McNeil

Neal E. McNeil
City Attorney

PASSED, with the emergency clause ruled upon separately and approved this 23 day of August, 1988.

APPROVED, this 23 day of August, 1988.

Mayor

ATTEST:

Philip W. Wood
City Auditor

APPROVED:

Neal E. McNeil
City Attorney

CITY OF TULSA
FILED
AUG 23 1988
A.M. P.M.
Office of City Auditor
By

CITY OF TULSA, OKLAHOMA
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION INSTRUCTIONS
BID OPENING AND AWARD SYSTEM

02.21.22
POLICY STATEMENT

The City of Tulsa (hereinafter City) is committed to implementing the City of Tulsa Small Business Enterprise (SBE) Program of the City of Tulsa, hereinafter referred to as SBE Program. The stated objectives of the programs are:

- To ensure the employment of SBE(s) in the award and administration of City agreements and contracts;
- To create a level playing field on which SBE firms can compete fairly for City contracts;
- To ensure that only firms that fully meet the eligibility standards are permitted to participate as SBE participants;
- To help remove barriers to participation in City contracts;
- To assist in the development of SBE firms so that they may graduate from the SBE Program and ultimately compete successfully in the marketplace.

GOALS BY BUSINESS CATEGORY – SBE

There are seven (7) Business Categories for the City of Tulsa: Construction Contractors (Prime and Subcontractor), Architecture / Engineering (Consultant and Subconsultant), Professional Services, Other Services, and Goods and Supplies. A general description of each category follows:

Construction

- General building contractors engaged primarily in the construction of commercial buildings.
- Heavy construction such as airport runways, bridges, plants, grading and drainage, roadways, and other municipal infrastructure.
- Light maintenance construction services such as carpentry work; electrical work; installation of carpeting; air-conditioning repair, maintenance, and installation; plumbing; and renovation.
- Other related services such as water and sewer lines and maintenance, asbestos abatement, drainage, dredging, grading, hauling, landscaping (for large construction projects such as boulevards and highways), paving, roofing, and toxic waste clean-up.

Architecture and Engineering

- Licensed Architect
- Landscape Architect
- Professional Engineer
- Professional Land Surveyor
- Construction observation
- Other professional design / construction related services

CITY OF TULSA, OKLAHOMA
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION INSTRUCTIONS
BID OPENING AND AWARD SYSTEM

Professional Services

- Financial Services
- Legal services
- Medical services
- Educational services
- Real Estate services
  Planning services.
- Other professional services

Other Services

- Janitorial and maintenance services
- Uniformed guard services
- Computer services
- Certain job shop services
- Graphics, photographic services
- Landscaping
- Other non-technical professional services

Good and Supplies

- Office goods
- Medical supplies
- Miscellaneous building materials
- Computers

The goals are to reflect resource availability and capability. The City of Tulsa's goal is to mitigate and close the disparity between the availability/capability versus actual utilization of SBE firms in Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa, and Wagoner counties in Oklahoma.

The City enters various agreements and contracts with the private sector for services, goods and supplies, and construction activities. The agreements or contracts may have a specific or primary deliverable associated with one of the Business Categories. However, supplementary efforts may exist to fulfill the agreement or contract. Therefore, the table below is provided to show goals for all Business Categories. Good faith efforts shall first be focused on the Business Category or Categories that relate directly to the deliverables. Additional good faith efforts shall be in supplementary efforts from other categories to assist in meeting the overall project goal.

The project goals will be monitored and periodically adjusted to address the disparity between the available / capable / willing SBE firms versus actual utilization of SBE firms. The ***overall project goal is 10%.***

SBE firms identified for utilization in an agreement or contract must be paid from the proceeds from that agreement or contract.

CITY OF TULSA, OKLAHOMA
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION INSTRUCTIONS
BID OPENING AND AWARD SYSTEM

Business Category	***SBE Goal (%)***
Construction (Prime Contractors)	10
Construction (Subcontractors)	10
Architecture / Engineering (Consultant)	10
Architecture / Engineering (Subconsultant)	10
Professional Services	10
Other Services	10
Goods and Supplies	10

BIDDER'S ACTIONS

For a:

A. GENERAL / PRIME CONTRACTOR Contract: When the City has established SBE contract goals (hereinafter referred to as "goals"), the City will award a contract only to a bidder who makes good faith efforts to meet the goals.

B. CONSTRUCTION MANAGEMENT AT-RISK (CMAR) Contract: When the City has established SBE contract goals (hereinafter referred to as "goals"), the City will recommend award to the Construction Management (CM) firm the bidder who makes good faith efforts to meet the goals. **However, Bidder(s) who are SBE(s) are not required to solicit other SBE firms but are encouraged.**

The following summary outlines the procedures

Summary:

1. RECORD OF SOLICITATION FOR SBE form:
   These forms MUST be submitted with the bid documents. These documents establish the initial good faith, outreach efforts. In the event the bidder submitted the lowest bid, the SBE firms identified on these forms submitted with the bid are the only SBE firms that will be considered for establishing the bidder's projected utilization percentages for consideration of the award of bid.

2. LETTER OF INTENT TO CONTRACT WITH SBE form:
   The bidder that submits the apparent lowest bid will be notified by City staff no later than the Monday following bid opening. The apparent low bidder MUST submit these forms and the associated attachments by close of business on Thursday following bid opening. Only SBE firms documented on the RECORD(s) OF SOLICITATION FOR SBE forms submitted with the bid will be considered for establishing the bidder's projected utilization percentages for consideration of the award of bid. If Letters of Intent are not submitted, the projected utilization will be 0% and the apparent lowest bidder is subject to being deemed non-responsive.

3. ADMINISTRATIVE RECONSIDERATION:
   If the City determines that a bidder failed to meet the requirements above, City staff will contact the bidder by phone to define the issue and clarify any miscommunications and/or inadvertent actions. If issue was not due to miscommunication and/or inadvertent actions, the bidder will be notified per the Administrative Reconsideration process defined below. If the apparent low bidder is deemed non- responsive, City staff will notify the next lowest bidder to submit their LETTERS OF INTENT TO CONTRACT WITH SBE by close of business of the 6th day following notification or may exercise its right to reject any and all bids.

4. CITY OF TULSA SBE UTILIZATION form:
   This form is completed by the contractor (successful bidder) and submitted as part of the contract to perform the project. This form documents the "projected" utilization for the project. At the end of the project, this form is submitted with the final pay request documenting the "actual" utilization. The "actual" utilization must meet or exceed the "projected" utilization. Any change in the "projected" utilization must be documented, submitted to the City on the CHANGE REQUEST FOR SBE PARTICIPATION form, and approved by the City. Approval of the change must occur at the time of the change. If the change is a reduction and not submitted and approved per the instructions, the amount will be deducted from the contractor's final pay request.

5. CHANGE REQUEST FOR SBE PARTICIPATION form:
   This form documents any change to the "projected" utilization for the project. Change in utilization includes reduction, substitution, and/or increase. Utilization shall be checked with the submission of partial pay requests, but not longer than 30 day intervals throughout the project. The contractor's acknowledgement that they have verified changes in his/her utilization is required as part of partial pay request documents. Reductions in utilization not approved prior to the final pay request will result in pay reduction to the contractor. If, at the completion of the project, the contractor has failed to meet the SBE contract goals, does not have an approved change request, and has not demonstrated good faith efforts to meet the contract goal, the contractor will be assessed liquidated damages for the difference between the contract goal and the actual SBE participation achieved.

Record of Solicitation

All bidders shall, ***with the submissions of their bids***, show their RECORD(s) OF SOLICITATION FOR SBE that demonstrates the good faith outreach effort to meet or exceed the SBE goals established for the project.

If bidders cannot meet the established SBE goals, the bidders shall document and submit with their bid proposal, justification stating why they could not meet the established SBE goals. To demonstrate good faith efforts to meet the SBE goals, the bidders shall document their efforts to obtain SBE participation. City will review and determine that the information is complete, accurate and adequately documents the bidder's good faith efforts before committing to the award of the contract to the bidder. In the event that the City awards a contract to a bidder who cannot meet the established SBE goals,

the findings of the City's review shall be in written form and shall be incorporated into and become part of the contract documents.

If the bidder to whom City proposes to award the contract is able to demonstrate good faith efforts, City may accept the bidder's proposed goal. Acceptance by the City of the bidder's proposed goal does not release the bidder from its contractual obligation to continue to make efforts throughout the duration of the project to utilize SBE firms on the project.

All bidders shall submit with their bid the completed and signed RECORD OF SOLICITATION FOR SBE form.

Letter of Intent

The bidder must submit to the Engineering Contract Coordinator written confirmation from the SBE firms on the form LETTER OF INTENT TO CONTRACT WITH SBE that it is participating in the contract as provided in the contractor's bid commitment. This may be submitted with the bid, but not later than the City's close of business of the Thursday following the bid opening. The signed forms will define the contractor's final proposed utilization and will be the basis of a final evaluation. If inadequate utilization is proposed, the bid shall be considered non-responsive.

The SBE firms submitted on the LETTER OF INTENT TO CONTRACT WITH SBE forms shall be considered binding and changes of committed SBE firms may only be made after the contract is fully executed, and may only be changed through the submission, review and approval of form CHANGE REQUEST FOR SBE PARTICIPATION.

Failure to make the written assurance (City form LETTER OF INTENT TO CONTRACT WITH SBE), which includes the names of the SBE firms to be used, the work they will perform, and the price for the work, or failure to demonstrate good faith efforts that is deemed acceptable to the City to meet or exceed the SBE goals, shall render a bid non-responsive.

It is the contractor's responsibility to submit the information necessary for the City to ascertain compliance with the good faith efforts requirement. Extra cost involved in finding and utilizing SBE firms shall not be deemed adequate reason for the bidder's failure to meet the project SBE goals unless such costs are grossly excessive.

In instances where a successful bidder's SBE commitment exceeds the actual SBE contract goals, the submitted goals of the bidder become the contractual obligation.

In instances where a successful bidder's SBE commitment is below the SBE contract goals, the submitted utilization goals become the contractual obligation.

Good Faith Efforts

The steps taken by the bidder to obtain SBE participation shall be documented in writing and shall include, but are not limited to, the following good faith efforts:

CITY OF TULSA, OKLAHOMA
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION INSTRUCTIONS
BID OPENING AND AWARD SYSTEM

A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) in the interest of all certified SBE firms capable to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the SBE firms to respond to the solicitation. The bidder must determine with certainty if the SBE firms are interested by taking appropriate steps to follow-up on the initial solicitation.

B. Selecting portions of the work to be performed by SBE firms in order to increase the likelihood that the SBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate SBE participation, even when the contractor might otherwise prefer to perform these work items with its own forces.

C. Providing interested SBE firms with adequate information about the plans, specifications and requirements of the contract in a timely manner to assist them in responding to a solicitation.

D. Negotiating in good faith with interested SBE firms:

(1) It is the bidder's responsibility to make a portion of the work available to SBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available SBE subcontractors and suppliers, to facilitate SBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of SBE firms that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for SBE firms to perform the work. RECORD OF SOLICITATION FOR SBE form will be submitted.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including available SBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using SBE firms is not sufficient justification for a bidder's failure to meet the contract SBE goals, as long as such costs are reasonable. Also, the ability or desire of a contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Contractors are not, however, required to accept higher quotes from SBE firms to fulfill the SBE contract requirements if the price difference is excessive or unreasonable. Documentation of quotes shall be submitted to the City with the bid as part of the bidder's record of solicitation.

E. Thoroughly analyzing the capabilities of SBE firms before determining a firm's qualification for a project. The following shall not be legitimate causes for the rejection or non-solicitation of SBE quotes in the efforts of the contractor to meet the project goal: (1) the subcontractor's standing, unrelated to job performance, within the industry; (2) membership in specific groups or organizations; or, (3) association with certain political and/or social organizations.

Administrative Reconsideration

If City determines that a bidder fails to meet the requirements stated above, the bidder will be provided an opportunity for administrative reconsideration. City staff will contact the bidder by phone to define the issue and clarify any miscommunications or inadvertent actions. If issue was not due to miscommunication and/or inadvertent actions, the following process will be followed:

1. The bidder will be notified by fax/email within ten working days following the bid opening.

2. The bidder will have 2 working days from time of notification to schedule a meeting for the purpose of administrative reconsideration with a City of Tulsa Attorney. Reconsideration meetings will generally be held within 7 days of notification of a bidder being determined non-responsive.

   As part of this administrative reconsideration, the bidder will have the opportunity to meet in person with a City of Tulsa Attorney to present arguments concerning whether it met the goal or made adequate good faith efforts to do so. Submittal of additional information documenting solicitation, which was due with the original bid submission, will not be accepted or considered.

3. The decision on reconsideration will be made by a City of Tulsa Attorney who did not take part in the original determination that the bidder failed to meet the goal or make adequate good faith efforts to do so.

4. No awards will be made until all administrative reconsiderations as outlined herein are complete. A City of Tulsa Attorney will provide a written decision on reconsideration to the bidder. This decision will explain the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. The determination is copied to the Contract Administrator, City Engineer, and the Director of Human Rights.

CONTRACTOR ACTIONS AFTER AWARD OF THE CONTRACT:

Counting SBE Participation Toward the Goal

When a SBE participates in a contract, only the value of the work actually performed by the SBE is counted toward the contract goal.

The entire amount of that portion of a contract that is performed by the SBE firm's own forces is counted, including the cost of supplies and materials obtained by the SBE for the work on the contract, including supplies purchased or equipment leased by the SBE (except supplies and equipment the SBE purchases or leases from their Prime Contractor).

When a SBE performs as a participant in a joint venture, the portion of the total dollar value of the contract equal to the clearly defined portion of the work that the SBE performs with its own forces may be counted toward the goal.

Only expenditures to a SBE contractor who performs a commercially useful function may be counted toward a SBE goal.

Commercially Useful Function

A SBE performs a commercially useful function when it is responsible for the execution of the work of its contract and is carrying out its responsibilities by actually performing, managing and supervising the work involved. The SBE must be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself.

To determine whether a SBE is performing a commercially useful function, City will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid is commensurate with the work it is actually performing and the SBE credit claimed, and other relevant factors.

A SBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction through which funds are passed in order to obtain the appearance of SBE participation. In determining whether a SBE is acting as a pass-through, City will examine similar transactions, particularly those in which SBE firms do not participate.

Manufacturers and Material Suppliers

If the materials or supplies are obtained from a certified SBE manufacturer, 100 percent of the cost of the materials or supplies will be counted toward the SBE goals. A manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials required under the contract as described by the specifications.

If the materials or supplies are purchased from a certified SBE regular dealer, 100 percent of the cost of the materials or supplies will be counted toward the SBE goals. A regular dealer is a firm that owns, operates or maintains a store, warehouse, or other establishment in which the materials, supplies, articles, or equipment described by the specification and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating or maintaining a place of business as provided for in the above paragraph if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad-hoc or contract-by-contract basis.

In order for a firm to qualify as a SBE supplier of metal and/or concrete pipe, the firm must also fabricate the pipe. Metal or concrete pipe is specialty pipe which is project specific and is inspected

during the manufacturing process. This arrangement provides for no warehousing of metal or concrete pipe and essentially requires the manufacturer to be the supplier. Merely ordering pipe from the fabricator and in turn selling it to contractors is not consistent with normal industry practice. Contractors normally purchase pipe directly from the manufacturer, thus eliminating the middleman. Supplying metal or concrete pipe is viewed as brokering and is considered inconsistent with SBE program requirements.

Change Request for SBE Participation

Substitution or replacement of a SBE firms will only be permitted or allowed after award and execution of the City contract.

A contractor may not terminate for convenience a SBE listed in their contract (or an approved substitute SBE firm) and then perform the work of the terminated subcontract with its own forces or those of an affiliate, without City's prior written consent.

When a SBE is terminated, or fails to complete the work of the contract for any reason, the contractor must make good faith efforts to find another SBE to substitute for the original SBE. These good faith efforts shall be directed at finding another SBE to perform at least the same amount of work (not necessarily the same work) under the contract as the SBE that was terminated, to the extent needed to meet the SBE goals established in the contract.

When the contractor obtains a substitute SBE, the contractor shall provide the Engineering Contract Coordinator with copies of the CHANGE REQUEST FOR SBE PARTICIPATION form and supporting documentation.

If the contractor is unable to replace the SBE with another SBE, then the contractor must provide City with evidence in writing that they have made a good faith effort. The contractor must submit to the Engineering Contract Coordinator a CHANGE REQUEST FOR SBE PARTICIPATION form along with documentation to support they have made a good faith effort. City may adjust the goal as appropriate.

In the case where a contractor cannot meet the SBE goals of a contract, he or she should request a change of that portion of the SBE goal, which cannot be met. The request will be subject to the following:

- A written request for change will be initiated by the contractor at the time he or she reasonably knows that despite good faith efforts the contract goal cannot be achieved. The request will be included on the CHANGE REQUEST FOR SBE PARTICIPATION form and will contain written document all good faith efforts made to meet the goal as well as the reason for the change.

- The request for change, CHANGE REQUEST FOR SBE PARTICIPATION form, will be submitted for review to the Engineering Contract Coordinator. The City will make the decision on the approval or denial of the change request and inform the contractor.

- If, at the completion of the project, the contractor has failed to meet the SBE contract goals, does not have an approved change request, and has not demonstrated good faith efforts to meet the contract goal, the contractor will be assessed liquidated damages for the difference between the contract goal and the actual SBE participation achieved. The City shall deduct the liquidated damages from the final payment. In the event insufficient earnings remain for the reduction of liquidated damages, the City may claim against the contractor's bond, suspend the contractor under performance suspension, withhold further proposals, suspend prequalification and/or other remedies available under the law.

- In those instances when the goal is not met due to a change in quantity, which occurs through no fault of the contractor, but due to City and/or changed site conditions, a change request will be recommended by Field Engineering at the time the change becomes known, but not later than the next progressive payment application from the contractor which covers the work identified for the SBE firm. The change request will include the statement of quantity change(s). The contractor shall endeavor, with good faith efforts, to mitigate underruns by utilizing other SBE firms.

Change in utilization includes reduction, substitution, and/or increase. Utilization shall be checked with the submission of each partial pay request, but not longer than 30 day intervals throughout the project. The contractor's acknowledgement that they have verified changes in his/her utilization is required as part of partial pay request documents. Reductions in utilization not approved prior to the final pay request, will result in pay reduction to the contractor.

If a contractor fails to comply with this section, appropriate administrative remedies may be taken including, but not limited to:

- No additional progressive payments may be processed
- Refusal to issue proposals
- Liquidated damages
- Suspension of work on the project
- Suspension of prequalification
- Termination of the contract

Prompt Payments

To ensure that contractors' obligations under City contracts are met, the contractor shall endeavor to pay all subcontractors for satisfactory performance of their contracts no later than fifteen (15) calendar days after receipt of each progressive payment from City. The contractor must further endeavor to make prompt release of retainage held to the SBE within thirty days after the work is satisfactorily completed, whether the contractor's work is complete or not. The term "satisfactorily completed" is defined as when; 1) City finds the work completed in accordance with the Plans and Specifications; 2) any required paperwork, including material certification, payrolls, etc., have been received and approved by City; 3) Field Engineering has determined the final quantities on the subcontractor's portion of the work; and 4) Contractor has received progressive payments from City which includes subcontractors' work.

CITY OF TULSA, OKLAHOMA
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION INSTRUCTIONS
BID OPENING AND AWARD SYSTEM

In an effort to accelerate payments to subcontractors, the City may pay the Contractor for acceptable material stockpiled or delivered to the project, at other approved or designated locations, or at a plant site required for Contractor's operations as approved by the City. This is governed by Oklahoma Department of Transportation Standard Specifications for Highway Construction 2009 or latest edition.

Contractor shall endeavor to include invoices from SBE for materials on hand, partially completed work, or complete work on the earliest partial payment request submitted to the City. It is incumbent on the SBE to submit invoices to the Contractor in a timely manner.

Failure to comply with the prompt payment and return of retainage provisions of the contract may result in sanctions under the contract, as listed below:

- Refusal to issue proposals
- Liquidated damages
- Suspension of work on the project
- No additional progressive payments may be processed
- Suspension of prequalification

Any delay or postponement of payment among the parties may take place only for good cause, with City written approval. The explanation from the contractor must be made in writing to the City.

Record Keeping Requirements

The contractor shall keep such records as are necessary to determine compliance with the SBE contract obligations. The records kept by the contractor will indicate:

1. The name(s) of SBE firms or other subcontractors, the type of work being performed, and payment for work, services and business.

2. Documentation of correspondence, verbal contracts, telephone calls, etc., to obtain services of SBE firms on the project.

Upon request, the contractor shall submit all subcontracts, purchase orders, contracts, agreements, and financial transactions, including canceled checks, executed with SBE firms with the reference to records referred to in this provision, in such form, manner, content prescribed by City.

The contractor should list all SBE firms in the contract and summarize total amounts paid to SBE firms and the project goal amount for each SBE firm.

Reciprocity

The City will grant reciprocity of membership in the SBE program to certified Oklahoma Department of Transportation Disadvantaged Business Enterprises which are located in the Tulsa Metropolitan Statistical Area.

(Must be submitted with Bid)

CITY OF TULSA
BIDDER'S AFFIDAVIT FOR
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION GOALS

STATE OF)
) ss:
COUNTY OF)

_____, of lawful age, being first duly sworn, says that s(he) is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder agrees to fully comply with the City of Tulsa's Resolution requiring that a good faith effort be made to utilize small business enterprises as subcontractors.

Affiant further states that s(he) will document on pages SBE-2BID, -3BID, -4BID, and -5BID for public record, his/her good faith efforts in solicitation.

Affiant further states that s(he) is responsible for having like requirements placed upon any subcontractor of said bidder.

Affiant further states that s(he) has read and agrees to the current CITY OF TULSA, OKLAHOMA SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION INSTRUCTIONS FOR BID OPENING AND AWARD SYSTEMS.

_____
BIDDER (Company Name)

_____
SIGNED

_____
TITLE

SUBSCRIBED and SWORN to before me this _____ day of _____, 20_____.

_____
NOTARY PUBLIC

MY COMMISSION EXPIRES:

_____

CITY OF Tulsa
A New Kind of Energy.

RECORD OF SOLICITATION FOR SMALL BUSINESS ENTERPRISE (SBE)

(MUST BE SUBMITTED WITH BID)

- Project Name:
- Project Number:
- Prime Contractor:
- Prime Contractor Representative:
Consultants, Subcontractors, Service, Regular Dealers, Material Suppliers, & Fabricators:
- Contact Date(s):
- Name of Company:
- Address (Street, City, County, State):
- City of Tulsa SBE: ☐ Yes ☐ No
- City of Tulsa SBE Certificate Number:
- Other SBE Certificate Number(s):
- Company Contact Person:
- Phone No.: Email:
- Description of Work:
- Contract Documents provided to and/or reviewed by Company: ☐ Yes ☐ No
- Will City of Tulsa SBE be utilized? ☐ Yes ☐ No
- If Yes, Estimated Agreement Amount: $
- If No, description of reasons why agreement could not be reached for City of Tulsa SBE to perform work:

CITY OF Tulsa
A New Kind of Energy.

LETTER OF INTENT
TO CONTRACT WITH SMALL BUSINESS ENTERPRISE (SBE)
(Must be submitted by close of business on Thursday following bid opening)

Engineering Services Department, Attn: Contract Administration
CITY OF TULSA
2317 South Jackson, N-103
Tulsa, Oklahoma 74107
Ph.: 918.596.9637
Fax: 918.596.1299

Project Name: _____

Project Number: _____

Submittal Date: _____

_____

Prime Contractor

HEREBY, intends to subcontract items of work generally described as

_____

to:

_____

SMALL BUSINESS ENTERPRISE

Total amount of participation by City of Tulsa SBE: $ _____

(City of Tulsa SBE, quote must be attached)

City of Tulsa SBE: ☐ Yes ☐ No
City of Tulsa SBE Certificate Number: _____
Other SBE Certificate Number(s):

_____

_____

SMALL BUSINESS ENTERPRISE		**PRIME CONTRACTOR**	
Signature:	_____	Signature:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

Signatures of Authorized representatives of the Prime Contractor and the City of Tulsa SBE firm above represent the written commitment by the Prime Contractor to subcontract with the City of Tulsa SBE firm and a written commitment by the City of Tulsa SBE firm to subcontract for work as described in the attached quote.

This form, along with the City of Tulsa SBE firm's quote must be submitted to the City with the executed Contract documents. If this form is not received, the proposed utilization will NOT be counted as part of the Prime Contractor's agreement. This may cause the agreement to be considered non-compliant and be rejected by the City of Tulsa.

CITY OF Tulsa
A New Kind of Energy.

CHANGE REQUEST
FOR SMALL BUSINESS ENTERPRISE (SBE) PARTICIPATION

Project Name: _____

Project Number: _____

Prime Contractor: _____

CHANGE: From / To (fill in both sides) **OR** **ADD:** To (fill in this side only)

FROM:

Name: _____

City of Tulsa SBE: ☐ Yes ☐ No
City of Tulsa SBE Certificate Number: _____
Other SBE Certificate Number(s):

_____

TO:

Name: _____

City of Tulsa SBE: ☐ Yes ☐ No
City of Tulsa SBE Certificate Number: _____
Other SBE Certificate Number(s):

_____

Change in service to be performed: _____

_____

_____

Change in amount of participation by City of Tulsa SBE: $ _____

Reason for Change: _____

_____

_____

NOTE: Attach a copy of the Letter of Intent for the original City of Tulsa SBE and a new Letter of Intent for the proposed City of Tulsa SBE.

PRIME CONTRACTOR

Signature: _____

Date: _____

Title: _____

SBE SUBCONTRACTOR

Signature: _____

Date: _____

Title: _____

Approved / Disapproved: _____ Date: _____
Engineering Services, Manager
(Planning, Design, or Field)

Approved / Disapproved: _____ Date: _____
Engineering Services / Contract Admin.

Distribution: Tulsa Authority for Economic Opportunity
Engineering Services Department Division (Planning, Design, or Field)

CITY OF TULSA
SMALL BUSINESS ENTERPRISE (SBE) UTILIZATION

Project No.			**Contractor**
Project Name			

Name	Business Category	Projected Dollars	Actual Dollars

Projected Contract % _____ **Actual Contract %** _____ **Total** _____ _____

PROJECTED:

_____
Contractor Representative

_____
Date

ACTUAL (Update and Submit with Final Payment):

_____
Contractor Representative

_____
Date

NOTE: REFER TO UTILIZATION INSTRUCTIONS

(Must be submitted at time of Bid)
CITY OF TULSA
50% RESIDENT RESOLUTION
AFFIDAVIT FOR BID

STATE OF)
) ss:
COUNTY OF)

_____, of lawful age, being first duly sworn, states that s(he) is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder, in compliance with City of Tulsa Resolution No. 18145, is committed to the goal of employing at least 50% bona fide residents of the City of Tulsa and/or the Metropolitan Statistical Area (composed of Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa, and Wagoner counties).

Affiant further states that bidder is responsible for having like requirements placed upon any of its subcontractors.

_____ _____

BIDDER (Company Name) **SIGNED**

_____
Title

SUBSCRIBED and SWORN to before me this ____ day of _____, 20____.

_____
NOTARY PUBLIC

MY COMISSION EXPIRES:

_____

COMMISSION NO.:

_____

(Must be submitted at time of Bid)
CITY OF TULSA
RESOLUTION NO. 7404
AFFIDAVIT OF COMPLIANCE

_____, of lawful age, being first duly sworn, states that s(he) is the authorized agent of the Company set forth below.

Affiant further states that the Company, in compliance with City of Tulsa Resolution No. 7404, shall not hire or knowingly allow any of its subcontractors or lower tier subcontractors to hire anyone who is not a United States citizen or legal immigrant or anyone who does not have legal status as a temporary worker to perform work on any project which is the subject of a contract between the Company and the City of Tulsa.

Affiant further states that the Company shall not fail to comply with and shall not knowingly allow any of its subcontractors or lower tier subcontractors to fail to comply with all applicable laws including, but not limited to, labor, employment and taxation laws, in the performance of any work on any project which is the subject of a contract between the Company and the City of Tulsa.

Affiant further states that the Company shall make available to the City of Tulsa, at the City's request, sufficient information and/or affirmations to allow the City to confirm Company's compliance with Resolution No. 7404 relating to the performance of any contract between the Company and the City of Tulsa.

Company: _____

Signed: _____

_____
Title

SUBSCRIBED and SWORN to before me, this _____ day of _____, 20__.

_____
NOTARY PUBLIC

MY COMMISSION EXPIRES:

_____

COMMISSION NO.:

_____

02/01/19

(Must be submitted at time of bid)

NON-COLLUSION AFFIDAVIT

STATE OF)
) ss:
COUNTY OF)

_____ , of lawful age, being first duly sworn, says that:

1. I am the duly authorized agent of the bidder submitting the competitive bid associated with this sworn statement for the purpose of certifying facts pertaining to the existence of collusion among bidders and between bidders and municipal officers or employees, as well as facts pertaining to the giving or offering of things of value to governmental personnel in return for special consideration in the letting of any contract pursuant to the bid;

2. I am fully aware of the facts and circumstances surrounding the making of the bid and have been personally and directly involved in the proceedings leading to the submission of such bid;

3. Neither the bidder nor anyone subject to the bidder's direction or control has been a party:
   a. to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding;
   b. to any collusion with any municipal official or employee as to quantity, quality or price in the prospective contract, or as to any other terms of such prospective contract; nor
   c. in any discussions between bidders and any municipal official concerning exchange of money or other things of value for special consideration in the letting of a contract.

4. If awarded the contract, neither the bidder nor anyone subject to the bidder's direction or control has paid, given or donated or agreed to pay, give or donate to any officer or employee of the City of Tulsa or of any public trust where the City of Tulsa is a beneficiary, any money or other thing of value, either directly or indirectly, in procuring the contract for which the bid is submitted.

_____ _____

BIDDER (Company Name) Signed

_____

Title

SUBSCRIBED and SWORN to before me this _____ day of _____, 20___.

_____

NOTARY PUBLIC

MY COMMISSION EXPIRES:

_____ , ___ .

COMMISSION NO.:

_____

(Must be submitted at time of bid)

BUSINESS RELATIONSHIP AFFIDAVIT

STATE OF)
) ss:
COUNTY OF)

_____ , of lawful age, being first duly sworn, says that s(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 and 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.)

Signed: _____

_____

BIDDER (Company Name)

_____

Title:

SUBSCRIBED and SWORN to before me this _____ day of _____, 20__.

_____

NOTARY PUBLIC

MY COMMISSION EXPIRES:

_____ , _____

COMMISSION NO.:

_____

INTEREST AFFIDAVIT

STATE OF _____)
)ss.
COUNTY OF _____)

I, _____, of lawful age, being first duly sworn, state that I am the agent authorized by Contractor, Engineer, Architect or provider of professional service ["Services Provider"] to submit the attached Agreement. Affiant further states that no officer or employee of the City of Tulsa either directly or indirectly owns a five percent (5%) interest or more in the Services Provider's business or such a percentage that constitutes a controlling interest. Affiant further states that the following officers and/or employees of the City of Tulsa own an interest in the Services Provider's business which is less than a controlling interest, either direct or indirect.

_____

_____

_____

By_____
Signature

Title_____

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

_____
Notary Public

My Commission Expires:_____

Notary Commission Number:_____

County & State Where Notarized:_____

The Affidavit must be signed by an authorized agent and notarized.

ELECTRONIC BID PROPOSAL INSTRUCTIONS - EXCEL SPREADSHEET

PROJECT NO. SP21-4

Please read the following instructions carefully.

1. After opening this file re-save it as your company's name.
2. Open the BID FORM Sheet from the tabs below.
3. Input the unit price of the appropriate pay item in the cells highlighted in blue.
4. Review all data input and check calculations to ensure accuracy of Bid.
5. Print 1hardcopy of the "PROPOSAL" tab, BID FORM and the "SIGNATURE PAGE" tab.
6. Complete and sign the "Signature Page" document.
6. Submit hardcopy and electronic disk with Contract Documents and Specifications for Bid opening date.

NOTES:

1. The sheet named "FOR CONTRACTOR USE" shall be used by the contractor to export data to estimating software.

AGREEMENT FOR USING ELECTRONIC BID PROPOSAL

By and Between: GH2 Architects, ENGINEER and RECIPIENT. The enclosed electronic media is provided pursuant to your request and is for your limited use in connection with your submittal of Bid Proposal for Project No. SP21-4. In no event shall the information be used for any other purpose or be released to third parties without the written consent of the ENGINEER. In the event of a discrepancy between the hard copy and this electronic media at delivery or in the future, the hard copy shall govern. ENGINEER hereby disclaims any and all liability for the consequences from use of the electronic media and makes no warranty or guarantee of accuracy. RECIPIENT shall assume full responsibility for the uses and consequences of the electronic media. It is agreed that ENGINEER has and retains ownership of the electronic media. ENGINEER does not warrant or guarantee that the electronic data is compatible with RECIPIENT'S computer hardware or software, and ENGINEER'S responsibility for the electronic media is limited to replacement of defective media for a period of thirty (30) days after delivery to RECIPIENT. !!! By opening and using this FILE, You AGREE to these TERMS AND CONDITIONS!!!

PROPOSAL
PROJECT NO. SP21-4

TO: HONORABLE MAYOR
CITY OF TULSA, OKLAHOMA

THE UNDERSIGNED BIDDER, having carefully examined the drawings, specifications, and other Contract Documents of the above project presently on file in the City Clerk, City of Tulsa Oklahoma:

CERTIFIES THAT he has inspected the site of the proposed work and has full knowledge of the extent and character of the work involved, construction difficulties that may be encountered, and materials necessary for construction, class and type of excavation, and all other factors affecting or which may be affected by the specified work; and

CERTIFIES THAT he has not entered into collusion with any other bidder or prospective bidder relative to the project and/or bid: and

HEREBY PROPOSES: to enter into a contract to provide all necessary labor, materials, equipment and tools to completely construct and finish all the work required by the Contract Documents referred to therein; to complete said work within **230 calendar days** after the work order is issued; and to accept in full payment therefore the amount set forth below for all work actually performed as computed by the Engineers as set forth in the Contract.

Basis of Award

IT SHOULD BE NOTED THAT THE LOWEST RESPONSIBLE BID SHALL BE DETERMINED BY THE TOTAL OF THE BASE BID PLUS ADDITIVE ALTERNATES NO. A1 THRU A4 . THE ITEMS IN ADDITIVE ALTERNATES NO. A1 THRU A4 MAY OR MAY NOT BE INCLUDED IN THE CONTRACT AWARD AT THE SOLE DISCRETION OF THE CITY OF TULSA. ANY PROPOSAL SUBMITTED WITH THE ADDITIVE ALTERNATES NO. A1 THRU A4 INCOMPLETE SHALL BE CONSIDERED NON-RESPONSIVE.

Note: - Item numbers omitted are not a part of the Contract.

PROPOSAL FOR
Lacy Park Improvements
PROJECT NO. SP21-4

ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	DATA INPUT UNIT PRICE	AMOUNT
01	OWNER'S ALLOWANCE	ALLOW	1	$10,000.00	$10,000.00
02	GENERAL SITE CONDITIONS	LOT	1		
03	SWPPP DOCUMENTATION AND MANAGEMENT	LOT	1		
04	PAVEMENT SAW CUT	LF	90		
05	DEMOLITION	LOT	1		
06	CONSTRUCTION STAKING	LOT	1		
07	EXCAVATION/ GRADING	CY	3,700		
08	STRIP & STOCKPILE OF TOPSOIL	CY	600		
09	IMPORTED GENERAL FILL	CY	250		
10	BERMUDA SOD	SY	5100		
11	KNOX BOX	EA	1		
12	5" THICK CONCRETE SIDEWALK	SY	1,870		
13	5" THICK COLORED CONCRETE - TAN	SY	264		
14	5" THICK COLORED CONCRETE - ORANGE	SY	175		
15	3" METAL POST AND CHAIN (AT TRASH RECEPTACLE)	EA	3		
16	CONDUIT AND WIRING TO LIGHTS	LF	350		
17	POLE LIGHT AND FOOTING	EA	6		
18	ELECTRICAL SERVICE	LOT	1		
19	1" BURIED ELECTRICAL CONDUIT AND WIRING	LF	91		
20	1" SURFACE MOUNTED ELECTRICAL CONDUIT AND WIRING	LF	10		
21	1 1/2" BURIED ELECTRICAL CONDUIT AND WIRING	LF	300		
22	1 1/2" SURFACE MOUNTED ELECTRICAL CONDUIT AND	LF	10		
23	2" TELEPHONE CONDUIT	LF	70		
24	2" BACKFLOW PREVENTER	LOT	1		
25	2" PEX WATER LINE	LF	508		
26	1 1/2" PEX PIPE - EQUIPMENT LINES	LF	620		
27	3/4" PEX PIPE	LF	55		
28	4" SCH40 PVC DRAIN LINE	LF	55		
29	6" SCH40 PVC DRAIN LINE	LF	490		
30	8" SCH40 PVC DRAIN LINE	LF	150		
31	12" SCH40 PVC DRAIN LINE	LF	290		
32	5" CHANNEL DRAIN	LF	153		
33	12" DECK DRAIN	EA	2		
		Base Bid			**$10,000.00**

ALTERNATES

34	ADD ALT A1 - SYNTHETIC TURF	LS	1		
35	ADD ALT A2 - ENTRANCE SHADE ACCENT	LS	1		
36	ADD ALT A3 - REFILLABLE CO2 TANK	LS	1		
37	ADD ALT A4 - SITE FURNISHINGS	LS	1		
		Alternates Total			
		Total (Base Bid + Alternates)			**$10,000.00**

BASE BID	$10,000.00 Figures
ADD ALT A1	 Figures
ADD ALT A2	 Figures
ADD ALT A3	 Figures
ADD ALT A4	 Figures
TOTAL BID (BASE BID + ADD ALTS A1, A2, A3, A4)	$10,000.00 Figures

Enclosed is a ( ) Bidder's Surety Bond, ( ) Certified Check, ( ) Cashier's Check for

_____ Dollars ($_____)
Figures

which the City of Tulsa may retain or recover as liquidated damages in the event that the undersigned fails to enter into contract for the work covered by this proposal., provided the Contract is awarded to the undersigned within thirty (30) days, or within ninety (90) days if Federal funds are utilized, from the date fixed for opening of bids and the undersigned fails to execute said Contract and furnish the required bonds and other requirements as called for in these Contract Documents within thirty (30) days after award of Contract.

Dated at Tulsa, Oklahoma, this _____ day of _____, 20__.

Respectfully submitted,

_____
(Complete legal name of company)

_____
(State of Organization)

By: _____
Title:
Printed Name:

ATTEST: _____
Title: Corporate Secretary
Printed Name:
(SEAL)

Address: _____
_____
_____
_____
_____

Telephone Number: _____ Fax Number: _____

By signing above bidder acknowledges receipt of the following Addenda (give number and date of each):

_____
_____
_____
_____

This form is made available for example purposes only and is not intended to be legal advice nor intended to be relied upon in lieu of consultation with an attorney.

Certificate of Secretary

The undersigned _____ (Assistant) Secretary of _____, a _____ corporation, (the "Corporation") hereby certifies that the following is a true and correct copy of a Resolution duly adopted by the Board of Directors of the Corporation on the _____ day of _____, 20___.

> RESOLVED, that _____ is authorized to execute and enter into bids, contracts, bonds, affidavits and any ancillary documents, on behalf of the Corporation.

The undersigned further certifies that this Resolution is in full force and effect as of the date of this Certificate and has not been amended, modified, revoked or rescinded.

IN WITNESS WHEREOF, I have executed this Certificate this ___ day of _____, 20__.

_____
(Signature)

_____
Printed Name

_____
(Assistant) Secretary

SAMPLE

[SAMPLE CONSENT OF MEMBERS]

[NAME OF COMPANY], LLC

Consent of Members

The undersigned, being all of the Members of [Name of Company], LLC, an Oklahoma Limited Liability Company, hereby authorize, consent to, approve and ratify the execution by _____ on behalf of [Name of Company], LLC of bid proposals, contracts, affidavits and related documents in connection with [Name of Project] of the City of Tulsa.

DATED, this ___ day of _____, 20__.

EXAMPLE

_____

Name printed: _____

_____

Name Printed: _____

[ADD ADDITIONAL LINES FOR ADDITIONAL MEMBERS]

Disclaimer Statement: This form is made available for example purposes only and is not intended to be legal advice nor intended to be relied upon in lieu of consultation with an attorney."

CITY OF Tulsa
A New Kind of Energy.

ENGINEERING SERVICES DEPARTMENT

Date

Contractor

RE: City of Tulsa Project No. SP 21-4 LACY PARK IMPROVEMENTS

TO WHOM IT MAY CONCERN:

Please be advised that the City of Tulsa, Oklahoma, a municipal corporation, has contracted for the construction of a public improvement project as referenced above, and that pursuant to Title 68 § Section 1356 (10), sales on tangible personal property or services to be wholly consumed in the performance of such projects are exempt from Oklahoma and City of Tulsa Sales Tax when:

> "…Any person making purchases on behalf of such subdivision or agency of the state shall certify, in writing, on the copy of the invoice or sales ticket to be retained by the vendor that the purchases are made for and on behalf of such subdivision or agency of this state and set out the name of such public subdivision or agency."

This letter of authorization expires.

A photostatic copy of this letter may be considered as the original.

CITY OF TULSA

Paul D. Zachary, P.E.
City Engineer

cc: Ryan McKaskle

HAS:KT:

EXTENSION OF TIME REQUEST

(to be submitted with eack partial payment application)

DATE: _____

CONTRACTOR: _____

ADDRESS: _____

_____

CONTRACT NO.: _____

PROJECT NO.: _____

DESCRIPTION: _____

ARE THERE ANY CHANGES TO YOUR SBE UTILIZATION? _____YES _____NO

IF YES, GIVE REASON AND ATTACH CHANGE REQUEST FORM (SBE-4): _____

_____

EXTENSION OF CONTRACT TIME REQUIRED: _____YES _____NO

TOTAL OF EXTENSION TIME REQUESTED: _____

IF YES GIVE REASON: _____

_____

_____

_____

SIGNATURE - CONTRACTOR

_____

CONSULTING ENGINEER OR DEPARTMENT OF PUBLIC WORKS STAFF RECOMMENDATIONS

APPROVED: _____ REJECTED: _____

REASON: _____

_____

_____

_____

SIGNATURE

_____

DATE

ACTION WILL BE TAKEN WITHIN 30 DAYS FROM RECEIPT OF REQUEST

ETR-1

CONTRACT FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS
TULSA, OKLAHOMA

THIS CONTRACT made and entered into the _____ day of_____, 2023, by and between___an (list state)_____ (Corporation or Limited Liability Company) of _____ , Oklahoma, hereinafter called the "CONTRACTOR", and the CITY OF TULSA - TULSA, OKLAHOMA, a Municipal Corporation, herein called the "CITY."

WITNESSETH:

WHEREAS, the City has caused to be prepared the necessary Drawings, Specifications, and other Contract Documents for the public improvements herein described, and has invited bids for the construction thereof in accordance with the terms of this Contract, all of which is hereby designated as:

PROJECT NO. SP 21-4 LACY PARK IMPROVEMENTS

WHEREAS, the Contractor, in response to the Advertisement, has submitted to the City, in the manner and at the time specified, a sealed bid in accordance with the terms of this Contract; and,

WHEREAS, the City, in the manner prescribed by law, has publicly opened, examined, and canvassed the bids submitted, and has determined the above named Contractor to be the lowest responsible bidder for the work and has duly awarded to the said Contractor therefore, for the sum or sums named in the Contractor's bid, a copy of the Bid Form being attached to and made a part of this Contract;

NOW, THEREFORE, in consideration of the compensation to be paid to the Contractor and of the mutual agreements and covenants herein contained, the parties to this Contract have agreed and hereby agree, as follows:

ARTICLE I. That the Contractor shall (a) furnish all tools, equipment, supplies, superintendent, transportation, and other construction accessories, services, and facilities; (b) furnish all materials, supplies, and equipment specified and required to be incorporated in and form a permanent part of the completed work; (c) provide and perform all necessary labor; and (d) in a good, substantial, and workmanlike manner and in accordance with the requirements, stipulations, provisions, and conditions of the Contract as defined in the attached General Provisions, sometimes referred to as General Conditions in the Contract Documents, said documents forming the Contract and being as fully a part thereof as if repeated verbatim herein, perform, execute, construct, and complete all work included in and covered by the City's official award of this Contract to the said Contractor, such award being based on the acceptance by the City of the Contractor's bid, or part thereof, as follows:

PRODUCT NO. SP 21-4 LACY PARK IMPROVEMENTS

ARTICLE II. That the City shall pay to the Contractor for performance of the work embraced in this Contract, and the Contractor will accept as full compensation therefor, the sum (subject to adjustment as provided by the Contract) of _____ AND /100 Dollars ($_____) for all work covered by and included in the Contract award and designated in the foregoing Article I; payments therefore to be made in cash or its equivalent, in the manner provided in the General Provisions.

ARTICLE III. That the Contractor shall start work within ten (10) days following the date stipulated in a written order from the City to proceed with the work to be performed hereunder, and shall complete the work within the number of consecutive calendar days after the authorized starting date, as stipulated below:

All Work Completed: **230** calendar days

ARTICLE IV. The sworn, notarized statement below shall be signed and notarized before this Contract will become effective.

ARTICLE V. Prior to submitting a final payment request, the Contractor shall furnish a lien waiver certifying that all subcontractors and suppliers have been paid.

IN WITNESS WHEREOF, the parties have hereto set their hands and seals,

this _____ day of _____, 2023.

CITY OF TULSA, OKLAHOMA
a municipal corporation

By:_____ ATTEST: (S E A L)

_____Date:_____ _____Date:_____
Mayor City Clerk

APPROVED: APPROVED:

_____Date:_____ _____Date:_____
City Attorney City Engineer

_____
CONTRACTOR

By:_____

Printed Name _____

_____ Date:_____ _____ Date:_____
Title Title

ATTEST:

_____
Corporate Secretary

(S E A L)

AFFIDAVIT

STATE OF _____)
)ss
COUNTY OF _____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the Contractor to submit the above Contract to the CITY OF TULSA, Tulsa, Oklahoma.

_____
Signature

Subscribed and sworn to before me this _____ day of _____, 2023.

_____
NOTARY PUBLIC

My Commission Expires:

_____, ____.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we, the undersigned, _____, (hereinafter called the Contractor"), duly authorized by law to do business as a construction contractor in the State of Oklahoma, and _____ (hereinafter called the "Surety"), a corporation organized under the laws of the State of _____, and authorized to transact business in the State of Oklahoma, as Surety, are hereby held and firmly bound unto the City of Tulsa, Tulsa, Oklahoma (hereinafter called the "City"), in the penal sum of

_____

_____

Dollars (full amount of the Contract), ($_____) lawful money of the United States, for the payment of which, well and truly to be made unto the said City, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents, as follows:

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT, WHEREAS, the Contractor has on the _____ day of _____, _____, entered into a written contract with the City of Tulsa, Tulsa, Oklahoma, for furnishing all materials, labor, tools, equipment, and transportation necessary for:

PROJECT NO. SP 21-4 LACY PARK IMPROVEMENTS

NOW, THEREFORE, if said Contractor shall well and truly perform and complete said project in accordance with said Contract, Advertisement for Bids, General Conditions, Instructions to Bidders, Bid Form, Plans and Specifications, and related documents, shall comply with all the requirements of the laws of the State of Oklahoma; shall pay as they become due all just claims for work or labor performed and materials furnished in connection with said contract, and shall defend, indemnify and save harmless said City against any and all liens, encumbrances, damages, claims, demands, expenses, costs and charges of every kind, including patent infringement claims except as otherwise provided in said specifications and other contract documents, arising out of or in relation to the performance of said work and the provisions of said Contract, then these presents shall be void; otherwise, they shall remain in full force and effect.

This obligation is made for the use of said City and also for the use and benefit of all persons who may perform work or labor, or furnish any material in the execution of said Contract, and may be sued on thereby in the name of the City.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or the specifications accompanying same, shall in any way affect its obligation on this bond; and it does hereby waive notice of any such change, extension of time, alteration or addition of the terms of the Contract, or to the work or to the specifications.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

_____
CONTRACTOR (Principal)

BY: ATTEST: (S E A L)

_____Date:_____ _____Date:_____
Title: Title:

_____Date:_____ _____Date:_____
Attorney In Fact ** Surety (S E A L)

**This date shall match the notarized certificate on the Power-of-Attorney

(Accompany this Bond with Power Of Attorney)

APPROVED AS TO FORM:

_____ Date:_____
City Attorney

_____ Date:_____
City Clerk

STATUTORY BOND

WHEREAS, the undersigned _____
has entered into a certain contract dated the _____ day of _____, ____, designated as **Project No. SP 21-4**, for the construction of certain public improvements Consisting of **Lacy Park Improvements** to be situated and constructed on and through the property described in said Contract, including all of the work mentioned and described in said Contract, and to be performed by the undersigned strictly and punctually in accordance with the terms, conditions, drawings and specifications thereof, on file in the office of the office of the City Clerk.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS: That _____, as Principal, and _____
_____, a Corporation organized under the laws of the State of _____, and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto the State of Oklahoma in the penal sum of _____
_____
Dollars (Full Amount of Contract) ($_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our successors, and assigns, jointly and severally firmly by these presents.

NOW, THEREFORE, if the said Principal shall fail or neglect to pay all indebtedness incurred by Principal or sub-contractors of said principal who perform work in the performance of such contract, for labor and materials and repairs to and parts for equipment used and consumed in the performance of said contract within thirty (30) days after the same becomes due and payable, the person, firm or corporation entitled thereto may sue and recover on this bond the amount so due and unpaid.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the specifications.

5/30/06

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

_____

CONTRACTOR (Principal)

BY: ATTEST: (S E A L)

_____Date:_____ _____Date:_____

Title: Title:

_____Date:_____ _____Date:_____

Attorney-In-Fact ** Surety (S E A L)

**This date shall match the date of the notarized certificate on the Power-of- Attorney.

(Accompany this Bond with Power-Of-Attorney)

APPROVED AS TO FORM:

_____ Date:_____

City Attorney

_____ Date:_____

City Clerk

06/13/06

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal, and _____, a corporation organized under the laws of the State of _____ and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto the City of Tulsa in the Penal sum of _____

_____

Dollars (full amount of Contract) ($_____) in lawful money of the United States of America for the payment of which, well and truly to be made, we bind ourselves and each of us, our heirs executors, administrators, trustees, successors, and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that:

WHEREAS, said Principal entered into a written contract with the City of Tulsa, Oklahoma dated_____,_____, for

Project No. SP 21-4 Lacy Park Improvements

all in compliance with the drawings and specifications therefore, made a part of said Contract and on file in the office of the City Clerk, Tulsa, Oklahoma.

NOW, THEREFORE, if said Principal shall pay or cause to be paid to the City of Tulsa, Oklahoma, all damage, loss, and expense which may result by reason of defective materials and/or workmanship in connection with said work, occurring within a period of one (1) year for all projects, from and after acceptance of said project by the City of Tulsa, Oklahoma; and if Principal shall pay or cause to be paid all labor and materials, including the prime contractor and all subcontractors; and if principal shall save and hold the City of Tulsa, Oklahoma, harmless from all damages, loss, and expense occasioned by or resulting from any failure whatsoever of said Principal, then this obligation shall be null and void, otherwise to be and remain in full force and effect.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in said Contract and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the sureties, or any of them, from the obligation of this Bond.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

_____
CONTRACTOR (Principal)

BY: ATTEST: (S E A L)

_____Date:_____ _____Date: _____
Title: Title:

_____Date:_____ _____Date: _____
Attorney-In-Fact ** Surety (S E A L)

** This date shall match the date of the notarized certificate on the Power of Attorney

(Accompany this Bond with Power-Of-Attorney)

APPROVED AS TO FORM:

_____ Date:_____
City Attorney

_____ Date:_____
City Clerk

AFFIDAVIT OF CLAIMANT

STATE OF _____

COUNTY OF _____

The undersigned, of lawful age, being first duly sworn, on oath says that this contract is true and correct. Affiant further states that the work, services or materials will be completed or supplied in accordance with the contract, plans, specifications, orders or requests furnished the affiant. Affiant further states that (s)he has made no payment directly or indirectly of money or any other thing of value to any elected official, officer or employee of the City of Tulsa or any public trust of which the City is a beneficiary to obtain or procure the contract or purchase order.

By: _____
Signature

Name: _____

Company: _____

Title: _____

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

_____
Notary Public

My Commission Expires: _____

Notary Commission Number: _____

GENERAL

CONDITIONS

GENERAL CONDITIONS OF CONTRACT

GC-1. SCOPE:
The Contract stipulations, which follow, are general in scope and may refer to conditions that will not be encountered in the performance of the work included in this Contract, and which are not applicable thereto. Any requirements, provisions, or other stipulations of these General Conditions, which pertain to a nonexistent condition, and are not applicable to the work to be performed hereunder, shall have no meaning in the Contract.

The specifications and drawings are intended to supplement, but not necessarily duplicate each other. Together they constitute one (1) complete set of specifications and drawings, so that any work exhibited in the one and not in the other shall be executed just as if it had been set forth in both, in order that the work shall be completed according to the complete design or designs as decided and determined by the Engineer.

Should anything be omitted from the specifications and drawings which is necessary to a clear understanding of the work, or should it appear various instructions are in conflict, then the Contractor shall request written clarification from the Engineer before proceeding with the construction affected by such omissions or discrepancies.

GC-2. CONTRACT DOCUMENTS:
It is understood and agreed that the Notice to Bidders, Instructions to Bidders, Proposal, Contract, Statutory Bond, Performance Bond, Maintenance Bond, Power of Attorney, Certificates of Insurance, General Conditions, Specifications, Drawings, Addenda, and duly authorized Change Orders, together with any and all supplementary drawings furnished by the Engineer as and when required to make clear and to define in greater detail the intent of the contract, drawings, and specifications, other drawings, specifications, and engineering data furnished by the Contractor (when accepted by the Engineer), and instructions furnished by manufacturers of equipment for the installation thereof, are each and all included in this Contract, and the work shall be done in full compliance and accord therewith.

GC-3. DEFINITIONS:
Any word, phrase, or other expression defined in this paragraph and used in these Contract Documents shall have the meaning herein given:

1. "Contract" or "Contract Documents" shall include all of the documents and drawings mentioned in Paragraph GC-2.

2. "City" shall mean the City of Tulsa, Tulsa County, Oklahoma.

3. "Contractor" shall mean the entity named and designated in the Contract who has entered into this Contract to perform the work covered thereby, and its, his, or their duly authorized agents and other legal representatives.

4. "Engineer" shall mean the Director of Engineering Services, or the Architect or Engineers who have been designated, appointed, or employed by the City for this project, or their duly authorized agents; such agents acting within the scope of the particular duties entrusted to them in each case.

5. "Inspector" shall mean the engineering or technical inspector or inspectors duly authorized by the Engineer, limited in each case to the particular duties entrusted to him or them.

6. "Surety" shall mean any entity that executes, as surety, the Contractor's performance bond, maintenance bond, and statutory bond securing the performance of this Contract.

7. "Drawings" shall mean and include all drawings prepared by the City as a basis for proposals; all drawings submitted by the successful bidder with his proposal and by the Contractor to the City, when and as accepted by the Engineer, and all drawings submitted by the City to the Contractor during the progress of the work as provided herein.

8. "Subcontractor" shall mean a person, firm or corporation to whom any portion of this work has been sublet by the Contractor.

9. "Work" shall mean the task to be performed, necessary for the fulfillment of this Contract.

10. "Unit Price" shall mean the cost per specified unit of measurement of work and/or material.

11. "Lump Sum" shall mean the price of an item of work including all things necessary to complete the item as shown on the drawings and specifications. Such an item is not measured in units but is defined by description.

GC-4. MODIFICATIONS AND ALTERATIONS:
In executing the Contract, the Contractor agrees that the City shall have the right to make such modifications, changes, and alterations as the City may see fit, in the extent, or plan of the Work agreed to be done or any part thereof, or in the materials to be used therein, either before or after the beginning of construction thereof, without affecting the validity of the Contract or the liability of the Sureties upon the performance of this Contract or the Statutory Bond.

Where any modification, change, or alteration increases the quantity of Work to be performed, and is within the scope of a fair interpretation thereof, such increase shall be paid for according to the quantity of work actually done, either at Unit Prices included in the Contract, or in the absence of such unit, as extra Work. Modifications and alterations, which reduce the quantity of Work to be done, shall not constitute a claim for damages or for anticipated profits on Work involved in such reduction.

The Engineer shall determine, on an equitable basis, the amount of credit due the City for Work not performed as a result of modifications or alterations authorized hereunder; where the value of the omitted Work is not fixed by Unit Prices in the Contract; allowance to the Contractor for any actual loss incurred in connection with the purchase, delivery, and subsequent disposal of materials and equipment required for use on the Work as actually built; and any other adjustment of the Contract amount where the method to be used in making such adjustment is not clearly defined in the Contract Documents. In this respect, such determination shall be final and binding only when approved by the Director of Public Works.

GC-5. DRAWINGS TO BE FURNISHED BY CONTRACTOR:
The Contractor shall furnish all shop, fabrication, assembly, foundation, and other drawings required by the specifications; drawings of equipment and devices, offered by the Contractor for review by the Engineer, shall be in sufficient detail to show adequately the construction and operation thereof; drawings of essential details of any change in design or construction proposed for consideration of the Engineer, by the Contractor in lieu of the design or arrangement required by the Contract or any item of extra work thereunder. The Contractor shall submit to the Engineer, the required number, of each copy of such drawing for the Engineer's review. After review by the Engineer, all such drawings shall become a part of the Contract Documents and the work or equipment shown thereby shall be in conformity therewith unless otherwise required by the City.

The Engineer's check and acceptance of drawings submitted by the Contractor will be for, and will cover, only general conformity to the plans and specifications and will not constitute a blanket acceptance of all dimensions, quantities, and details of the material or equipment shown; nor shall

such acceptance relieve the Contractor of his responsibility for errors contained in such drawings.

GC-6. CONTRACTOR'S BUSINESS ADDRESS:
The business address of the Contractor given in the bid or proposal upon which this Contract is founded is hereby designated as the place to which all notices, letters, and other communications to the Contractor may be mailed or delivered. The delivery at the above named address, or depositing in any mailbox regularly maintained by the Post Office, of any notice, letter, or other communication to the Contractor, shall be deemed sufficient service thereof upon the Contractor and the date of said service shall be the date of such delivery or mailing. Such address may be changed at any time by a written instrument, executed by the Contractor and delivered to the Engineer. Nothing contained herein shall be deemed to preclude or render inoperative the service of any notice, letter, or communication upon the Contractor personally.

GC-7. CONTRACTOR'S RISK AND RESPONSIBILITY:
The performance of the Contract and the Work is at the risk of the Contractor until the final acceptance thereof and payment therefor. The Contractor shall take all responsibility of the Work, and shall bear all losses resulting because of the amount or character of the Work, or because the nature of the land in or on which the Work is done is different from what is assumed or expected, or on account of the weather, floods, fire, windstorm, or other actions of the elements, or any cause or causes, whatsoever, for which the City is not responsible. If the Work or any part or parts thereof is destroyed or damaged from any of the aforesaid causes, the Contractor, at his own cost or expense, shall restore the same or remedy the damage.

The Contractor shall, in a good and workmanlike manner, perform all Work and furnish all supplies and materials, machinery, equipment, facilities, and means, except as otherwise expressly specified, necessary or proper to perform and complete all Work required by the Contract within the time herein specified, in accordance with the provisions of these Contract Documents and Drawings of the Work covered by this Contract, and any and all supplemental Drawings. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements and limitations of the Contract, and shall complete the entire Work to the satisfaction of the Engineer and of the City.

GC-8. ASSIGNMENT AND SUBLETTING OF CONTRACT:
The Contractor shall give his personal attention to the fulfillment of this Contract, and shall not let, assign or transfer it or his right, title, or interest in any part thereof, by attorney or otherwise, or sublet any part of the Work to any other person without the prior consent of the City in writing.

Should any Subcontractor fail to perform his work in a satisfactory manner the Contractor upon notice from the City shall immediately terminate his subcontract. The Contractor shall be fully responsible to the City for the acts and omissions of his Subcontractor, and of persons either directly or indirectly employed by his Subcontractor. Nothing contained in these Contract Documents shall create any contractual relation between any Subcontractor and the City.

GC-9. CONTRACTOR'S REPRESENTATIVES:
The Contractor shall designate a person on the Work site to represent him when absent from the Work site.

GC-10. CONTRACTOR AND HIS EMPLOYEES:
The Contractor shall employ competent foremen, experienced mechanics, and others skilled in the Work in this Contract; and shall promptly discharge any and all incompetent or otherwise unsatisfactory employees. Contractor's employees directly employed to perform the Work shall not be paid less than the prevailing minimum wage scale.

Necessary sanitary conveniences for the use of employees on the job site, properly secluded from public observation, shall be provided and maintained by the Contractor. The construction and

location of the facility and disposal of the contents shall comply with all laws of the City and State, relating to health and sanitation regulations.

GC-11. CONTRACTOR'S RIGHT OF PROTEST:
If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or considers any record or ruling of the Engineers to be unfair, he shall, immediately upon such Work being demanded or such record or ruling being made, ask for written instructions or decisions, whereupon he shall proceed without delay to perform the Work or to conform to the record or ruling; and within ten (10) days after the date of receipt of written instructions or decision, he shall file a written protest with the Engineer, stating clearly and in detail the basis of his objections. Except for such protests and objections made of record in the manner herein specified and within the time stated, the records, rulings, or decisions of the Engineer shall be final and conclusive.

GC-12. INSURANCE AND BONDS:
The CONTRACTOR (and any subcontractors) shall carry and keep in force during this Contract, policies of insurance issued by an insurer authorized to transact business in Oklahoma in minimum amounts as set forth below or as required by the laws of the State of Oklahoma. The Contractor shall also furnish an Owner's Protective Policy in the same amounts naming the City of Tulsa as the assured, issued by the same insurance company as the Contractor's liability coverage and indemnifying the City of Tulsa against any and all actions, claims, judgments or demands arising from injuries of any kind and character sustained by any person or persons because of work performed by the Contractor.

General Liability Insurance with a bodily injury and property damage combined single limit of not less than $1,000,000.00 for each occurrence.

Employer's Liability and Workmen's Compensation in the amounts as required by law.

The Contractor shall provide proof of such coverage:

(a) By providing Certificate(s) of Insurance prior to the execution of this contract; and
(b) By submitting updated Certificate(s) of Insurance with each and every subsequent request for payment. The Certificate(s) should show that the policies are current and should be dated within 30 days of the payment request.

The Contractor shall not cause any required insurance policy to be cancelled or permit it to lapse. If the Contractor cancels, allows to lapse, fails to renew or in any way fails to keep any required insurance policy in effect, the City will suspend all progress and/or final payments for the project until the required insurance is obtained. Further, a Contractor who fails to keep required insurance policies in effect may be deemed by the City to be in breach of contract, ineligible to bid on future projects, and/or ineligible to engage in any new contracts.

The Contractor shall execute and furnish a Statutory Bond for the protection of laborers, mechanics, and material men in a sum equal to one hundred percent (100%) of the contract price.

The Contractor shall execute and furnish a Performance Bond in a sum equal to one hundred percent (100%) of the contract price.

The Contractor shall execute and furnish a Maintenance Bond in a sum equal to one hundred percent (100%) of the contract price.

Prior to doing blasting, the Contractor shall furnish a Certificate of Insurance, which shall certify that any damage caused by blasting is within the coverage of the Contractor's liability insurance to the full limits thereof.

All bonds and insurance must be executed by a company licensed to do business in the State of Oklahoma, and must be acceptable to the Authority.

GC-13. TIME FOR COMPLETION:

The Work shall commence within ten days from and after the date of a written work order from the City. The Contractor agrees that the Work shall be performed regularly, diligently and uninterruptedly at a uniform rate of progress so as to ensure completion within the number of days after the day on which the work order is issued. If the Contractor fails to complete all Work within the time specified, then the Contractor agrees to pay the City, not as a penalty, but as liquidated damages for breach of contract, the Sum of **Two Thousand Five Hundred Dollars ($2,500.00)** for each and every calendar day beyond the date on which the work was to be completed. The said amount is fixed and agreed upon because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the City would sustain in such event. It is expressly understood and agreed that the said time for completion of the work described herein is a reasonable time for the completion of same.

The Contractor shall commence work within twenty-four (24) hours of traffic control devices being established at the project location. If the Contractor fails to commence work within twenty-four (24) hours of traffic control devices being established at the project location, then the Contractor agrees to pay the City, not as a penalty, but as liquidated damages the sum of **OneThousand Dollars ($1000.00)** per lane for each day of failure to commence work after the specified time set forth. The amount is fixed and agreed upon because of the impracticability and extreme difficulty of fixing and ascertaining the actual damage the City would sustain in such event.

Within 14 days after Bid Opening and prior to Award of Bid the successful Contractor will be required to furnish the Engineer with a progress schedule, in a format approved by the Engineer, setting forth in detail the procedure he proposes to follow, and giving the dates on which he expects to start and to complete separate portions of the Work. If at any time, in the opinion of the Engineer, proper progress is not being maintained, such changes shall be made in the schedule of operations, which will satisfy the Engineer that the Work will be completed within the period stated in the Proposal. Monthly progress meetings will be conducted to maintain coordination between all project entities.

The Contractor will be required to provide a full-time, onsite English speaking superintendent for this Work for direct contact with City and coordination of Subcontractors. A working foreman is not acceptable as a project superintendent. The superintendent shall be required to be present at the Work site whenever the Contractor or Subcontractors are performing Work. The superintendent shall be a representative of the Contractor with the authority to make decisions. If the Contractor fails to provide a non-working superintendent on a day when Work is being performed, the Contractor agrees to pay the City, not as a penalty, but as liquidated damages for such breach of contract, the sum of **One Thousand Dollars ($1000.00)** for each and every calendar day it fails to provide a non-working superintendent at the Work site. This amount is fixed and agreed upon because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the City would sustain in such an event.

It is further agreed that time is of the essence as to each and every portion of this Contract and the specifications wherein a definite and certain time is fixed for the performance of any act whatsoever; and where under the Contract an allowance of additional time for completion of any Work is made, the new time fixed by such extension shall be of the essence of this Contract.

Failure to complete the Work within the specified time, as set forth in the Contract, may be grounds for disqualification for future consideration for contracts with the City of Tulsa.

Final acceptance of the Work is defined as the completion of the Work and the Contractor moving off the project site. No defined or additional Work is needed.

Contract Evaluation forms will be compiled by City staff upon completion of Work to provide a record of the Contractor's performance for use in subsequent projects.

GC-14. EXTENSIONS OF TIME:
Should the Contractor be delayed in the final completion of the Work by any act or neglect of the City or Engineer, or any employee of either, or strikes, injunctions, fire, or other causes outside of and beyond the control of the Contractor and which, in the opinion of the Engineer, could have been neither anticipated nor avoided, then an extension of time sufficient to compensate for the delay, as determined by the Engineer, shall be granted by the City, provided, however, that the Contractor shall give the City and the Engineer notice in writing of the cause of each delay on the "Extension of Time Request" form enclosed in these documents, and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the Work.

The Contractor shall submit the "Extension of Time Request" form with each partial payment application. Failure to submit the Extension of Time Request with a partial payment application shall constitute a complete waiver of any claim for time extension for the period covered by the partial payment.

Extensions of time will not be granted for delays caused by unsuitable ground conditions, inadequate construction force, or the failure of the Contractor to place orders for the equipment or materials a sufficient time in advance to insure delivery when needed. Any extension of time granted by the City shall not release the Contractor and Surety herein from the payment of liquidated damages as provided in the General Conditions of this Contract, for a period of time not included in the original Contract or the time extension, as herein provided.

In no event shall the City be liable or responsible to the Contractor, Surety, or any person for or on account of any stoppage or delay of Work herein provided for by injunction or any other kind of legal, equitable proceedings, or from or by or on account of any delay from any other cause whatsoever.

GC-15. ENGINEER'S POWERS AND DUTIES:
The Engineer will provide general administration of the Contract, including performance of the functions hereinafter described.

The Engineer will be the City's representative during construction and until final payment. The Engineer will have authority to act on behalf of the City to the extent provided herein unless otherwise modified by written instrument, which will be shown to the Contractor. The Engineer will advise and consult with the City, and all of the City's instructions to the Contractor shall be issued through the Engineer. Nothing contained in the Contract documents shall create any contractual relationship between the Engineer and the Contractor.

The Engineer shall at all times have access to the Work as provided elsewhere herein. The Engineer will make periodic visits to the Work site to familiarize himself generally with the progress and quality of the Work and to determine in general whether the Work is proceeding in accordance with the Contract. On the basis of his on-site observations as Engineer, he will keep the City informed of the progress of the Work and will endeavor to guard the City against defects and deficiencies in the Work caused by the Contractor. The Engineer will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract. Based on such observations and the

Contractor's applications for payment, the Engineer will determine the amounts owing to the Contractor and will issue certificates for payment in amounts as provided elsewhere herein.

The Engineer may provide one or more full-time project representatives to assist the Engineer in carrying out his responsibilities at the Work site. The duties, responsibilities and limitations of authority of the Engineer as the City's representative during construction as set forth herein will not be modified or extended without written consent of the City, the Contractor and the Engineer.

The Engineer will not be responsible for the acts or omissions of the Contractor, any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

The Engineer shall decide the meaning and intent of any portion of the specifications, and of any plans or Drawings, where the same are found to be obscure or be in dispute; he shall have the right to correct any errors or omissions therein when such corrections are necessary to further the intent of said specifications, plans or Drawings; the action of such correction shall be effective from the date that the Engineer gives due notice thereof.

Any differences or conflicts, which may arise between the Contractor and other contractors with the City in regard to their work, shall be adjusted as determined by the Engineer.

Neither the Engineer's authority to act under this article or elsewhere in the Contract nor any decision made by the Engineer in good faith either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any manufacturer, fabricator, supplier or distributor, or any of their agents or employees or any other person performing any of the Work.

Whenever in the Contract the terms "as ordered", "as directed", "as required", "as allowed", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory" or adjectives of like effect or import are used, to describe requirements, direction, review or judgement of the Engineer as to the Work, it is intended that such requirement, direction, review, or judgement will be solely to evaluate the Work for compliance with the Contract (unless there is a specific statement indicating otherwise). The use of any such term or adjective never indicates that the Engineer shall have authority to supervise or direct performance of the Work or authority to undertake responsibility contrary to the provisions of this General Condition.

GC-16. CITY'S RIGHT OF INSPECTION:
The City shall appoint or employ such engineers or inspectors as the City may deem proper to inspect the materials furnished and the work performed, and to determine whether said materials are furnished and work is performed in accordance with the Drawings and specifications therefor. The Contractor shall furnish all reasonable aid and assistance required by the Engineer, or by the Inspectors, for the proper inspection and examination of the Work and all parts thereof, even to the extent of uncovering or taking out portions of finished Work. Should the Work thus exposed or examined prove satisfactory, the uncovering or removing and the replacing of the covering or the making good of the parts removed shall be paid for by the City; however, should the Work exposed or examined prove unsatisfactory, the uncovering, taking out, replacing, and making good shall be at the expense of the Contractor.

Such inspection shall not relieve the Contractor of any obligation to perform said Work strictly in accordance with the Drawings and specifications or any modifications thereto as herein provided; and the Work not so constructed shall be removed and made good by the Contractor at his own expense; and free of all expense to the City, whenever so ordered by the Engineer, without reference to any previous oversight or error in inspection.

GC-17. SUSPENSION OF WORK ON NOTICE:
The Contractor shall delay or suspend the progress of the Work or any part thereof whenever he

shall be so required by written order of the City or Engineer, and for such period of time as it or he shall require. Any such order of the City or Engineer shall not modify or invalidate in any way the provisions of this Contract.

GC-18. QUALITY OF WORKMANSHIP:
All workmanship shall be the best possible, both as to material and labor that could be demanded by these Contract Documents or if no specific description is given, it is understood that the best quality is required.

GC-19. SATURDAY, SUNDAY, HOLIDAY, AND NIGHT WORK:
No work shall be done between the hours of 67:00 p.m. and 86:00 a.m., nor on Saturday, Sunday, or legal holidays without the written approval or permission of the Engineer in each case, except such work as may be necessary for the proper care, maintenance, and protection of work already done, or of equipment, or in the case of an emergency.

GC-20. LAWS AND ORDINANCES:
The Contractor shall keep himself fully informed of all existing and current regulations of the City, county, state and national laws which in any way limit or control the actions or operations of those engaged upon the Work, or affecting the materials supplied to or by them. The Contractor shall at all times observe and comply with all applicable ordinances, laws, and regulations; and shall protect and indemnify the City and the City's employees and agents against any claims or liability arising from or based on any violations of the same.

The contractor certifies that it and all of its Subcontractors to be used in the performance of the Contract are in compliance with 25 O.S. Sec. 1313 and participate in the Status Verification System. The Status Verification System is defined in 25 O. S. Sec. 1312 and includes but is not limited to the free Employee Verification Program (E-Verify) available at **www.dhs.gov/E-Verify**.

The Contractor shall take the necessary actions to ensure its facilities are in compliance with the requirements of the Americans with Disabilities Act (ADA). It is understood that the program of the Contractor is not a program or activity of the City. The Contractor agrees that its program or activity will comply with the requirements of the ADA. Any costs of such compliance will be the responsibility of the Contractor. Under no circumstances will Contractor conduct any activity which it deems to not be in compliance with the ADA.

GC-21. TAXES AND PERMITS:
Unless otherwise specified in these Contract Documents, the Contractor shall pay all sales, use, and other taxes that are lawfully assessed against the City or Contractor in connection with the Work included in this Contract and shall obtain all licenses, permits, and inspections required for the Work. Contractor shall comply with all zoning ordinances of the City, as provided in the Tulsa Zoning Code, Title 42 Tulsa Revised Ordinances and conform with all zoning requirements established by the Tulsa Metropolitan Area Planning Commission and the Board of Adjustment. Contractor can call the Indian Nations Council of Governments (INCOG) at (918) 584-7526, to determine if any zoning requirements must be met.

GC-22. PROTECTION OF PROPERTY:
The protection of City, state, and government monuments, street signs, and other City property is of prime importance, and if the same be damaged, destroyed, or removed, they shall be repaired, replaced, or paid for by the Contractor.

GC-23. PATENT RIGHTS:
All fees for any patented invention, article, or arrangement that is based upon, or in any manner connected with the construction, erection, or maintenance of the Work or any part thereof embraced in the Contract and these specifications, shall be included in the price stipulated in the Contract for said Work. The Contractor shall protect and hold harmless the City against any and all demands of

such fees or claims.

GC-24. DEFENSE OF SUITS:
In case any action at law or suit in equity is brought against the City or any employer, officer, or agent thereof, for or on account of the failure, omission or neglect of the Contractor to do and perform any of the covenants, acts, matters, or things required by this Contract to be done or performed, or for injury or damage caused by negligence or willful act of the Contractor or his Subcontractors or his or their agents, or in connection with any claim or claims based on the lawful demands of Subcontractors, workmen, material men, or suppliers of machinery and parts thereof, equipment, power tools, and supplies incurred in the fulfillment of this Contract, the Contractor shall indemnify and save harmless the City and it's employees, officers, and agents, and the Engineer and any employees, officers and agents thereof, of and from all losses, damages, costs, expenses, judgements, or decrees whatsoever arising out of such action or suit that may be brought without requiring said parties to give any notice thereof.

The City may suspend payments of any sum due or to become due for work done on this Contract until such claims, suits, actions, or proceedings are final and liability has been determined. The amount of such damages or liability shall be deducted from sums due or to become due on this Contract. The City will retain the sums mentioned above until the Contractor furnishes evidence that satisfactory settlement has been made. Any action taken by the City shall not excuse the Contractor for failure to perform this Contract or bar the City from legal action to recover from the Contractor the amount of damages or liability suffered in excess of the amount retained.

The Contractor shall furnish the City with satisfactory evidence upon demand that all persons who have done work on the Contract or furnished materials for the Contract have been paid in full. If such evidence is not furnished, the amount necessary to pay the lawful claims may be retained until such evidence is furnished, or if such evidence is not furnished, the City may apply any sums retained to valid claims and charge the amounts disbursed, including the costs of any action that may be necessary to prove or disprove the claims against the Contractor.

GC-25. REMOVAL OF CONDEMNED MATERIALS AND STRUCTURES:
The Contractor shall remove from the site of the Work, without delay, all rejected and condemned materials or structures of any kind brought to or incorporated in the Work, and upon his failure to do so, or to make satisfactory progress in so doing, within forty-eight (48) hours after the service of a written notice from the Engineer ordering such removal, the condemned material or structures may be removed by the City and the cost of such removal be taken out of the money that may be due or may become due the Contractor by virtue of this Contract. No such rejected or condemned material shall again be offered for use by the Contractor under this or any other Contract under this project.

GC-26. EXTRA WORK:
If a modification increases the amount of the Work, and the added Work or any part thereof is of a type and character which can properly and fairly be classified under one or more Unit Price items of the Bid Form, then the added Work or part thereof shall be paid for according to the amount actually done and at the applicable Unit Price. Otherwise, such work shall be paid for as hereafter provided.

Claims for extra work will not be paid unless the City authorized the work covered by such claims in writing. The Contractor shall not have the right to take action in court to recover for extra work unless the claim is based upon a written order from the City. Payments for extra Work will be based on agreed lump sums or on agreed Unit Prices whenever the City and the Contractor agree upon such prices before the extra Work is started.

For the purpose of determining whether proposed extra work will be authorized, or for determining the payment method for extra work, the Contractor shall submit to the Engineer, upon request, a detailed cost estimate for proposed extra work. The estimate shall show itemized quantities and charges for all elements of direct cost. The cost shall include only those extra costs for labor and materials expended in direct performance of the extra work and may include:

(a) **Labor**. For all labor and foremen in direct charge of the specific operations, the Contractor shall receive the rate of wage (or scale) agreed upon in writing before beginning work for each and every hour that said labor and foremen are actually engaged in such work. An amount equal to fifteen (15) percent of the sum of the above items will also be paid the Contractor.

(b) **Bond, Insurance, and Tax**. For property damage, liability, and workmen's compensation insurance premiums, unemployment insurance contributions and social security taxes on the force account work, the Contractor shall receive the actual cost, to which cost no percentage will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance, and tax.

(c) **Materials**. For materials accepted by the Engineer and used, the Contractor shall receive the actual cost of such materials delivered on the Work site, including transportation charges paid by him (exclusive of machinery rentals as hereinafter set forth), to which cost ten (10) percent will be added.

(d) **Equipment**. For any machinery or special equipment (other than small tools), including fuel, lubricants and transportation costs, the use of which has been authorized by the Engineer, the Contractor shall receive the rental rates agreed upon in writing before such work is begun for the actual time that such equipment is in operations on the Work, as provided in the ODOT Subsection 109.04 (b3), to which rental sum no percentage will be added.

(e) **Miscellaneous**. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

The form on which field cost records are kept, the construction methods and the type and quantity of equipment used shall be submitted to the Engineer for approval.

Construction equipment which the Contractor has on the Work site and which is of a type and size suitable for use in performing the extra Work shall be used. The hourly rental charges for equipment, including all insurance, taxes, fuel, and operating costs, shall not exceed twelve (12) percent of the latest applicable Associated Equipment Distributors published monthly rental rates and shall apply to only the actual time the equipment is used in performing the extra Work.

When extra Work requires the use of equipment which the Contractor does not have on the Work site, the Contractor shall obtain the approval of the Engineer before renting or otherwise acquiring additional equipment. The rental charges for the additional equipment shall not exceed the latest applicable Associated Equipment Distributors published rental rates.

The Contractor shall file with the Engineer, certified lists in duplicate, of any equipment and the schedule of pay rates for common and semi-skilled labor and operators of various classes which are intended to be used in performing the Work covered by this Contract. These rates shall be subject to the review of the Engineer. This information will be used by the Engineer for computation of extra work as mentioned above; however, if the Contractor fails to file these lists with the Engineer prior to starting any Work covered by this Contract, then the Engineer's computation shall be based on average wages and rates paid on City work.

GC-27. PAYMENT FOR CONTRACTOR'S PLANT AND MISCELLANEOUS TEMPORARY WORK: For providing plant, tools, and equipment, and for furnishing, erecting, maintaining, and removing scaffolding and construction plant, construction roads, camps, sanitary conveniences, temporary water supply, trestles, dewatering and other temporary works, the Contractor shall receive no direct payment, but compensation for them shall be considered as having been included in the prices stipulated for the appropriate items.

GC-28. BASIS OF PAYMENT FOR ITEMS OF WORK:
The Contractor shall be paid for all Work performed under the Contract based on the Engineer's computations of as-built quantities and the Contractor's Unit Price or Lump Sum bid per item. This payment shall be full compensation for furnishing all supplies, materials, tools, equipment, transportation, and labor required to do the Work; for all loss or damage, because of the nature of the work, the action of the elements or any unforeseen obstruction or difficulty which may be encountered in the performance of the Work, and for which payment is not specifically provided; for all expense incurred by or because of any suspension or discontinuance of all or any part of the Work; and for faithfully completing the Contract according to the Drawings and specifications and requirements of the Engineer.

GC-29. PAYMENTS:
(1) Partial: If the work is progressing in good and workmanlike manner and if the Contractor is faithfully carrying out the terms of this Contract, approximate estimates of the work done shall be made by the Engineers between the first and fifteenth of each calendar month, including labor actually performed and supplies or materials actually used or incorporated in the Work, and an allowance will be made for acceptable materials satisfactorily delivered, stored and secured on the site of the Work in such amount as can be incorporated in the Work within a reasonable time. The City shall have a lien as owner on any materials stored on the site of the Work.

Each partial estimate for payment shall contain or have attached an affidavit in the form found in this book of specifications, as required by law.

The Contractor shall submit with each partial pay estimate a complete list of vendors and suppliers with itemized purchases and invoices from each vendor. Each list shall contain the name of the contractor or Subcontractor ordering the materials or supplies, and the specific use or placement of each of the materials purchased by the City of Tulsa for this project in accordance with Article IIB of the Contract. At the direction of the Contractor, the City of Tulsa will withhold retainage in the amount of 5% on materials and supplies to be purchased under the terms of this Contract.

Each month that work is performed for which payment is due, the Contractor shall submit to the Engineer an application for such payment, provided said payment is not less than $1,000.00, and, if required, receipts or other vouchers from Subcontractors showing his payments to them shall be submitted.

Each estimate shall be of the approximate value of all work performed and materials in place or delivered to the Work site, determined as aforesaid from the beginning of this contract to the date fixed for the current estimate, from which shall be deducted five percent (5%) or a lesser amount approved by the City, and, in addition thereto, all previous payments and all other sums withheld under the foregoing provisions of this Contract, the remainder to become due and payable; after the estimate has been reviewed and signed by the Engineer the City shall pay the estimate in the regular manner in the amount determined as due unless it shall be known by the City that there is good reason under the terms of this Contract for withholding same.

When the Contractor has completed Work constituting more than fifty percent (50%) of the total Contract amount, the retainage will continue at five percent (5%) of the amount earned to date; provided, however, that the City or its duly authorized representative has determined that satisfactory progress is being made and upon approval by the Surety.

The Contractor may withdraw any part or the whole of the amount which has been retained from partial payment to the Contractor pursuant to the terms of Contract, upon depositing with or delivery to the City:

(1) United States Treasury Bonds, United States Treasury Notes, United States Treasury bills, or

(2) General Obligation Bonds of the State of Oklahoma, or

(3) Certificates of Deposit from a state or national bank having its principal office in the State of Oklahoma.

No retained amount shall be withdrawn which would represent an amount in excess of the market value of the securities at the time of deposit or of the par value of such securities, whichever is lower.

All partial estimates are subject to correction in the final estimate.

(2) Final Payment:
When this contract, in the opinion of the Engineer, shall be completely performed on the part of the Contractor, the Engineer shall proceed with all reasonable diligence to measure up the Work and shall make out the final estimate for the same, and shall, except for cause herein specified, give to the Contractor, within thirty (30) days after receiving said certificate, an order on the City for the balance found to be due, excepting therefrom such sum or sums as may be lawfully retained under any of the provisions of the Contract; PROVIDED, that nothing herein contained shall be construed to affect the rights of the City hereby reserved to reject the whole or any portion of the aforesaid Work should the said estimate and certificate be found or known to be inconsistent with the terms of this Contract or otherwise improperly given; PROVIDED, that if, in case after the work hereunder has been accepted and final payment made, it shall be discovered that any part of the Contract has not been fully performed or has been done in an improper or faulty manner, the Contractor shall immediately remedy such defect, or, in case of neglect to do so within a reasonable time after notice thereof, shall be liable for and shall pay to the City the cost of remedying such defect or a sum equal to the damages sustained thereby, as the City shall elect, and the acceptance of and final payment for the Work shall be no bar to suit on any bond against any principal or principals, or Surety or Sureties, or both, given for the due performance of the Contract, or for the recovery of such cost or the equivalent of such damage.
The City will pay to the Contractor interest at the rate of three-fourths percent (3/4%) per month on the final payment due the Contractor. For lump sum contracts, the interest shall commence thirty (30) days after the Work under the Contract has been completed and accepted and all required material certifications and other documentation required by the Contract have been furnished the City by the Contractor, and shall run until the date when the final payment or estimate is tendered to the Contractor. For contracts bid by Unit Prices, the interest will commence sixty (60) days after the above conditions are satisfied. When contract quantities or the final payment amount is in dispute, the interest-bearing period will be suspended until the conclusion and settlement of the dispute.

GC-30. CONTRACTOR REIMBURSEMENT FOR SURETY BOND:
For contracts of $1,000,000.00 or more, the Contractor may receive reimbursement for the cost of the surety bonds after issuance of a work order. To receive reimbursement, the Contractor shall submit a standard partial payment form and affidavit, and a copy of the surety bond invoice. The final partial pay estimate will be reduced by the amount paid for surety bond reimbursement.

GC-31. RELEASE OF LIABILITY AND ACCEPTANCE:
The acceptance by the Contractor of the final payment shall operate as, and shall be a release to the City and every employee, officer and agent thereof, from all claims and liability to the Contractor for anything done or furnished for or relating to the Work, or for any act or neglect of the City or of any person relating to or affecting the Work, and, following such acceptance, no person, firm, or corporation other than the signer of this Contract as Contractor, will have any interest hereunder, and no claim shall be made or be valid, and neither the City nor any employees, officers, or agents thereof shall be liable or be held to pay any money, except as herein provided.

It shall be the duty of the Engineer to determine when the Work is completed and the Contract fulfilled, and to recommend its acceptance by the City. The Work herein specified to be performed shall not be considered finally accepted until the City has accepted all the Work.

GC-32. RIGHT OF CITY TO TERMINATE CONTRACT:
If the Work to be done under this Contract shall be abandoned by the Contractor, or if this Contract shall be assigned by him otherwise than as herein provided, or if the Contractor should be adjudged bankrupt, or if a general assignment of his assets be made for the benefit of his creditors, or if a receiver should be appointed for the Contractor or any of his property; or if at any time the Engineer shall certify in writing to the City that the performance of the Work under this Contract is being unnecessarily delayed, or that the Contractor is executing the same in bad faith or otherwise not in accordance with the terms of the Contract; or if the work be not substantially completed within the time named for its completion, or within the time to which such completion date may be extended, then the City may serve written notice upon the Contractor and his Surety of said City's intention to terminate this Contract, and unless within five (5) days after service of such notice upon the Contractor, a satisfactory arrangement is made for the continuance of the Contract, this Contract shall cease and terminate. In the event of such termination, the City shall immediately serve notice upon the Surety and Contractor, and the Surety shall have the right to take over and complete the Work, provided, however, that if the Surety does not commence performance thereof within fifteen (15) days from the date of said notice of termination, the City may take over the Work and perform same to completion, by Contract or otherwise, for the account and at the expense of the Contractor, and the Contractor and his Surety shall be liable to the City for any and all excess cost sustained by the City by reason of such performance and completion. In such event the City may take possession of and utilize in completing the Work, all such materials, equipment, tools, and plants as may be on the site of the Work and necessary therefor. The Contractor shall not receive any other payment under the Contract until said Work is wholly finished, at which time, if the unpaid balance of the amount to be paid under the Contract shall exceed the expense incurred by the City in finishing the Work as aforesaid, the amount of the excess shall be paid to the Contractor, but if such expense shall exceed the unpaid balance, the Contractor shall pay the difference to the City.

GC-33. ADMINISTRATIVE COSTS AND FEES:
Cash Improvements - In the event the improvements are to be paid for in cash, the costs and fees for publication, engineering, filing, recording, abstracting, acquisition of easements, flushing, and pipe testing, shall be paid by the City unless otherwise provided for in these Contract Documents.

Assessment Improvements: In the event the improvements are to be paid for by the issuance of special assessment bonds, the costs and fees for publication, engineering, filing, recording, abstracting, acquisition of easements, flushing, pipe testing, and other authorized costs shall be added to the contract price and paid for in the same manner as the other Work included in this Contract. The Contractor shall pay the City the amount of said charges before the execution and delivery of the special assessment bonds or other payments. If the Contractor fails, neglects, or refuses to pay said charges within thirty (30) days after the bonds are ready for delivery, he shall pay the City interest at the rate of seven percent (7%) per annum and shall be liable for same in a civil suit. The Contractor shall pay the pipe testing fees directly to the testing laboratory.

GC-34. PAYMENT OR ACCEPTANCE NOT A WAIVER BY CITY:
Neither acceptance by the City or the Engineer or any employee of either nor any order by City for the payment of money, or the payment thereof, nor any taking of possession by City, nor the granting of any extension of time, shall operate as a waiver of any rights or powers of the City hereunder, and in the event that after the Work hereunder has been accepted and final payment made, it should be discovered that any part of this Contract has not been fully performed, or has been done in a faulty or improper manner, the Contractor shall immediately remedy such defect, or in the event of neglect to do so within a reasonable time after notice thereof, shall be liable for and shall pay to City the cost of remedying such defect, or a sum equal to the damage caused thereby, as City may elect. The acceptance of the Work or final payment therefor shall be no bar to suit against the Contractor or Surety, or both.

GC-35. CONTRACTOR'S OBLIGATION AFTER ACCEPTANCE:
Contractor further agrees, without cost other than is specially provided for in this Contract, at any and all times during one (1) year next following the completion and final acceptance of the Work embraced in this Contract, without notice from City, to repair or rework any work that fails to function properly due to defective material or workmanship and to indemnify, save harmless and defend the City from any and all suits and actions of every description brought against City for, or on account of injuries or damages alleged to have been received or sustained by any party or parties by reasons of, or arising out of the failure of Contractor to repair or rework any work where such failures have occurred, which said injuries or damages are alleged to have been received or incurred within one (1) year from the final acceptance of the Work hereunder, and to pay any and all judgements that might be rendered against City in any suits and actions, together with such expenses or attorney fees expended or incurred by City in the defense thereof, and Contractor hereby expressly waives any notice that might by law be required to be given to them by City of any defect, break, settling, or failure or of any other condition that might be the cause of injury or damage to any person on account of which a claim or suit might be made or filed against City, or a judgement taken for damages against City. It is expressly agreed that the acceptance of the Work by City shall constitute no bar against any person injured or damaged by the failure of the Contractor to perform all of his covenants and agreements hereunder from maintaining an action against the Contractor, or against City from enforcing its rights against the Contractor hereunder.

GC-36. NOTICES:
Any notices or other communications hereunder may be given to Contractor at the address listed in the Proposal, to the Surety at the office of the Attorney-in-Fact signing the bond or at Surety's home office address on file with the Insurance Commissioner of the State of Oklahoma, and to City in care of the Deputy Director of Public Works, or at such other place as may be designated in writing. The delivery to such address, or depositing in any mailbox regularly maintained by the Post Office, of any notice, letter, or other communication to the Contractor, shall be deemed sufficient service thereof, and the date of said service shall be the date of such delivery or mailing.

GC-37. RELATION TO OTHER CONTRACTORS:
Nothing herein contained and nothing marked upon the Drawings shall be interpreted as giving the Contractor exclusive occupancy of the territory or right-of-way provided. The City and its employees, officers, and agents for any just purpose, and other contractors of the City for any purpose required by their respective contracts, may enter upon or cross this territory or occupy portions of it or take materials therefrom as directed or permitted. When two or more contracts are being executed at one time on the same or adjacent land in such manner that the work on one contract may interfere with the work on another, the Engineers shall decide which contractor shall cease work and which shall continue, or whether the work on both contracts shall progress at the same time and in what manner. When the territory of one contract is the necessary or convenient means of access for the transportation or movement of men, machines, or appliances for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the Engineers to the contractor desiring it, to the extent, amount, in the manner and at the time permitted. Any decision regarding the method or time of conducting the work or the use of the territory shall not be made the basis of claims for delay or damage except as otherwise stipulated. The Contractor shall not cause any unnecessary hindrance or delay to any other contractors on the premises, and shall bear all damages done to the work of such other contractors by him or by his employees.

GC-38. PARTIAL OCCUPANCY AND USE:
The City, upon advance written notification to the Contractor, shall have the right to occupy and use any completed or partially completed portions of the Work site when such occupancy and use are in the City's best interest, notwithstanding completion of the entire project.

Such partial occupancy and use shall be upon the following terms:

a. The Engineer shall make an inspection of the portion or portions of the Work concerned, and report to the City his findings as to the acceptability and completeness of the Work. The Engineer's report shall include a list of items to be completed or corrected before final payment.

b. The City, upon acceptance of the Engineer's report, shall give written notice to the Contractor of the City's intention to occupy and use said portions of the Work site. The City's notice shall include a copy of the Engineer's report, shall clearly identify the portions of the Work site to be occupied and used, and shall establish the date of said occupancy and use.

c. From the date thus established, the City shall assume all responsibilities for operation, maintenance, and the furnishing of water, gas, and electrical power for the portions of the Work site thus occupied and used. The City shall have the right to exclude the Contractor from those portions of the Work site but shall provide the Contractor reasonable access to complete or correct necessary items of Work.

d. The one year guarantee required by the General Conditions shall not begin until completion and final acceptance of the entire project, except as to any items of mechanical or electrical equ ipment such as pumps, blowers, process equipment, instrumentation, controls, metering equipment, heating, and ventilating equipment and similar items having movable or operable components, and any of which are thus used by the City. For said equipment, the one-year warranty shall start from the date established in the written notice from the City.

e. Occupancy or use of any space in the Work site shall not constitute acceptance of Work not performed in accordance with the Contract, nor relieve the Contractor of liability to perform any Work required by the Contract but not completed at the time of said occupancy and use.

f. The Contractor shall not be held responsible for normal wear and tear or damage resulting from said occupancy, except to the extent that such damage is covered by the one-year guarantee.

g. The partial occupancy and use of any portions of the Work site by the City shall not constitute grounds for claims by the Contractor for release of any amounts retained from payments under the provisions of the Contract. The retained amounts will not be due until completion of the entire project for final acceptance and final payment, as set forth in the General Conditions.

SPECIAL

PROVISIONS

SPECIAL PROVISION
SUPPLEMENTAL CONTRACT REQUIREMENTS
PROJECT NO. SP 21-4 LACY PARK IMPROVEMENTS

1. Successful Contractor shall return fully executed contract documents (including bonds and insurance) to the City of Tulsa, Contract Administration Section, Room N-103, 2317 South Jackson Avenue within two (2) weeks after bid opening.

2. If the successful Contractor can provide proper bonds and insurance and the contract is executed, the Pre-Construction Conference for this project will be held within eight (8) weeks after bid opening.

Special Provisions

For

Environmental Issues

Contractor shall immediately report to Owner (City of Tulsa):

- Any environmental issue, whether observed, uncovered, exposed, caused or created;
- Any activity, action or failure to act, which may be causative of increased environmental liability, degradation of the environment, or that could adversely affect or impact human health and/or safety.

No action by Owner shall be deemed to relieve Contractor of these requirements.

All work performed and all work subcontracted shall comply with all Local, State and Federal laws and regulations.

Disposal of any material, including but not limited to waste, excess, spoil, or overburden, shall be done in a manner to comply with any and all Local, State and Federal laws and regulations.

SPECIAL PROVISIONS
REMOVAL OF CASTINGS

All water, sanitary sewer, and storm sewer manhole castings, lids, frames, curb hoods, grates, hydrants, valves, and other fittings removed as part of any construction project are property of the City of Tulsa. Contractor will not take ownership.

All storm sewer and sanitary sewer castings shall be salvaged and delivered by the contractor to the Underground Collections North Sewer Base Stockyard at 9319 East 42nd Street North. Contractor will coordinate the return of such items with the Stockyard personnel at 918-669-6130.

All hydrants, valves, and other fittings from abandoned water mains shall be salvaged and delivered by the contractor to the South Yard at 2317 South Jackson Avenue. Contractor will coordinate the return of such items with the South Yard personnel at 918-596-9401.

SPECIAL PROVISIONS
OWNER ALLOWANCE

The "Owner Allowance" may be used for various work and miscellaneous items not specifically identified in the Contract Documents with the following provisions:

A. The allowance shall be used for cost of design and construction, including all materials, labor, equipment, profit and overhead, of work items not specifically identified in the Construction Documents, or included in original pay items bid for the contract.
B. The allowance shall be utilized only at the discretion of the City of Tulsa. Any balance remaining at the completion of the Project will be retained by the City of Tulsa.
C. The Contractor shall provide, to the City of Tulsa, a written request for the use of any allowance, including a schedule of values and associated backup information, including validity of need, materials, labor, equipment, and time required to perform the associated work.

Contractor shall proceed with the allowance work only after receiving written permission from the City of Tulsa. Proceeding with associated allowance work without written permission from the City of Tulsa will be at the Contractor's sole expense.

Special Provision

For Utility Relocations

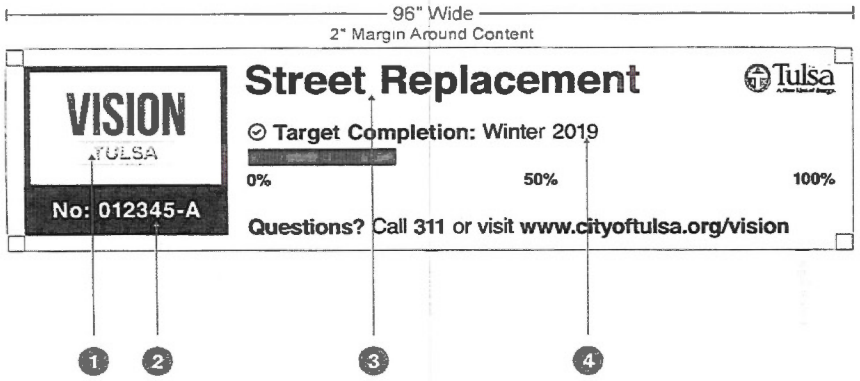
And Design Issues

It is the intent of this specification to provide no more than twenty-one (21) calendar days due to delays caused by required utility relocations and required design clarifications. Should the Contractor be delayed in the final completion of work by any utility relocation or design issue, additional days as determined by the Engineer shall be granted by the City. However, the Contractor shall give the Engineer notice in writing of the cause of the delay in each case on the Extension of Time Request Form enclosed in these documents, and agrees that any claim shall be fully compensated for by the provisions of this specification to complete performance of the work. An adjustment will not be made to the contract time bid for incentive purposes.

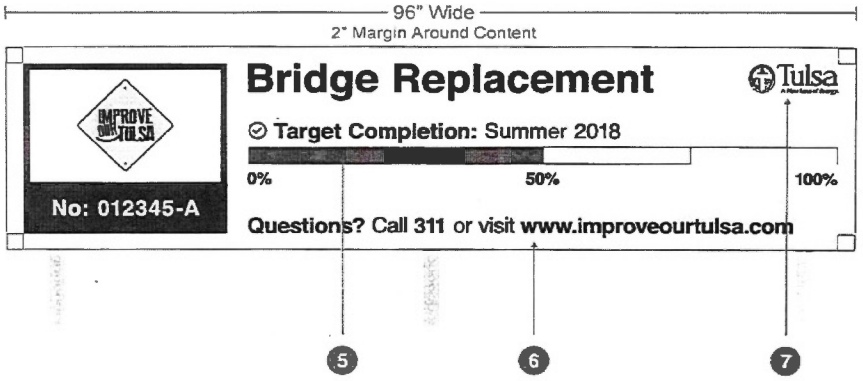
Any time granted for utility relocations or design issues up to (21) calendar days will be in addition to the number of days shown in the proposal for computation of disincentive and liquidated damages.

Capital Program Project Signage: Overview and Specifications

Vision Tulsa Project Signage



Improve Our Tulsa Project Signage



Sign Overview

To ensure consistency and assist contractors with the creation of capital program project signage, the City of Tulsa has developed PDF sign templates. The templates are at full size and include pre-formatted, editable text fields for the project number, project title, and target completion date. The font, point size, and color for editable fields is auto-generated. However, full sign specifications have been included on this document. For questions, email: communicationdept@cityoftulsa.org

1 Capital Program Logo

Available Sign Templates:
- Vision Tulsa
- Improve Our Tulsa

2 Project Number

Font: Helvetica Bold
Size: 180 pt
Alignment: Center
Color: White

3 General Project Title

Font: Helvetica Bold
Size: 340 pt
Alignment: Left
Color: City Blue
Generalized Project Title Choices:
- Street Replacement
- Street Rehabilitation
- Street Widening
- Street Resurfacing
- Bridge Replacement
- Bridge Rehabilitation

4 Target Completion

Font: Helvetica Regular and Bold
Size: 180 pt
Alignment: Left
Color: City Blue and Black

5 Project Progress Bar

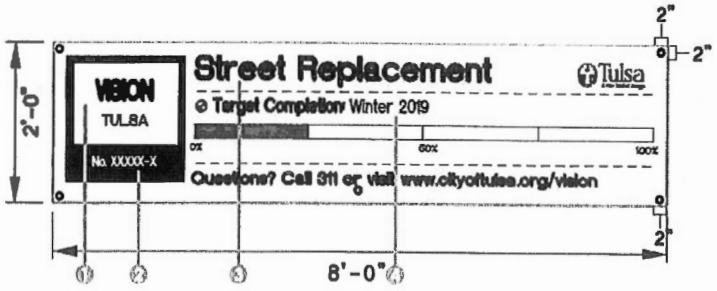
Size: 2" Tall x 66.675" Wide
Color: Green
Material: 2" green, industrial duct tape cut at 1/4 segments should be used to indicate project progress/advancements in the progress bar. Paint should only be used in the event that tape is not available or unable to remain affixed over a longer construction period

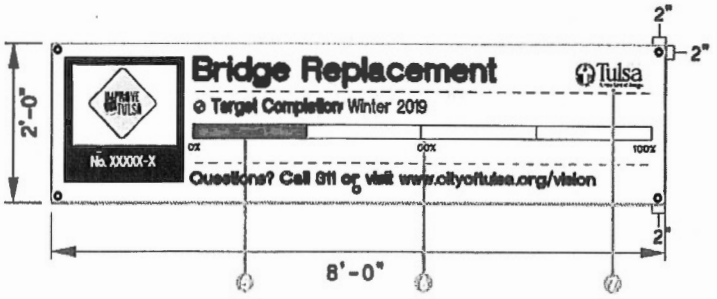
6 Contact Information

Options: 311 and Corresponding URL
Font: Helvetica Regular and Bold
Size: 180 pt
Alignment: Left
Color: Black and City Blue

7 City of Tulsa Logo

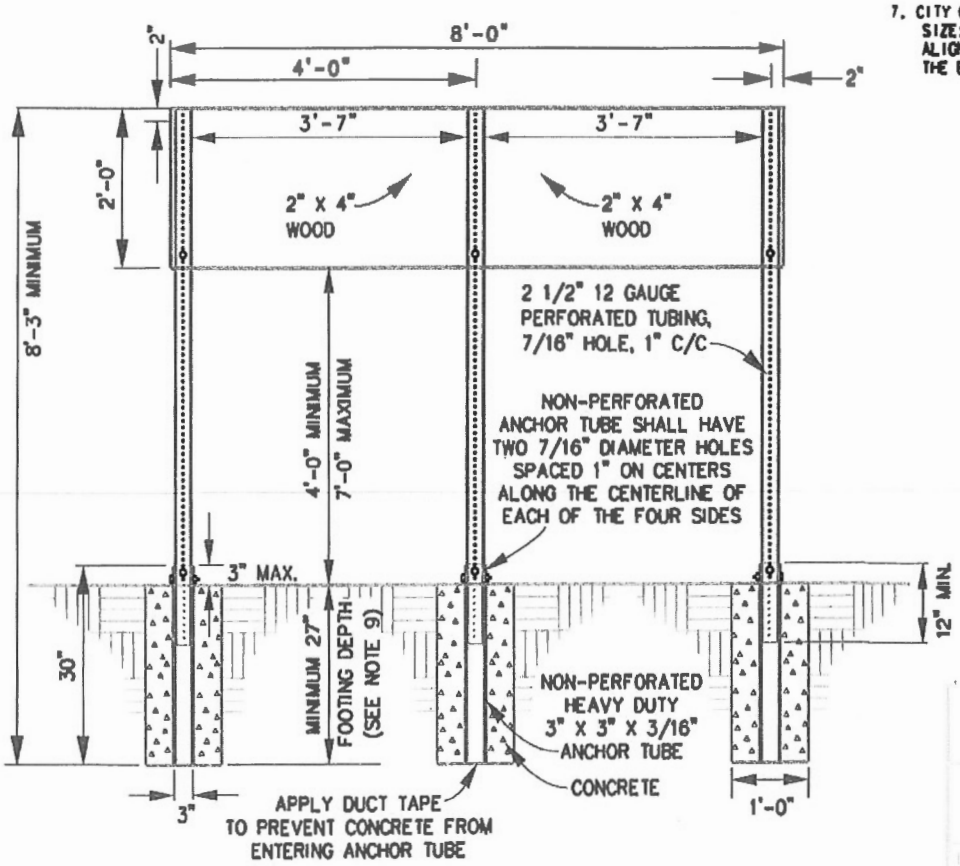
Size: 10" Wide
Alignment: Outer right margin Edge and to the baseline of the General Project Title.





NOTE:

1. CAPITAL PROGRAM LOGO
   - VISION TULSA
   - IMPROVE OUT TULSA
2. PROJECT NUMBER
   FONT: HELVETICA BOLD
   SIZE: 180 PT
   ALIGNMENT: CENTER
   COLOR: WHITE
3. GENERAL PROJECT TITLE
   FONT: HELVETICA BOLD
   SIZE: 340 PT
   ALIGNMENT: LEFT
   COLOR: CITY BLUE
   GENERALIZED
   - STREET REPLACEMENT
   - STREET REHABILITATION
   - STREET WIDENING
   - STREET RESURFACING
   - BRIDGE REPLACEMENT
   - BRIDGE REHABILITATION
4. TARGET COMPLETION
   FONT: HELVETICA REGULAR AND BOLD
   SIZE: 180 PT
   ALIGNMENT: LEFT
   COLOR: CITY BLUE AND BLACK
5. PROJECT PROGRESS BAR
   SIZE: 2" TALL X 66.675" WIDE
   COLOR: GREEN
   MATERIAL: 2" GREEN, INDUSTRIAL DUCT TAPE CUT AT 1/4 SEGMENTS SHOULD BE USED TO INDICATE PROJECT PROGRESS/ADVANCEMENTS IN THE PROGRESS BAR. PAINT SHOULD ONLY BE USED IN THE EVENT THAT TAPE IS NOT AVBAILABLE OR UNABLE TO REMAIN AFFIXED OVER A LONGER CONSTRUCTION PERIOD.
6. CONTACT INFORMATION
   OPTIONS: 311 AND CORRESPONDING URL
   FONT: HELVETICA REGULAR AND BOLD
   SIZE: 180 PT
   ALIGNMENT: LEFT
   COLOR: CITY BLUE AND BLACK
7. CITY OF TULSA LOGO
   SIZE: 10" WIDE
   ALIGNMENT: OUTER RIGHT MARGIN EDGE AND TO THE BASELINE OF THE GENERAL PROJECT TITLE.



ASSEMBLY OF PLYWOOD SIGN

PROJECT SIGN

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

DRAWN BY: | REVISED
CHECKED BY:
DATE: AUGUST 2017
NOT TO SCALE | STANDARD NO. 102

PATH: e1/parts/std/DGN_std/102-project-sign.dgn RMO 8/7/2017

TECHNIACL

SPECIFICATIONS

TECHNICAL

SPECIFICATIONS

PROJECT MANUAL FOR

LACY PARK TIF IMPROVEMENTS

PROJECT NO. SP21-4

ENGINEERING SERVICES DEPARTMENT

CITY OF TULSA, OKLAHOMA

ARCHITECT:

GH2 ARCHITECTS, LLC

320 S. BOSTON, SUITE 100

TULSA, OK 74103

918.587.6158

CIVIL:

WALLACE ENGINEERING

123 N. MARTIN LUTHER KING JR. BLVD.

TULSA, OK 74103

918.584.5858

STRUCTURAL:

WALLACE ENGINEERING

123 N. MARTIN LUTHER KING JR. BLVD.

TULSA, OK 74103

918.584.5858

ELECTRICAL:

GATES ENGINEERING

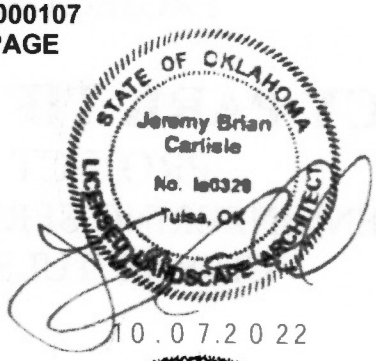
616 S. MAIN ST., SUITE 112

TULSA, OK 74119

918.583.6905

SECTION 000107
SEALS PAGE

LANDSCAPE ARCHITECT: JEREMY B. CARLISLE



10.07.2022

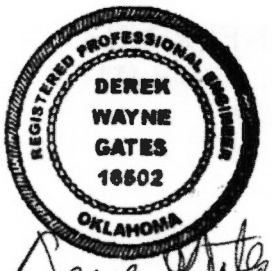
CIVIL ENGINEER: JORDAN RODICH

10/07/2022

STRUCTURAL ENGINEER: SAMUAL HENRY

Date: 2022.09.22 15:20:13-05'00'

ELECTRICAL ENGINEER: DEREK GATES



10-07-2022

END OF SECTION

SECTION 000110
TABLE OF CONTENTS

2.06 DIVISION 26 -- ELECTRICAL

A. 260000 - Basic Materials and Methods (Electrical)
B. 260519 - Cable Wire and Connectors - 600V and Under
C. 260526 - Grounding
D. 260533 - Raceway Systems and Accessories
E. 262416 - Panelboards and Enclosures
F. 265100 - Lighting Fixtures, Lamps, and Ballasts

2.07 DIVISION 31 -- EARTHWORK

A. 311000 - Site Clearing
B. 311100 - Stormwater Pollution Prevention Plan
C. 312000 - Earth Moving

2.08 DIVISION 32 -- EXTERIOR IMPROVEMENTS

A. 321216 - Asphalt Paving
B. 321313 - Concrete Paving
C. 321373 - Concrete Paving Joint Sealants
D. 321723.13 - Painted Pavement Markings
E. 321823.53 - Tennis Court Surfacing
F. 323113 - Chain Link Fences and Gates
G. 329223 - Sodding

2.09 DIVISION 33 -- UTILITIES

A. 33 4100 - Storm Utility Drainage Piping

END OF SECTION

SECTION 011000
SUMMARY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Lacy Park TIF Improvements. Work consists of new tennis court, basketball court, court lighting, concrete walks, and site furnishings. Reference drawings and specifications for detailed scope of work.
   1. Project Location: 2134 N. Madison Pl., Tulsa, Oklahoma.
   2. Owner: City of Tulsa

B. Architect Identification: The Contract Documents were prepared for Project by GH2 Architects, LLC; 320 S. Boston, Suite 100, Tulsa, Oklahoma, 74103; 918.587.6158 (Phone); 918.587.0357 (Fax).

1.03 CONTRACT

A. Project will be constructed under a general construction contract.

1.04 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
   1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
   2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
      a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.05 MISCELLANEOUS PROVISIONS

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 011400
WORK RESTRICTIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 USE OF PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
   1. Owner Occupancy: Allow for Owner occupancy of site and use by the public.
   2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
      a. Schedule deliveries to minimize use of driveways and entrances.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. The Contract sum and the schedule for payments are described in the Form of Agreement.
   3. Payments upon substantial completion and completion of the Work are described in the General Conditions and in Section 01 7000 Execution and Closeout Requirements of these Specifications.
   4. The Owner's Representative's approval of applications for progress payment and final payment may be contingent upon the Owner's Representative's approval of status of Project Record Documents as described in Section 01 7839 Project Record Documents, of these Specifications.
   5. Schedule of Values - Section 01 2973.
   6. Final Payment check list.

1.02 QUALITY ASSURANCE

A. Prior to start of construction, secure the Owner's Representative's approval of the schedule of values required to be submitted.

B. During progress of the work, modify the schedule of values as approved by the Owner's Representative to reflect changes in the contract sum due to change orders or other modifications of the Contract.

C. Base requests for payment on the approved schedule of values.

1.03 SUBMITTALS

A. Formal submittal: Unless otherwise directed by the Owner's Representative:
   1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or neat lettering in ink, on AIA Document G702, "Application and Certificate for Payment", plus continuation sheet or sheets, or other form as approved by Owner.
   2. Sign and notarize the Application and Certificate for Payment and City of Tulsa's "Affidavit of Claimant".
   3. Submit the original of the Application and Certificate of Payment plus two (2) identical copies of the continuation sheet or sheets to the Owner.
   4. Owner will, upon approval, disburse directly to the Contractor. Normal billings to the City are approved within 30 calendar days.

B. First Payment Request Check list:
   1. The following documents or tasks are required to be approved prior to the first payment.
      a. Construction Schedule: Reference Section 01 3216
      b. Submittal Log: Reference Section 01 3400
      c. Substitutions Request (30 days): Reference Section 01 2500
      d. Schedule of Values: Reference Section 01 2973
      e. Construction Photographs: Reference Section 01 3233
      f. Project Sign Installation: Reference Section 01 5000
      g. Pre-Construction Photo or Video: Reference Section 01 5513
      h. Site Protection Installation: Reference Section 01 5513

C. Final Payment Request Check List:
   1. The following documents or tasks are required to be approved prior to Final Payment.

a. City of Tulsa Affidavit for Payment: Reference TUL-373-G
b. Application marked "Final": Reference Project Manual
c. Consent of Surety to Final Payment: Reference Project Manual
d. Affidavit of Payment of Debts & Claims: Reference Project Manual
e. Subcontract & General Contract
    1) Affidavit of Release of Liens: Reference Project Manual
    2) Owner's Representative: Reference Project Manual
    3) SBE Actual Usage: Reference Project Manual
    4) Record Documents: Reference Section 01 7839
    5) Operation & Maintenance Data: Reference Section 01 7300

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012100
ALLOWANCES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. Refer to bid proposal form for additional information.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for Allowances.

1.03 WORK COVERED BY ALLOWANCES

A. An Allowance as listed on the Bid Proposal Form has been provided in the contract for unforeseen conditions.

B. The Allowance shall be used for the cost of materials, labor, installation, and overhead and profit for additional work required or requested by the Owner, that is not identified in the Construction Documents, and not included in the Base Bid.

C. The Allowance shall be used only at the discretion of the City of Tulsa.

D. The Contractor shall provide, to the City of Tulsa Representative, a written request for the use of the allowances, with a schedule of values, and associated backup information.

E. The Contractor shall proceed with Work included in the allowances only after receiving a written order, from the City of Tulsa Representative, authorizing such work. Proceeding with Work in the allowance without a written order from the City of Tulsa Representative will be at the Contractor's cost.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012200
UNIT PRICES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

B. Refer to bid proposal form for additional information.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for unit costs.

1.03 DEFINITIONS

A. Unit cost is an amount proposed by bidders, stated on the Bid Proposal Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.04 PROCEDURES

A. Unit costs include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to Bid Proposal Form for description of Work that requires establishment of unit costs. Methods of measurement and payment for unit costs are specified on the Bid Proposal Form.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit costs and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Costs: A list of unit costs is included on the Bid Proposal. Specification Sections included in the Project Manual contain requirements for materials and systems described under each unit price.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LIST OF UNIT COSTS

A. Refer to Bid Proposal Form.

END OF SECTION

SECTION 012300
ALTERNATES

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 alternates.

1.03 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
   2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.04 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of Alternate.
   2. Include as part of each alternate, all modifications and adjustments of adjacent Work as necessary to completely and fully integrate Alternate into the project.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included within the Summary of Pay Quantities on the Drawings. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012500
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Product options and substitutions.

1.02 QUALITY ASSURANCE

A. To the greatest extent possible, provide products, materials and equipment of a singular generic kind and from a single source.

B. Where more than one choice is available as options for Contractor's selection of a product or material, select an option which is compatible with other products and materials already selected. Total compatibility among options is not assured by limitations within contract documents, but must be provided by Contractor. Compatibility is a basic general requirement of product/material selection.

1.03 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Requirements Included:
   1. The Contract is based on the standards of quality established in the Contract Documents.
   2. All products proposed for use, including those specified by required attributes and performance, shall require approval by the Owner's Representative before being incorporated into the work.
   3. Do not substitute materials, equipment or methods unless substitution has been specifically approved for this work by the Owner's Representative and Owner.

B. Products List:
   1. At the time of execution of the Contract, submit to the Owner's Representative five copies of complete list of major products which are proposed for installation and require submittals.
   2. Tabulate products by specification section number and title.
   3. Said list shall be utilized as a submittal log to track submittal process.

C. Contractor's Options:
   1. For products specified only by reference standard, select product meeting that standard by any manufacturer.
   2. For products specified by naming several products or manufacturers, select any one of products and manufacturers named which complies with specifications.
   3. For products specified by naming one or more products or manufacturers and stating "or equal", "or equal as approved by the Owner's Representative" or "approved substitute", etc., in the Contract Documents do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this work by the Owner's Representative and Owner. Submit a request for substitutions for any product or manufacturer which is not specifically named. The decision of the Owner's Representative and Owner shall be final.

D. Substitutions:
   1. Within a period prior to 10 calendar days before the bids are due, the Owner's Representative will review considerations for substitutions. Within the 10 calendar day window before the bids are due, no substitution requests will be accepted. After the end of that period, requests will be considered only in case of product unavailability or other conditions beyond the control of Contractor.
   2. Submit separate request for each substitution on form provided by the Owner.
   3. The Contractor shall support each request with;
      a. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents, product identification, including manufacturer's name and address, manufacturer's literature, product description, reference standards, performance and test data, samples as applicable, name and address of similar projects on which product has been used, and date of each installation.

b. Itemized comparison of the propose substitution with product specified; list significant variations.
c. Data relating to changes in construction schedule.
d. Any effect of substitution on separate contracts.
e. List of changes required in other work or products.
f. Accurate cost data comparing proposed substitution with product specified.
g. Amount of net change to Contract Sum.
h. Designation of availability of maintenance services, sources of replacement materials.

4. Substitutions will not be considered for acceptance when:
   a. They are indicated or implied on shop drawings or product data submittals without a formal request from Contractor.
   b. They are requested directly by a subcontractor or supplier.
   c. Acceptance will require substantial revision of Contract Documents.
5. Substitute products shall not be ordered or installed without written acceptance of Owner's Representative and Owner.
6. Owner's Representative will recommend acceptability of proposed substitutions.

E. Owner's Representative Duties:
   1. Review Contractor's requests for substitutions with reasonable promptness.
   2. Recommend to Owner acceptance or rejection of request.
   3. Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012663
CHANGE ORDERS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Make such changes in the work, in the contract sum, in the contract time of completion or any combination thereof as are described in written Change Orders signed by the Owner and the Owner's Representative and issued after execution of the Contract, in accordance with the provisions of this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such measures as are needed to assure familiarity of the Contractor's staff and employees with these procedures for processing Change Order data.

1.03 SUBMITTALS

A. Make submittals directly to the Architect at the address indicated in Section 01 1000, Summary and send City of Tulsa - Field Engineering transmittal notice.

B. Submit the number of copies called for under the various items listed in this Section.

1.04 PRODUCT HANDLING

A. Maintain a "Register of Field Orders and Change Orders" at the job site, accurately reflecting current status of all pertinent data.

B. Make the Register available to the Owner and his Representative for review at his request.

1.05 PROCESSING CHANGES INITIATED BY THE OWNER

A. Should the Owner contemplate making a change in the work or a change in the contract time of completion the work, or a change in the contract time of completion, the Owner will issue a "Request for Proposal (RFP)" to the Contractor.
   1. RFP's will be dated and will be numbered in sequence.
   2. The RFP will describe the contemplated change and will carry one of the following instructions to the Contractor:
      a. Make the described change in the work at no change in the contract sum and no change in the contract time of completion;
      b. Promptly advise the Owner as to credit or cost proposed for the described change. This is not an authorization to proceed with the change.

B. If the Contractor has been directed by the Owner to promptly advise him as to credit or cost proposed for the described change, the Contractor shall:
   1. Analyze the described change and its impact on costs and time;
   2. Secure the required information and forward it to the Owner for review;
   3. Meet with Owner as required to explain costs and, when appropriate, determine other acceptable ways to achieve the desired objective;
   4. Alert pertinent personnel and subcontractors as to the impending change and, to the maximum extent possible, avoid such work as would increase the Owner's cost for making the change, advising the Owner in writing when such avoidance no longer is practicable.

1.06 PROCESSING CHANGES INITIATED BY THE CONTRACTOR

A. Should the Contractor discover a discrepancy among the Contract Documents, a concealed condition or other cause for suggesting a change in the work, a change in the contract sum or a change in the contract time of completion, he shall notify the Owner as required by pertinent provisions of the Contract Documents.

1.07 PROCESSING CHANGE ORDERS AND PERFORMING INCLUDED IN CHANGE ORDERS

A. Change Orders will be dated and will be numbered in sequence.

B. The Change Order will describe the change or changes, will refer to the Request(s) for Proposal involved, and will be prepared by the Owner.

C. Should the Contractor disagree with the stipulated change in contract sum or change in contract time of completion, or both:
   1. The Contractor shall issue a letter signed by the Contractor and stating the reason or reasons for the Contractor's disagreement.
   2. The Contractor's disagreement with the Change Order shall not in any way relieve the Contractor of his responsibility to proceed with the change as ordered and to seek settlement of the dispute under pertinent provisions of the Contract Documents.

D. No work associated with a Change Order is to be performed prior to receipt of a signed and approved Change Order from the Owner. Any Change Order work performed by the Contractor without a signed and approved Change Order will be at the Contractor's expense.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012900
APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. The Contract sum and the schedule for payments are described in the Form of Agreement.
   3. Payments upon substantial completion and completion of the Work are described in the General Conditions and in Section 01 7000 Execution and Closeout Requirements of these Specifications.
   4. The Owner's Representative's approval of applications for progress payment and final payment may be contingent upon the Owner's Representative's approval of status of Project Record Documents as described in Section 01 7839 Project Record Documents, of these Specifications.
   5. Schedule of Values - Section 01 2973.
   6. Final Payment check list.

1.02 QUALITY ASSURANCE

A. Prior to start of construction, secure the Owner's Representative's approval of the schedule of values required to be submitted.

B. During progress of the work, modify the schedule of values as approved by the Owner's Representative to reflect changes in the contract sum due to change orders or other modifications of the Contract.

C. Base requests for payment on the approved schedule of values.

1.03 SUBMITTALS

A. Formal submittal: Unless otherwise directed by the Owner's Representative:

B. Make formal submittal of request for payment by filling in the agreed data, by typewriter or neat lettering in ink, on AIA Document G702, "Application and Certificate for Payment", plus continuation sheet or sheets, or other form as approved by Owner.

C. Sign and notarize the Application and Certificate for Payment and City of Tulsa's "Affidavit of Claimant".

D. Submit the original of the Application and Certificate of Payment plus two (2) identical copies of the continuation sheet or sheets to the Owner.

E. Owner will, upon approval, disburse directly to the Contractor. Normal billings to the City are approved within 30 calendar days.

F. First Payment Request Check list:
   1. The following documents or tasks are required to be approved prior to the first payment.
      a. Construction Schedule: Reference Section 01 3216
      b. Submittal Log: Reference Section 01 3400
      c. Substitutions Request (30 days): Reference Section 01 2500
      d. Schedule of Values: Reference Section 01 2973
      e. Construction Photographs: Reference Section 01 3233
      f. Project Sign Installation: Reference Section 01 5000
      g. Pre-Construction Photo or Video: Reference Section 01 5513
      h. Site Protection Installation: Reference Section 01 5513

G. Final Payment Request Check List:

1. The following documents or tasks are required to be approved prior to Final Payment.
    a. City of Tulsa Affidavit for Payment: Reference TUL-373-G
    b. Application marked "Final": Reference Project Manual
    c. Consent of Surety to Final Payment: Reference Project Manual
    d. Affidavit of Payment of Debts & Claims: Reference Project Manual
    e. Subcontract & General Contract
        1) Affidavit of Release of Liens: Reference Project Manual
        2) Owner's Representative: Reference Project Manual
        3) SBE Actual Usage: Reference Project Manual
        4) Record Documents: Reference Section 01 7839
        5) Operation & Maintenance Data: Reference Section 01 7300

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 012973
SCHEDULE OF VALUES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the work as specified herein and in other provisions of the Contract Documents.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. Schedule of values is required to be compatible with the "Continuation Sheet" accompanying applications for payment as described in Section 01 2900.

1.02 QUALITY ASSURANCE

A. Use required means to assure arithmetical accuracy of the sums described.

B. When so required by the Owner's Representative provide copies of the subcontracts or other data acceptable to the Owner's Representative substantiating the sums described.

1.03 SUBMITTALS

A. Prior to first application for payment, submit a proposed schedule of values to the Owner and Owner's Representative.
   1. The following should appear as a line item where applicable:
      a. Work shall be broken down by site when multiple sites are involved.
      b. Description of work shall include, but not limited to, the following as applicable:
         1) Bonds and Insurance.
         2) General Conditions (Layout, temporary facilities, mobilization).
         3) Site Preparation.
         4) Demolition.
         5) Erosion Control
         6) Site Grading.
         7) Concrete.
         8) Playground Equipment.
         9) Playground Surfacing.
         10) Site Furnishings.
         11) Sodding.
   2. Meet with Owner's Representative and determine additional data, if any, required to be submitted.
   3. Secure the Owner's and Owner's Representative's approval of the schedule of values prior to submitting first application for payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 013119
PROJECT MEETINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: To enable orderly review during progress of the work and to provide for systematic discussion of issues, the Owner will conduct project meetings throughout the construction period. The Contractor shall be present at such meetings.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are not the Owner's Representative responsibility and normally are not part of project meetings content.

1.02 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

B. The Owner shall be notified of all such meetings one week in advance.

1.03 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the Owner's Representative at least 24 hours in advance of project meetings regarding items to be added to the agenda.

B. Job notes:
   1. The Owner will compile job notes of each project meeting and will furnish copies to the Contractor and to the Owner.
   2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 PRODUCTS (NOT USED.)

PART 3 EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Pre-construction Meeting, project meetings will be held semi-monthly, at the Owner's discretion.

B. Coordinate as necessary with the Owner and Owner's Representatives to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. The Owner will establish meeting location.

3.03 PRE-CONSTRUCTION MEETING

A. A Pre-construction meeting will be scheduled prior to work commencing.
   1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
   2. The Owner will advise other interested parties, including the Owner's Representative, and request their attendance.

B. Minimum agenda: Data will be distributed and discussed on at least the following items.
   1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers and Owner's Representative.
   2. Channels and procedures for communication.
   3. Construction schedule, including sequence of critical work and closing of any facilities.
   4. Contract documents, including distribution of required copies of original documents and revisions.
   5. Human Rights discussion of hiring practices.

6. Processing of shop drawings and other data submitted to Owner's Representative for review.
7. Rules and regulations governing performance of the work.
8. Procedures for safety and first aid, security, quality control, housekeeping and related matters.
9. Location of underground utilities.
10. Notification procedures for adjacent property owners.

3.04 PROJECT MEETINGS

A. Attendance:
   1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the work.
   2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the work is involved.

B. Minimum agenda:
   1. Review, revise and approve job notes of previous meetings.
   2. Review progress of the work since last meeting, including status of submittals for approval.
   3. Identify problems which impede planned progress.
   4. Develop corrective measures and procedures to regain planned schedule.
   5. Complete other current business.

C. Revisions to job notes:
   1. Unless published job notes are in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
   2. Persons questioning published job notes shall reproduce and distribute copies of the question to all indicated recipients of the particular set of job notes.
   3. Questions to job notes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

END OF SECTION

SECTION 013216
CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: To assure adequate planning and execution of the work so that the work is completed within the number of calendar days allowed in the Contract and to assist the Owner's Representative in appraising the reasonableness of the proposed schedule in evaluating progress of the work and assessing liquidated damages for breach of contract. Prepare and maintain the schedules and reports described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. Construction period: Form of Agreement.

1.02 QUALITY ASSURANCE

A. Time for completion: The work shall be commenced within ten (10) days from the date of the Notice to Proceed from the City. The Contractor agrees that the work shall be prosecuted regularly, diligently and uninterruptedly at a uniform rate of progress so as to ensure completion within the contracted calendar days as stated in the Bid Proposal. It is expressly understood and agreed that the said time for completion of the work described herein is a reasonable time for the completion of same.
   1. If the Contractor fails to substantially complete the work of the contract as indicated within the time specified, then the Contractor agrees to pay to the City, not as a penalty, but as liquidated damages for such breach of contract, the sum as noted in the General Conditions for each and every calendar day of failure to complete the work after the specified time set forth in the Bid Proposal. The said amount is fixed and agreed upon because of the impracticality and extreme difficulty of fixing and ascertaining the actual damages the City would in such event sustain. A Certificate of Substantial Completion must be executed by the Owner's Representative and Contractor stating the contract status. At Substantial Completion, a project must be available for Owner's intended purpose.

B. Perform data preparation, analysis, charting and updating in accordance with standards approved by the Owner's Representative.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3400.

B. Preliminary analysis: Within ten calendar days after the Contractor has received the Owner's Notice to Proceed, submit one reproducible copy and four prints of a preliminary construction schedule prepared in accordance with Part 3 of this Section.

C. Construction schedule: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit one reproducible copy and four prints of a construction schedule prepared in accordance with Part 3 of this Section.

D. Periodic reports: Submit with each application for payment on the first working day of each month. Following the submittal described in Paragraph 1.03 C. above, submit four prints of the construction schedule updated as described in Part 3 of this Section.

PART 2 PRODUCTS

2.01 CONSTRUCTION ANALYSIS

A. Graphically show by bar-chart the order and interdependence of all activities necessary to complete the work and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.

B. Include, but do not necessarily limit indicated activities to:

1. Project mobilization.
2. Submittal and approval of Shop Drawings and Samples.
3. Procurement of equipment and critical materials.
4. Fabrication of special material and equipment, and its installation and testing.
5. Final cleanup.
6. Final inspecting and testing.
7. All activities by the Owner's Representative that effect progress, required dates for completion, or both, for all and each part of the work.

PART 3 - EXECUTION

3.01 PRELIMINARY ANALYSIS

A. Contents:
   1. Show all activities of the Contractor under this work for the period between receipt of Notice to Proceed and submittal of construction schedule required under Paragraph 1.03 C. above.
   2. Show the Contractor's general approach to remainder of the work.
   3. Show cost of all activities scheduled for performance before submittal and approval of the construction schedule.

B. Submit in accordance with Paragraph 1.03 B. above.

3.02 CONSTRUCTION SCHEDULE

A. As soon as practicable after receipt of Notice to Proceed, complete the construction analysis in preliminary form, meet with the Owner's Representative, review contents of the proposed construction schedule and make all revisions agreed upon.

B. Submit in accordance with Paragraph 1.03 C. above.

3.03 PERIODIC REPORTS

A. As required under Paragraph 1.03 D. above, update the approved construction schedule.
   1. Indicate "actual" progress in percent completion for each activity.
   2. Provide written narrative summary of revisions causing delay in the program and an explanation of corrective actions taken or proposed.

3.04 REVISIONS

A. Make only those revisions to approved construction schedule as are approved in advance by the Owner.

END OF SECTION

SECTION 013233
PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.01 DISTRIBUTION

A. Work included: Provide photographs taken at the specified stages during construction.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limit to, General Conditions, Supplementary Conditions and Sections in division 1 of these Specifications.
   2. Section 01 5513: Site Access.

1.02 QUALITY ASSURANCE

A. Digital camera or equal.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3400.

PART 2 - PRODUCTS

2.01 CONSTRUCTION PHOTOGRAPHS

A. Provide JPEG formatted pictures in hard copy and on USB flash drive media:
   a. A minimum of 12 views per site per month during construction.

B. Provide the following on each picture:
   1. Job name.
   2. Location from which photographed.
   3. Date of photograph.
   4. Photographer's name, address and photograph number.

C. Retain the file for at least two years following date of substantial completion, and provide additional pictures to the Owner during that period at the prevailing commercial rates for such prints.

D. Do not permit pictures to be issued for any other purpose without specific written approval from the Owner.

PART 3 EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHY

A. Except as otherwise specifically approved by the Owner's Representative make the pictures within two calendar days of the date of the Contractor's application for progress payment.
   1. To the maximum extent practicable, make pictures at approximately the same time of day throughout progress of the work.
   2. When inclement weather is anticipated, consult with the Owner's Representative and determine acceptable alternative arrangements.

B. Except as otherwise specifically approved by the Owner's Representative, take the pictures from three separate locations around the work.
   1. Select the locations to provide diversified overall views of the work from positions which are expected to remain accessible throughout progress of the work.
   2. Identify each location by word description, by marked drawing, or by such other means as acceptable the Owner's Representative to enable future pictures to be taken from the same position.
   3. When so directed by the Owner's Representative because of the stage of construction, change one or more of the locations to new locations inside or outside the buildings the Owner's Representative directs.

C. Make each picture clear, in focus, with high resolution and sharpness, and with minimum distortion.

D. Submit photographs monthly with Application for Payment.

END OF SECTION

SECTION 013400
SUBMITTALS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures:
   1. Wherever possible throughout the Contract Documents the minimum acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance.
   2. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for their review by the Owner's Representative and Owner.
   3. Make all submittals required by the Contract Documents and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Construction progress schedules.

C. Schedule of values.

D. Shop drawings, product data and samples.

E. Manufacturer's instructions and certificates.

F. Submittal log.

1.02 RELATED REQUIREMENTS

A. Individual requirements for submittals are described in pertinent sections of these Specifications.

B. Related work:
   1. Section 01 2500: Substitutions Prodedures.
   2. Section 01 4529: Testing Laboratory Services.
   3. Section 01 7000: Execution and Closeout Requirements.

1.03 QUALITY ASSURANCE/CONTRACTOR RESPONSIBILITIES

A. Coordination of submittals: Before each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item, and the submittal for it, conforms in all respects with the requirements of the Contract Documents. Coordinate with other trades as required. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

B. Grouping of submittals: Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.

C. Timing: Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing deliveries.

D. Notify Owner's Representative in writing with submittal of any deviations in submittals from Contract Document requirements.

E. Do no fabrication or work which requires submittals until accepted by the Owner's Representative.

1.04 SUBMITTAL SCHEDULE

A. Compile a complete and comprehensive schedule of all submittals anticipated to be made during progress of the work. Include a list of each type of item for which Contractor's drawings, shop drawings, certificates of compliance, material samples, guarantees or other types of submittals are required. Adhere to the schedule except when specifically otherwise permitted. Submittal log is for Owner's Representative and Owner to track review.

B. Coordinate the schedule with all necessary subcontractors and materials suppliers to ensure their ability to adhere. Coordinate as required to ensure the grouping of submittals.

C. Revise and update the schedule on a monthly basis to reflect conditions and sequences. Promptly submit revised schedules to Owner's Representative for review and comment.

1.05 SCHEDULE OF VALUES

A. Refer to Section 01 2973: Schedule of Values.

1.06 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

1.07 SHOP DRAWINGS:

1. Present in clear and thorough manner, with details referenced to sheet, detail, schedule or room numbers shown on Contract Drawings. Provide quantity directed by Owner's Representative.

B. Product Data:
   1. Preparation: Clearly mark each copy to identify pertinent products or models. Show performance characteristics and capacities, dimensions and clearances required, and wiring or piping diagrams and controls.
   2. Modify manufacturer's standard drawings, diagrams and literature to delete information not applicable to work and supplement information specifically applicable to the work.

C. Samples:
   1. Office samples: Provide in quantity and size directed, complete with integrally related parts and attachment devices and illustrating functional characteristics of product and full range of color, texture and pattern.
   2. Field samples/mock-ups: Erect at project site at location acceptable to Owner's Representative in size or area specified in other specification sections. Fabricate to be complete and finished. Remove at conclusion of work or when directed.

D. Make submittals promptly and in such sequence as to cause no delay in work.

E. Submission Requirements:
   1. Quantity required:
      a. Shop drawings: One (1) unfolded reproducible transparency and seven (7) opaque reproductions.
      b. Submit seven (7) index brochures of mechanical and electrical submittals (manufacturer's literature and drawings) for final approval and distribution.
      c. Product data: Submit seven (7) copies each. Complete catalogs will not be acceptable. Manufacturer's regular catalog sheets will be acceptable if they indicate completely all specification requirements. When manufacturer's catalog sheets are submitted, material not directly connected with subject shall be completely lined out. Where drawings cover several sizes or types of construction they shall clearly indicate size or type of construction to be used including a schedule identifying each piece of equipment. Sheets of submittals containing more than five different items of equipment shall be assembled in an index brochure.
   2. Submittal contents:
      a. Submission date and dates of any previous submissions.
      b. Project title and number.
      c. Names of Contractor, supplier and manufacturer.
      d. Identification of product, with specification section number.
      e. Field dimensions, clearly identified as such.
      f. Applicable standards, such as ASTM, Federal Spec numbers, etc.
      g. Relation to adjacent or critical features of work or materials.
      h. Identification of deviations from Contract Documents.
      i. Identification of revisions on resubmittals.
      j. Contractor certification of submittal review, to include product verification, field measurements, quantities, coordination with adjacent equipment structural members, or architectural features, and coordination of information within submittal with

requirements of work and Contract Documents. Certification may be by stamp of approval or a letter of transmittal containing a statement to the effect that they have been reviewed. Uncertified submittals will be rejected.

F. Resubmission Requirements:
   1. Make corrections or changes required by Owner's Representative and resubmit until accepted.
   2. Shop drawings and product data: Revise and resubmit as specified for initial submittal; indicate any changes which have been made other than those requested by Owner's Representative.
   3. Samples: Submit new samples as required for initial submittal.
   4. Resubmission of structural shop drawings and product data: Resubmit finalized drawings and product data. File copy to Owner's Representative and Owner; field copy to field office. Resubmit all subsequent changes with changes and dates noted.

G. Distribution:
   1. Distribute reproductions of shop drawings and product data which carry Owner's Representative and Owner's stamp of approval to job site and record documents file, other affected contractors, subcontractors and supplier or fabricator.
   2. Distribute samples with Owner's Representative and Owner's stamp of approval as directed by Owner's Representative.

1.08 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Submit in accordance with Section 01 2500: Substitution Procedures.

1.09 MANUFACTURER'S CERTIFICATES

A. Submit certificates in accordance with requirements of each specification section.

1.10 PROJECT RECORD DOCUMENTS

A. Submit in accordance with Section 01 7839 Project Record Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL PROCEDURES

A. Deliver submittals to Owner's Representative.

B. Transmit each item under Contractor's Standard Letter of Transmittal. Identify project, contractor, subcontractor, major supplier, pertinent drawing sheet and detail number and specification section number as appropriate. Identify deviations from Contract Documents.

C. Submit initial progress and submittal schedules within 15 days after execution of Contract and schedule of values with first application for payment. Update with each Application for Payment reflecting changes since previous submittal.

D. Comply with progress schedule for submittals related to work progress.

E. After Owner's Representation and Owner's review of submittal, revise and resubmit as required, identifying changes made since previous submittal.

F. Distribute copies of review submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

3.02 OWNER'S REPRESENTATIVE REVIEW

A. Owner's Representative duties:

B. Review submittals with reasonable promptness.
   1. Affix stamp and initials or signature and indicate resubmittal requirements or approval of submittal.
   2. Submit to Owner for approval.
   3. Return submittals to Contractor for distribution or for resubmission.

C. Review by the Owner's Representative shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve

the Contractor from responsibility for errors which may exist.

D. Authority to Proceed: The notations "Approved" or "Approved as Corrected" authorizes the Contractor to proceed with fabrication, purchase, or both, of the items so noted, subject to the revisions, required by the Owner's Representative review comments.

E. Revisions: Make only those revisions directed or approved by the Owner's Representative and Owner.

F. Revisions after approval: When a submittal has been reviewed by the Owner, re-submittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

END OF SECTION

SECTION 014529
TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SELECTION AND PAYMENT

A. Owner shall employ and pay for the services of an independent engineering and testing laboratory to perform specified services and testing.

1.02 EXTENT OF LABORATORY TESTS AND INSPECTIONS

A. Inspections, engineering and testing required by law, ordinance, rules, regulations, orders or approvals required by public authorities having jurisdiction at project site.

B. Inspections and testing required in various sections of specifications.

C. Additional inspections and testing requested by Owner.

1.03 LABORATORY DUTIES AND TEST METHODS

A. Cooperate with Owner and Contractor to provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction.
   1. Comply with latest standards of ASTM and other recognized authorities, and pertinent sections of specifications.
   2. Ascertain compliance with requirements of contract documents.

C. Promptly notify Owner's Representative and Contractor of irregularities or deficiencies of work or products being tested.

D. Promptly submit written report of each test and inspection with one copy each to the Owner, contractor and project record documents file. Each report shall include:
   1. Date issued.
   2. Project title and number.
   3. Testing laboratory name, address and telephone number.
   4. Name and signature of laboratory inspector.
   5. Date and type of inspection or test.
   6. Results of tests or inspections and compliance with contract documents.
   7. Interpretation of tests or inspection results when requested by Owner's Representative.

E. Laboratory is not authorized to:
   1. Release, revoke, alter or enlarge on requirements of contract documents.
   2. Approve or accept any portion of the work.
   3. Perform any duties of the Contractor.

1.04 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory and:
   1. Make available, without cost, samples of all materials to be used and which require testing.
   2. Furnish such nominal labor and sheltered working space as is necessary to obtain samples at project.
   3. Advise laboratory of identity of materials sources and instruct suppliers to allow tests or inspections.
   4. Notify laboratory sufficiently in advance of operations to allow for completion of initial tests and assignment of inspection personnel.
   5. Notify laboratory sufficiently in advance of cancellation of required testing operations. Contractor shall be responsible to laboratory for changes due to failure to notify if requirements for testing are canceled.

B. Furnish copies of product test reports as required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Provide temporary facilities and controls needed for the work including, but not necessarily limited to:
   1. Temporary utilities such as heat, water, electricity and telephone;
   2. Field office for Contractor's personnel;
   3. Sanitary facilities;
   4. Enclosures such as tarpaulins, barricades and canopies;
   5. Temporary fencing of the construction site;
   6. Project sign.
   7. Tree Fencing, per requirements.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. Except that equipment furnished by Subcontractors shall comply with requirements pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.
   3. Permanent installation and hookup of the various utility lines are described in other Sections of these Specifications.

1.02 PRODUCT HANDLING

1. Maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

PART 2 PRODUCTS

2.01 UTILITIES

A. Water:
   1. Use existing water service on site, as available. Owner will pay utility costs. Take all reasonable measures to conserve usage.
   2. Provide necessary temporary piping and water supply and, upon completion of the work, remove such temporary facilities.

B. Electricity:
   1. Use existing electrical service on site, as available. Owner will pay utility costs. Take all reasonable measures to conserve usage. Provide necessary temporary wiring and, upon completion of the work, remove such temporary facility.
   2. Provide area distribution boxes so located that the individual trades may furnish and use 100 ft. maximum length extension cords to obtain power and lighting at points where needed for work, inspection and safety.

C. Telephone:
   1. Contractor shall provide a dedicated telephone and facsimile service at the field office.

2.02 FIELD OFFICES AND SHEDS

A. Contractor's facilities:
   1. Provide a single field office building and sheds adequate in size and accommodation for Contractor's offices, supply and storage. Locate field office at location to be determined by Owner.

B. Sanitary facilities:
   1. Provide temporary sanitary facilities in the quantity required for use by all personnel.
   2. Maintain in a sanitary condition at all times.

2.03 ENCLOSURES

A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges and other temporary construction necessary for proper completion of the work in compliance with pertinent safety and other regulations.

2.04 TEMPORARY FENCING

A. Provide and maintain for the duration of construction a temporary chain link fence barricade to prevent entry onto the work by the public. Fencing shall be paid for through unit cost per the Bid Proposal.

2.05 PROJECT SIGNS

A. Prior to start of construction, furnish and install one standard City of Tulsa project sign as required by city standards at each working project site. Mount at the job site were directed by the Owner's Representative.

B. Upon completion of the work, demount signs.

C. Except as otherwise specifically approved by the Owner's Representative, do not permit other signs or advertising on the job site. Backs of signs may be utilized for permits and other notices as may be required on site.

PART 3 EXECUTION

3.01 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.

B. Remove such temporary facilities and controls as rapidly as progress of the work will permit, or as directed by the Owner's Representative.

END OF SECTION

SECTION 015513
SITE ACCESS

PART 1 GENERAL

1.01 REQUIREMENTS

A. Work included: this information applies to situations in which a Contractor or his representatives including, but not limited to, suppliers, subcontractors, employees and field engineers enter upon City of Tulsa property.

1.02 QUALITY ASSURANCE

A. Upon approval by Owner for access, notify all pertinent personnel regarding requirements of this information.

B. Require that all personnel who will enter upon City property certify their awareness of and familiarity with the requirements of the Owner.

C. Tree protection in accordance with requirements.

1.03 SUBMITTALS

A. Pre-construction pictures in accordance with Paragraph 1.07.

1.04 TRANSPORTATION FACILITIES

A. Truck and equipment access:
   1. Limit the access of trucks and equipment to the route shown on the drawings as "Access Route" or pre-determined route identified by Owner.
   2. Provide protection for curbs, sidewalks, roads, parking, utilities and amenities over which trucks and equipment pass to reach work areas.

B. Contractor's vehicles:
   1. Limit the access of vehicles belonging to employees and all other vehicles entering upon City property to use only the access route.
   2. Do not permit vehicles to park on any other area of City property except in the areas so designated as parking areas.

1.05 NOTIFICATION BY CONTRACTOR

A. The Contractor shall notify the Owner, in writing, two weeks in advance of any proposed construction activity on Owner's property. Said notice does not constitute authority to proceed with work in the Park. Official notice of approval will be at the discretion of the Owner.

1.06 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

A. The Contractor shall be responsible for the preservation of all City property and shall protect carefully from disturbance or damage all said property until the City has witnessed or otherwise referenced their location and shall not move any item until directed.

B. The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the work, or at any time due to defective work or materials.

C. The Contractor shall consult with the Owner regarding his work activities and shall install any and all barriers, warning signs, fencing, property protection, access control or other devices to the satisfaction of the Owner and needed to provide for public safety and protection of City Property.

D. When or where any direct or indirect damage or injury is done to City property by or on account of any act, omission, neglect, or misconduct in the execution of the work or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed by the Owner or he shall make good such damage or injury in an acceptable manner to the Owner.

E. Tree protection in accordance with requirements.

1.07 PRE-CONSTRUCTION PICTURES OR VIDEO

A. The Contractor shall provide pictures or video of the specified work area one day prior to any work starting, but after appropriate construction staking and protection.

B. Pictures shall have the following information: Job name, location of picture, date of picture and photographer's name, address and picture number.

C. Pictures shall be from a minimum of twenty-four (24) diversified overall views of the work area and of any pertinent City property within construction limits. Additional photos may be required in unusual or extremely large sites.

D. Each picture shall be clear, in focus, with high resolution and sharpness and with minimum distortion.

1.08 CLEANING

A. Progress cleaning:
   1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, packaging and shipping material. Remove such items from premises weekly.
   2. Weekly, and more often if necessary, inspect all materials stored on site, restack, tidy, or otherwise arrange in safe condition.

B. Final cleaning:
   1. Completely remove resultant construction debris, particularly any loose rock or stone imported or uncovered during construction.
   2. Broom clean paved areas on site.
   3. Mow grass areas as directed, which had not been under normal park maintenance.
   4. Repair any areas of turfing that have been damaged by construction operations in accordance with Section 32 9223 Sodding.
   5. Alleviate compacted turf areas if access has been over turf, but no turf has to be placed. A coring implement with 6" O.C. minimum coverage of 3" deep should alleviate compaction. Drag cores until leveled.
   6. Often when fences are erected for protection, holes are left when fence posts are pulled. Holes should be filled with appropriate topsoil and settled with water to grade.

1.09 RECORD DOCUMENTS

A. Submit to Owner a complete record drawing in accordance with Section 01 7839.

1.10 FINAL APPROVAL

A. Upon the completion of all work a final inspection must be made by the Owner to determine whether the work has been completed in accordance with the contract, plans and/or specifications.

B. When the work has been so completed the Owner will provide certification of it and forward to appropriate contracting authorities.

C. Acceptance by Owner shall not restrict or prohibit the rights provided for in regard to latent defects; frauds or such gross mistakes as may amount to fraud or as regards the rights under any warranty guarantee.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.

B. Related work:
   1. Additional procedures also may be prescribed in other sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work materials.

1.03 MANUFACTURER'S RECOMMENDATIONS

A. Except as otherwise approved by the Owner, determine and comply with manufacturer's recommendations on product handling, storage and protection.

1.04 PACKAGING

A. Deliver products to the job site in their manufacturer's original container with labels intact and legible.
   1. Maintain packaged materials with seals unbroken and labels intact until time of use.
   2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements.

B. The Owner's Representative may reject as non-complying such material and products that do not bear identification satisfactory to the Owner's Representative as to the manufacturer, grade, quality and other pertinent information.

1.05 PROTECTION

A. Protect finished surfaces through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred and suitably protected until accepted by the Owner.

1.06 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Owner's Representative and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Owner to justify an extension in the contract time of completion.

PART 2 PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 017000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Provide an orderly and efficient transfer of the completed work to the Owner.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.

1.02 QUALITY ASSURANCE

A. Prior to requesting inspection by the Owner's Representative, use adequate means to assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.03 PROCEDURES

A. SUBSTANTIAL COMPLETION
   1. Substantial Completion is the stage in the progress of Work when the Work or designated portion thereof is sufficiently complete in general accordance with Contract Documents to Owner can occupy or utilize Work for its intended use.
   2. Work will not be considered for Substantial completion until all systems and equipment are operational; all designated or required governing agency inspections and certifications have been made and posted, including the Certificate of Occupancy; instruction of designated Owner's personnel in operation of systems and equipment has been completed; operation and maintenance data has been satisfactorily turned over to Owner; and finishes are in place. In general, the only remaining portion of Work shall be minor in nature, such that Owner may occupy or utilize Work or designated portion thereof, and completion or correction of Work by Contractor would not materially interfere or hamper Owner's intended business use or operation.
   3. Contractor shall certify that all remaining Work will be completed within 10 consecutive calendar days following date of identified Substantial Completion, or as agreed to in writing, and failure to do so shall automatically reinstate provisions for damages due Owner as contained elsewhere in Contract Documents, or a provided by law for such period of time as may be required by Contractor to fully complete Work whether Owner has occupied Work or not.
   4. Owner's Representative will make an inspection within seven (7) days after receipt of certification together with the Owner.
   5. Should Owner's Representative consider that work is substantially complete in accordance with the construction contract:
      a. Contractor shall prepare a punch list of items to be completed or corrected as determined by the inspection.
      b. Owner's Representative will prepare a Certificate of Substantial Completion and shall submit to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate. The Certificate of Substantial Completion shall contain the following:
         1) Date of Substantial Completion;
         2) Punch list of items to be completed or corrected.
         3) The time within which Contractor shall complete or correct work of listed items.
         4) Date and time Owner will assume possession of work or designated portion thereof.
      c. Contractor shall:
         1) Complete work listed for completion or correction within the designated time.
         2) Refer to Construction Contract for post substantial completion requirements.
   6. Should Owner's Representative consider that work is not substantially completed:
      a. He shall immediately notify Contractor in writing stating reasons.

b. Contractor: Complete work and send second written notice through Owner's Representative to Owner certifying that the project is substantially complete.
c. Owner's Representative will reinspect work.

B. Final Completion:
1. Contractor shall submit written certification that:
a. Contract documents have been reviewed;
b. Project has been inspected for compliance with contract documents.
c. Work has been completed in accordance with the construction contract.
d. Equipment and systems have been tested in presence of Owner and are operational.
1) Equipment and systems shall be operated in a normal mode for a minimum period of three (3) weeks prior to final inspection.
e. Owner's personnel have been instructed in operation of all systems, mechanical, electrical and other equipment.
f. Project is completed, ready for final inspection.
2. Owner and Owner's Representative will make final inspection within seven (7) days after receipt of certification.
3. Should Owner and Owner's Representative consider that work is finally complete in accordance with contract documents, contractor shall submit final Application for Payment as set forth in the General Conditions, Paragraph GC-29.
4. Should Owner's Representative consider that work is not finally complete:
a. He shall notify contractor, in writing, stating reasons.
b. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice through Owner's Representative to Owner certifying that work is complete.
c. Owner's Representative will reinspect work.

1.04 RETURN OF CONTRACT DOCUMENTS

A. Return of Drawings: Drawings, details, sketches and specifications are property of Owner, and are issued to contractor as instruments of service only. If required, contractor shall return same to Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 017300
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: To aid the continued instruction of operating and maintenance personnel and to provide a positive source of information regarding the products incorporated into the work, furnish and deliver the data described in this Section and in pertinent other Sections of these Specifications.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. Required contents of submittals also may be amplified in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section and skilled in technical writing to the extent needed for communicating the essential data.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3400.

B. Submit two copies of a preliminary draft of the proposed Manual or Manuals to the Owner's Representative for review and comments.

C. Unless otherwise directed in other Sections, or in writing by the Owner's Representative, submit four copies of the final Manual to the Owner's Representative prior to indoctrination of operation and maintenance personnel.

PART 2 PRODUCTS

2.01 INSTRUCTION MANUALS

A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.

B. Format:
   1. Size: 8-1/2" x 11".
   2. Paper: White bond, at least 20 lb. Wt.
   3. Text: Neatly written or printed.
   4. Drawings: 11' in height; bind in with text; foldout acceptable, not to exceed 11x17".
   5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
   6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to Owner's Representative's approval.
   7. Measurements: Provide all measurements in U.S.standard units such as feet and inches, lbs, and cfm.

C. Provide front and back covers for each Manual, using durable material approved by the Owner's Representative and clearly identified on or through the cover with at least the following information:
   1. Title: OPERATING AND MAINTENANCE INSTRUCTIONS
   2. Name and address of work
   3. Name of Contractor
   4. General Subject of this Manual
   5. Owner's Representative

D. Contents: Include at least the following:
   1. Neatly typewritten index near the front of the Manual.
   2. For architectural products, applied materials and finishes:
      a. Manufacturer's data, giving full information on finishes:
         1) Catalog number, size, composition.
         2) Color and texture designations.
         3) Information required for reordering special manufactured products.
      b. Instructions for care and maintenance:
         1) Manufacturer's recommendations for types of cleaning agents and methods.
         2) Cautions against cleaning agents and method which are detrimental to product.
         3) Recommended schedule for cleaning and maintenance.
      c. All approved submittals.
   3. For moisture protection and weather exposed products:
      a. Manufacturer's data, giving full information on products.
         1) Applicable standards.
         2) Chemical composition.
         3) Details of installation.
      b. Instructions for inspection, maintenance and repair.
      c. All approved submittals.
   4. For each electric and electronic system and mechanical system as appropriate:
      a. Description of system and component parts. Function, normal operating characteristics and limiting conditions. Complete nomenclature and commercial number of replaceable parts.
      b. Circuit directories of panel boards: Electrical service, controls and communications.
      c. Operating procedures: Routine and normal operating instructions, sequences required and special operating instructions.
      d. Maintenance procedures: Routine operations, guide to "trouble-shooting", disassembly, repair and reassembly and adjustment and checking.
      e. Manufacturer's printed operating and maintenance instructions.
      f. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
      g. Other data as required under pertinent sections of specifications.
      h. All approved submittals.
   5. Certificate of substantial completion.
   6. Master list of extended warranty items.

PART 3 - EXECUTION

3.01 INSTRUCTION MANUALS

A. Preliminary:
   1. Prepare a preliminary draft of each proposed Manual.
   2. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.
   3. Secure the Owner's Representative's approval prior to proceeding.

B. Final:
   1. Complete the Manuals in strict accordance with the approved preliminary drafts and the Owner's Representative's review comments.

C. Revisions:
   1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Owner's Representative.

END OF SECTION

SECTION 017329
CUTTING AND PATCHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:
   1. Division 2 Section "Selective Demolition" for demolition of selected portions of the building for alterations.
   2. Divisions 3 through 50 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.03 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.05 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
   1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.03 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   5. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
   1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
   2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   3. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION

SECTION 017839
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included:
   1. Throughout progress of the work, maintain an accurate record of changes in the Contract Documents as described in Article 3.01 below.
   2. Upon completion of the work, transfer the recorded changes to a set of Record Documents, as described in Article 3.02 below.

B. Related work:
   1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of the Specifications.
   2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Owner's Representative.

B. Accuracy of records:
   1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
   2. Accuracy of records shall be such that future search for items shown in the Contract Documents may relay reasonably on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information that the change has occurred.

D. Information shall be tied to base line control data of the Owner and so noted on the Owner's field books.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3400.

B. The Owner's Representative's approval of the current status of Project Record Documents may be a prerequisite to the Owner's Representative approval of requests for progress payment and request for final payment under the Contract.

C. Prior to submitting each request for progress payment, secure the Owner's Representative's approval of the current status of the Project Record Documents.

D. Prior to submitting request for final payment, submit and secure approval for the final Project Record Documents by the Owner and Owner's Representative.

1.04 PRODUCT HANDLING

A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the work and transfer all recorded data to the final Project Record Documents.

B. In the event of loss of recorded data, use means necessary to again secure the data to the Owner's Representative's approval.
   1. Such means shall include, if necessary in the opinion of the Owner's Representative, removal and replacement of concealing materials.
   2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 PRODUCTS

2.01 RECORD DOCUMENTS

A. Job set: Promptly following receipt of the Owner Notice to Proceed, secure from the Owner's Representative at no charge to the Contractor one complete set of all Documents comprising the Contract.

PART 3 EXECUTION

3.01 MAINTENANCE OF JOB SET

A. Immediately upon receipt of the job set described in Paragraph 2.01 above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET."

B. Preservation:
   1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Owner's Representative.
   2. Do not use the job set for any purpose except entry of new data and for review by the Owner's Representative until start of transfer of data to final Project Record Documents.
   3. Maintain the job set at the site of work as that site is designated by the Owner's Representative.

C. Making entries on Drawings:
   1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
   2. Date all entries.
   3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
   4. In the event of overlapping changes, use different colors for the overlapping changes.

D. Make entries in the pertinent other Documents as approved by the Owner's Representative.

E. Conversion of schematic layouts:
   1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts and similar items is shown schematically and is not intended to portray precise physical layout.
      a. Final physical arrangement is determined by the Contractor, subject to the Owner's Representative's approval.
      b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
   2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in subparagraph 3.01 E. 1. above.
      a. Clearly identify the item by accurate note such as "cast iron drain", "galv. water" and the like.
      b. Show, by symbol note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed" and the like).
      c. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
   3. The Owner's Representative may, subject to Owner approval, waive the requirements for conversion of schematic layouts where, in the Owner's Representative's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Owner.

3.02 FINAL PROJECT RECORD DOCUMENTS

A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation and examination.

B. Approval of recorded data prior to transfer:

1. When Substantial Completion of work has been granted, secure the Owner's Representative's approval of all recorded data.
2. Make required revisions.

C. Review and submittal:
1. Submit the completed set of Project Record Documents to the Owner as described in Paragraph 1.03 D. above.
2. Participate in review meetings as required.
3. Make required changes and promptly deliver the final Project Record Documents to the Owner's Representative.

3.03 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION

SECTION 022000
SITE WORK

PART 1 GENERAL

1.01 DESCRIPTION

A. These general site work requirements apply to all site work operations.

B. Related work:
   1. Section 01 5513: Site Access
   2. Section 02 2000: Selective Demolition
   3. Section 03 3000: Cast-In-Place Concrete.
   4. Section 03 3800: Post-Tensioned Concrete.
   5. Section 31 1000: Site Clearing
   6. Section 31 1100: Stormwater Pollution Prevention Plan.
   7. Section 31 2000: Earth Moving
   8. Section 32 1216: Asphalt Paving
   9. Section 32 1313: Concrete Paving
   10. Section 32 1373: Concrete Paving Joint Sealants
   11. Section 32 3113: Chain Link Fences and Gates
   12. Section 32 9223: Sodding
   13. Section 33 4100: Storm Drainage Utility Piping

1.02 QUALITY ASSURANCE

A. Comply with all applicable local, state and federal requirements regarding materials, methods of work and disposal of excess and waste materials.

B. Obtain and pay for all required inspections, permits and fees. Provide notices required by governmental authorities.

1.03 PROJECT CONDITIONS

A. Locate and identify existing underground and overhead services and utilities within contract limit work areas. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations at Contractor's expense.

B. Arrange for disconnection, disconnect and seal or cap all utilities and services designated to be removed before start of site work operations, and as required for demolition work. Perform all work in accordance with the requirements of the applicable utility company or agency involved.

C. Contractor shall be responsible to locate all existing utilities. Cooperate with the applicable utility company in maintaining active services in operation. If the services are Owner maintained, notify Owner's Representative immediately.

D. Locate, protect and maintain benchmarks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Contractor's expense.

E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with streets, walks and other adjacent facilities.

F. Obtain governing authorities written permission when required to close or obstruct street, walks and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways when required by governing authorities.

G. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.

H. Protect existing buildings, utilities, paving and other services or facilities on site and adjacent to the site from damage caused by site work operations. Cost of repair and restoration of damaged items at Contractor's expense.

I. Protect and maintain street lights, utility poles and services, traffic signal control boxes, curb boxes, valves and other services, except items designated for removal. Provide for temporary relocation when required to maintain facilities and services in operation during construction work.

J. The Owner will occupy the premises and adjacent facilities during the entire period of construction. Perform site work operations to minimize conflicts and to facilitate Owner's use of the premises and conduct of his normal operations.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PREPARATION

A. Examine the areas and conditions under which site work is performed. Do not proceed with the work until unsatisfactory conditions are corrected.

B. Consult the records and drawings of adjacent work and of existing services and utilities that may affect site work operations.

C. Prior to beginning work, carefully document existing site conditions with photographs and / or video, per Specification 01 3233.

END OF SECTION

SECTION 024100
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of the project site, or external elements such as pavement, equipment, furnishings, and footings.
   2. Repair procedures for selective demolition operations.

B. Related Sections include the following:
   1. Division 1 Section "Summary" for use of the premises and phasing requirements.
   2. Division 1 Section "Work Restrictions" for restrictions on use of the premises due to Owner or tenant occupancy.
   3. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
   4. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.

1.03 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.04 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
   1. Owner shall have first right of refusal for items to be removed from the site, such as playground equipment, benches, picnic tables, barbeque grills, sports equipment.

B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.05 SUBMITTALS

A. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

B. Predemolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.07 PROJECT CONDITIONS

A. Owner will occupy portions of site immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
   1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Visit the site and verify the extent and location of selective demolition required.
   1. Carefully identify limits of selective demolition.
   2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
   3. Contractor to field verify remaining items for demolition.

D. Prepare and follow organized plan for demolition and removal of items.
   1. Shut off, cap and otherwise protect existing public and private utility lines in accordance with the requirements of the public agency or utility having jurisdiction.
   2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid and ready to receive new materials specified elsewhere.
   3. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.

E. Owner assumes no responsibility for condition of areas to be selectively demolished.
   1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

F. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

G. Storage or sale of removed items or materials on-site will not be permitted.

H. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1.08 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.01 REPAIR MATERIALS

A. Use repair materials identical to existing materials.
   1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.02 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
   1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.

C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies. Coordinate with Owner.
   2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
   3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.03 PREPARATION

A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
   2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
   3. Protect existing site improvements, appurtenances, and landscaping to remain.

C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.

D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

3.04 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.05 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.
10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Existing Facilities: Comply with Owner's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.

C. Removed and Salvaged Items: Comply with the following:
   1. Clean salvaged items.
   2. Store items in a secure area until delivery to Owner.

D. Removed and Reinstalled Items: Comply with the following:
   1. Clean and repair items to functional condition adequate for intended reuse.
   2. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.06 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Patching: Comply with Division 1 Section "Cutting and Patching."

C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
   1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 033300
CAST-IN-PLACE-CONCRETE

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 specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Footings.
   2. Foundation walls.
   3. Vapor barrier at athletic courts.

B. Related Sections include the following:
   1. Division 32 Section "Concrete Paving" for concrete pavement and walks.

1.03 SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Samples: For waterstops and vapor retarder.

E. Qualification Data: For installer, manufacturer and testing agency.

F. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
   1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

G. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.
   4. Steel reinforcement and accessories.
   5. Fiber reinforcement.
   6. Waterstops.
   7. Curing compounds.
   8. Floor and slab treatments.
   9. Bonding agents.
   10. Adhesives.
   11. Vapor retarders.
   12. Semi-rigid joint filler.
   13. Joint-filler strips.
   14. Repair materials.

H. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

I. Field quality-control test and inspection reports.

J. Minutes of pre-installation conference.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, 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.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Pre-Installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete subcontractor.
   2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi-rigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, and concrete protection.

1.05 DELIVERY, STORAGE, AND HANDLING

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

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. High-density overlay, Class 1 or better.
      b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
      c. Structural 1, B-B or better; mill oiled and edge sealed.
      d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

F. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

G. Form-Release Agent: Commercially formulated form-release agent containing VOC's less than 250 grams per liter that will not bond with stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

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

2.03 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.04 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

C. Bar Supports: Use only concrete bricks as supports under rebars (regular rebar chairs not permitted)

2.05 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I/II gray.

B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
   1. Maximum Coarse-Aggregate Size: 1-1/2 inch nominal for foundations, stem walls and slabs on grade; 1 inch nominal for elevated slabs.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C330, ¾-inch nominal maximum aggregate size.

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

2.06 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

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

2.07 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
   1. Available Products:
      a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
      b. Concrete Sealants Inc.; Conseal CS-231.
      c. Greenstreak; Swellstop.
      d. Henry Company, Sealants Division; Hydro-Flex.
      e. JP Specialties, Inc.; Earthshield Type 20.
      f. Progress Unlimited, Inc.; Superstop.
      g. TCMiraDRI; Mirastop.

2.08 VAPOR BARRIERS

A. Plastic Vapor Retarder: ASTM E 1745, Class A vapor retarder with minimum WVTR of 0.008 as tested by ASTM E96 and permeance as tested after mandatory conditioning (ASTM E 154 sections 8,11,12,13) less than 0.01 Perms. Include manufacturer's recommended adhesive or pressure-sensitive tape (minimum width of tape shall be 4 inches). Construct pipe boots from vapor retarder material and pressure sensitive tape per manufacturer's recommendations.
   1. Available Products:
      a. Stego Wrap (15 mil) Vapor Barrier by Stego Industries
      b. Ecoshield-E (15 mil) Epro
      c. Iron Barr (15 mil) Flatiron Films

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.09 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.10 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
   1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.0217-inch- thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.11 REPAIR MATERIALS

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

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

2.12 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
   1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Proportion normal-weight concrete mixture for Footings and Piers as follows:
   1. Minimum Compressive Strength: 3000 psi at 28 days or as shown on drawings.
   2. Maximum Water-Cementitious Materials Ratio: 0.57.
   3. Minimum Cementitious Materials Content: 470 lb/cu. yd.
   4. Slump Limit: 6 inches, plus or minus 1 inch.
   5. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

B. Proportion normal-weight concrete mixture for walls as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.49
   3. Minimum Cementitious Materials Content: 564 lb/cu. yd.
   4. Slump Limit: 4 inches, plus or minus 1 inch.
   5. Air Content: Do not allow air content of walls to exceed 3 percent.

2.14 FABRICATING REINFORCEMENT

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

2.15 CONCRETE MIXING

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

PART 3 EXECUTION

3.01 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class A, 1/8 inch for smooth-formed finished surfaces.
   2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to

prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated.

3.03 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
   2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
   1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.05 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: See drawings for locations. Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool 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, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. 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.

3.06 WATERSTOPS

A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.07 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. 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 average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

G. After a rain event, the contractor must delay concrete placement for slabs on grade until the subgrade is dry. The contractor may use commercial air blowers to remove accumulated water.

3.08 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.10 CONCRETE PROTECTING AND CURING

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

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   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. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.11 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired

areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections, sample materials and prepare test reports.

B. Inspections:
1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs, hooked anchor bolts and other embedded steel anchors
4. Monitor addition of water to concrete at job site and length of time concrete is allowed to remain in truck during pour.
5. Certify each delivery ticket indicating class of concrete delivered (or poured), amount of water added and time at which cement and aggregate were discharged into truck, and time at which concrete was discharged from truck.
6. Verification of use of required design mixture.
7. Concrete placement, including conveying and depositing.
8. Curing procedures and maintenance of curing temperature.
9. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Contractors Responsibilities:
1. Furnish necessary labor to assist testing agency in obtaining and handling samples at job-site.
2. Advise testing agency in advance of operations to allow for assignment of testing personnel and testing.
3. Provide and maintain for use of testing agency adequate facilities for proper curing of concrete test specimens on project site in accordance with ASTM C31

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. but less than 25 cu. yd. plus one set for each additional 50 cu. yd. or fraction thereof.

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 mixture. Test to be taken from sample at point of discharge from hose. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete: one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; 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. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi
10. 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.
11. Concrete for which strength tests do not meet criteria for acceptance shall be considered inadequate until proven otherwise.
12. Completed concrete work will be accepted when the requirements of ACI 301, Chapter 18 have been complied with.
13. In any case, where strength tests of concrete fail to meet criteria specified herein, Architect shall be sole judge of structural adequacy of concrete. In such case, burden of proof of structural adequacy shall be responsibility of Contractor. Strength evaluation shall conform to requirements of ACI 318. If strength evaluation testing indicates, in opinion of Architect, that structure is of inadequate strength; portions of structure in question shall be repaired or removed and replaced as directed by Architect at no additional expense to Owner. If strength tests fall below specified strength, but not so low as to cause concern for structural adequacy, Architect may request improved conditions of curing or modification of design mixes to improve strength.
14. 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.

15. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
16. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
17. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION

SECTION 033800
POST-TENSIONED CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place post-tensioned concrete slabs-on-grade.

B. Sheathing-covered tensioning tendons for unbonded system.

1.02 RELATED SECTIONS

A. Section 03 3000: Cast-in-Place Concrete.

B. Section 32 1313: Site Concrete.

C. Section 32 1373: Concrete Paving Joint Sealants.

1.03 REFERENCES

A. American Concrete Institute (ACI):
   1. ACI 301, Specifications for Structural Concrete for Buildings.
   2. ACI 302, Guide for Concrete Floor and Slab Construction.
   3. ACI 318, Building Code Requirements for Reinforced Concrete.

B. American Society for Testing and Materials (ASTM):
   1. ASTM A416, Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.

C. American Welding Society (AWS):
   1. AWS B2.1, Standard for Welding Procedure and Performance Qualification.

D. Post Tensioning Institute (PTI):
   1. PTI Post-Tensioning Manual.
   2. PTI Specification for Unbonded Single Strand Tendons.

1.04 SUBMITTALS

A. Shop Drawings: Indicate layout, tendon sizes, grouping, spacing, placing sequence, supports and locations, tendon supports, accessories, clearances required for jack, and pressure plate stresses. Drawings shall bear the seal and signature of a Professional Engineer experienced in design of this Work and licensed in the State of Oklahoma.

B. Design Data: Provide calculations for tendon load elongation curves and prestress losses indicating method of elongation calculation including values used for friction coefficients, anchorage seating loss, elastic shortening, creep, relaxation, and shrinkage. Calculations shall bear the seal and signature of a Professional Engineer experienced in design of this Work and licensed in the State of Oklahoma.

C. Describe tensioning sequence, type of jack, pressure monitoring device, anchorage set, tendon elongation and tendon cut-off procedures.

D. Manufacturer's Certificate: Certify that tendons strength characteristics meet or exceed specified requirements.

E. Certificate of jack calibration, identifying calibration method.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in constructing the work of the section with minimum five years documented experience.

B. Welder: Qualified within previous 12 months in accordance with AWS B2.1.

C. Convene pre-installation conference one week prior to commencing work of this section to discuss tendon locations, underground piping penetrations of beams, and cautions regarding cutting or core drilling.

1.06 PROJECT CONDITIONS

A. Coordinate the work of framing components not post-tensioned but associated with the work of the section.

PART 2 PRODUCTS

2.01 FORMWORK

A. Formwork: As specified in Section 32 1313.

2.02 REINFORCEMENT

A. General: Materials shall conform to PTI "Specification for Unbonded Single Strand Tendons."

B. Tendon Strand: 0.5-inch diameter strand. Factory assembled, ASTM A416, Grade 270 low relaxation stranded steel cable; full length without splices; ultimate tensile strength of 270 ksi, greased and covered with polyethylene or polypropylene sheathing providing free movement of tendon within sheathing; complete with end anchorages.

C. Post-Tensioning Coating: Compound with friction-reducing, moisture-displacing, and corrosion-inhibiting properties; chemically stable and nonreactive with prestressing steel, nonprestressed reinforcement, sheathing material, and concrete.

D. Tendon Sheathing:
   1. Minimum Thickness: 0.050 inch for polyethylene or polypropylene with a minimum density of 0.034 lb/cu. in..
   2. Continuous over length of tendon to provide watertight encapsulation of strand and between anchorages to prevent intrusion of cement paste or loss of coating.

E. Tendon Anchor: Type compatible with tendon of strength not less than tendon.

F. Tendon Coupling: Type compatible with tendon of strength equal to or greater than tendon after attachment to tendons.

G. Encapsulation System: Watertight encapsulation of prestressing strand and anchorage consisting of the following:
   1. Wedge-Cavity Caps: Attached to anchorages with a positive mechanical connection and completely filled with post-tensioning coating.
   2. Sleeves: Attached to anchorage device with positive mechanical connection; overlapped a minimum of 4 inches with sheathing and completely filled with post-tensioning coating.

H. Supplementary Bonded Reinforcement: As specified in Section 02751.

2.03 ACCESSORIES

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Size and shape for strength and support of reinforcement during tendon location, installation, and placement of concrete.

C. Touch-up Primer: Corrosion resistive paint.

D. Grout Fill at Tendon Cut-Off: Non-metallic, non-shrink grout, 5000 psi strength.

2.04 CONCRETE MATERIALS AND MIX DESIGN

A. Concrete Materials: As specified in Section 02751.

B. Mix Design: As specified in Section 02751. Adjust concrete strength as necessary to reach the specified compressive strengths required for stressing of tendons within the time period after concrete placement specified on the drawings.

2.05 SOURCE QUALITY CONTROL AND TESTS

A. Concrete materials: As specified in Section 02751.

B. Inspect and test stressing tendons before delivery to site for compliance with specified standards.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify that site conditions are ready to receive work and field measurements are as indicated on shop drawings.

B. Bonded Steel Reinforcement: As specified in Section 32 1313 and Drawings.

C. Concrete work: As specified in Section 32 1313.

3.02 FORMWORK ERECTION

A. Construct and support formwork in accordance with Section 32 1313.

B. Provide supports and working space for tensioning jacks.

C. Mark all anchorage locations on the forms and drill holes for the strand and anchorage assembly at stressing end locations.

D. Install anchorage and connection devices.

3.03 REINFORCING PLACEMENT

A. Install tendons and anchors in conformance with PTI "Specification for Unbonded Single Strand Tendons."

B. Locate and position tendons. Protect from displacement. Protect from damage; replace if damaged. Support tendons at a maximum spacing of 54 inches on-center.

C. Provide the following minimum clear concrete cover to tendons:
   1. Beams: Bottom 3", Top 2", Sides 2"
   2. Slabs: Bottom 1 1/2", Top 1".

D. Bonded Reinforcing: As specified in Section 02751.

E. Secure jack pressure plates in position perpendicular to line of stressing force.

F. Repair all breaks in the tendon sheathing with waterproof polyethylene adhesive tape, minimum of two circular wraps.

G. Seal tendon sheathing at intersection to anchorage device to exclude concrete paste, using waterproof polyethylene adhesive tape or some other sealant.

3.04 TOLERANCES

A. Tolerances
   1. Maximum vertical distance from indicated position:
      a. 1/4 inch where depth of slab or beam is less than 8 inches, 3/8 inch where depth is greater than 8 inches and 1/2 inch where depth exceeds 24 inches.
   2. Maximum horizontal distance from indicated position:
      a. Slab tendons - place as straight as possible.
   3. Deflections up to 12" may be provided to slab tendons to avoid obstructions by utilizing large radius curves of the tendons.
   4. Minimum radius of curvature shall be 5'-0" for all tendons.

3.05 INSTALLING CONCRETE

A. Place concrete in accordance with Section 31 1313.

B. Verify tendons, anchors, seats, plates, and other items to be cast into concrete are placed and secure.

C. Fully consolidate concrete behind tendon anchors without displaying the anchors.

D. Maintain anchor locations and beam tendon provile during concrete placement. Reposition/secure displaced anchors and tendons before concrete reaches set.

3.06 TENSIONING

A. Stress and finish end of tendons according to PTI "Specification for Unbonded Single Strand Tendons".

B. Complete initial tensioning operations after concrete has reached f'c = 1,500 psi compressive strength and within 48 hours of concrete placement. Confirm concrete strength with site-cured test cylinders prior to tensioning.

C. Complete final tensioning operations with 10 days of concrete placement.

D. Measure prestressing force. Maintain jacking and tensioning records as work progresses.

E. Jack against anchorage assembly/tendon pressure plate, not against concrete.

F. After the stressing and tendon elongation have been properly completed and approved by the Testing Laboratory, cut off excess tendon using abrasive wheel or hydraulic shears. Apply touch-up primer to tendon cut end. Provide 1" clearance from face of concrete to the end of cut strand.

G. Do not cut off the ends of partially stressed or incorrectly stressed tendons.

H. Repair members damaged during tensioning process. Conduct repairs as directed by Architect.

3.07 GROUTING

A. Grout fill anchorage pockets with non-metallic non-shrinking grout as soon as practical after tendon stressing and cutting, but no later than 7 days after the final stressing operation. Moisten concrete surfaces immediately prior to placing the grout. Cure according to Section 32 1313.

3.08 FIELD QUALITY CONTROL

A. Bonded Reinforcing Steel: As specified in Section 32 1313.

B. Concrete materials: As specified in Section 32 1313.

C. Post Tension Reinforcement:
   1. Record actual locations of tendons.
   2. Maintain records of stressing sequence, tension loads, measured elongation, and jack gauge pressures for each stressing location.
   3. Measured elongation and tendon force variations shall agree with calculated elongation within + or - 7%. Report values in excess of 7% to the design engineer for review and recommended remedial action.

END OF SECTION

SECTION 033816 - UNBONDED POST-TENSIONED CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes post-tensioning reinforcement and accessories and post-tensioning operations including stressing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing tendon layout and installation procedures.

C. Delegated-Design Submittal: For post-tensioning system.
1. Sealed design calculations prepared by a qualified structural engineer indicating method of elongation calculation including values used for friction coefficients, anchorage seating loss, elastic shortening, creep, relaxation, and shrinkage.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer and testing agency.

B. Product certificates.

C. Mill Test Reports: For prestressing strand.

D. Field quality-control reports.

E. Stressing Records: Submit the same day as stressing operations.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Fabricating plant certified by PTI according to procedures set forth in PTI's "Manual for Certification of Plants Producing Unbonded Single Strand Tendons."

B. Installer Qualifications: A qualified installer whose full-time Project superintendent has successfully completed PTI's Level 1 - Field Fundamentals course or has equivalent verifiable experience and knowledge acceptable to Architect.
1. Superintendent must receive training from post-tensioning supplier in the operation of stressing equipment to be used on Project.

C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

1. Testing Agency Inspector: Personnel performing field inspections and measuring elongations shall have successfully completed PTI's Level 1 - Field Fundamentals course or shall have equivalent verifiable experience and knowledge acceptable to Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle post-tensioning materials according to PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."

PART 2 - PRODUCTS

2.1 PRESTRESSING TENDONS

A. ACI Publications: Comply with ACI 423.6, "Specification for Unbonded Single Strand Tendons," unless otherwise indicated in the Contract Documents.

B. Prestressing Strand: ASTM A 416/A 416M, Grade 270, uncoated, seven-wire, low-relaxation, 0.5-inch-diameter strand.

C. Post-Tensioning Coating: Compound with friction-reducing, moisture-displacing, and corrosion-inhibiting properties; chemically stable and nonreactive with prestressing steel, nonprestressed reinforcement, sheathing material, and concrete.

D. Tendon Sheathing:

1. Minimum Thickness: 0.050 inch for polyethylene or polypropylene with a minimum density of 0.034 lb/cu. in..
2. Continuous over length of tendon to provide watertight encapsulation of strand and between anchorages to prevent intrusion of cement paste or loss of coating for an encapsulated system.

E. Anchorage Device and Coupler Assembly: Assembly of strand, wedges, and anchorage device or coupler complying with static and fatigue testing requirements and capable of developing 95 percent of actual breaking strength of strand.

F. Encapsulation System: Watertight encapsulation of prestressing strand consisting of the following:

1. Wedge-Cavity Caps: Attached to anchorages with a positive mechanical connection and completely filled with post-tensioning coating.
2. Sleeves: Attached to anchorage device with positive mechanical connection; overlapped a minimum of 4 inches with sheathing and completely filled with post-tensioning coating.

2.2 NONPRESTRESSED STEEL BARS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content a minimum of 25 percent.

B. Support Bars, Reinforcing Bars, Hairpins:

1. Steel: ASTM A 615/A 615M, Grade 60, deformed.
2. Low-Alloy Steel: ASTM A 706/A 706M, deformed.

C. Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening tendons and tendon support bars 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. For uncoated bars, use all-plastic bar supports.

2.3 ACCESSORIES

A. Pocket Formers: Capable of completely sealing wedge cavity; sized to provide the required cover over the anchorage and allow access for cutting strand tail.

B. Anchorage Fasteners: Stainless steel nails, wires, and screws used to attach anchorage devices to formwork.

C. Sheathing Repair Tape: Elastic, self-adhesive, moistureproof tape with minimum width of 2 inches, in contrasting color to tendon sheathing; nonreactive with sheathing, coating, or prestressing steel.

2.4 PATCHING MATERIAL

A. One-component, polymer-modified, premixed patching material containing selected silica aggregates and portland cement, suitable for vertical and overhead applications. Do not use material containing chlorides or other chemicals known to be deleterious to prestressing steel or material that is reactive with prestressing steel, anchorage device material, or concrete.

PART 3 - EXECUTION

3.1 FORMWORK

A. Provide formwork for post-tensioned elements as specified in Section 033000 "Cast-in-Place Concrete." Design formwork to support load redistribution that may occur during stressing operation. Ensure that formwork does not restrain elastic shortening, camber, or deflection resulting from application of prestressing force.

B. Do not remove forms supporting post-tensioned elements until tendons have been fully stressed and elongations have been approved by Architect.

C. Do not place concrete in supported floors until tendons on supporting floors have been stressed and elongations have been approved by Architect.

3.2 NONPRESTRESSED STEEL REINFORCEMENT PLACEMENT

A. Placement of nonprestressed steel reinforcement is specified in Section 033000 "Cast-in-Place Concrete." Coordinate placement of nonprestressed steel reinforcement with installation of post-tensioning tendons.

3.3 TENDON INSTALLATION

A. Install tendons according to installation drawings and procedures stated in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."

1. Tolerances: Comply with tolerances in ACI 423.6 for beams and slabs.

B. Tendon Supports: Provide continuous slab bolsters or bars supported on individual high chairs spaced at a maximum of 54 inches o.c. to ensure tendons remain in their designated positions during construction operations and concrete placement.

1. Support tendons as required to provide profiles shown on installation drawings.
2. Attach tendons to supporting chairs and reinforcement without damaging tendon sheathing.

C. If tendon locations conflict with nonprestressed reinforcement or embedded items, tendon placement governs. Obtain Architect's approval before relocating tendons or tendon anchorages that interfere with one another.

D. Deviations in horizontal spacing and location of slab tendons are permitted when required to avoid openings and inserts.

E. Installation of Anchorage Devices:

1. Place anchorage devices at locations shown on approved installation drawings.
2. Do not switch fixed- and stressing-end anchorage locations.
3. Attach pocket formers, intermediate anchorage devices, and stressing-end anchorage devices securely to bulkhead forms. Install stressing-end and intermediate anchorage devices perpendicular to tendon axis.
4. Install tendons straight, without vertical or horizontal curvature, for a minimum of 12 inches behind stressing-end and intermediate anchorages.
5. Embed intermediate anchorage devices at construction joints in first concrete placed at joint.
6. Minimum splice length in reinforcing bars at anchorages is 65 bar diameters. Stagger splices a minimum of 60 inches.
7. Place fixed-end anchorage devices in formwork at locations shown on installation drawings. Support anchorages firmly to avoid movement during concrete placement.
8. Remove loose caps on fixed-end anchorages, refill with post-tensioning coating, and re-attach caps to achieve a watertight enclosure.

F. Maintain minimum concrete cover according to ACI 423.6.

G. Maintain minimum clearance of 6 inches between tendons and openings.

H. Prior to concrete placement, mark tendon locations on formwork with spray paint.

I. Do not install sleeves within 36 inches of anchorages after tendon layout has been inspected.

J. Do not install conduit, pipe, or embeds requiring movement of tendons after tendon layout has been inspected.

K. Do not use couplers unless location has been approved by Architect.

3.4 SHEATHING INSPECTION AND REPAIR

A. Inspect sheathing for damage after installing tendons. Repair damaged areas by restoring post-tensioning coating and repairing or replacing tendon sheathing.
1. Ensure that sheathing is watertight and there are no air voids.
2. Follow tape repair procedures in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."

B. Immediately remove and replace tendons that have damaged strand.

3.5 CONCRETE PLACEMENT

A. Place concrete as specified in Section 033000 "Cast-in-Place Concrete." Ensure consolidation of concrete around anchorages.

B. Ensure that position of tendon and nonprestressed-steel reinforcement does not change during concrete placement. Reposition tendons and nonprestressed-steel reinforcement moved during concrete placement to original location.

C. Ensure that method of concrete placement does not damage tendon sheathing. Do not support pump lines, chutes, or other concrete-placing equipment on tendons.

3.6 TENDON STRESSING

A. Calibrate stressing jacks and gages at start of project and at least every six months thereafter. Keep copies of calibration certificates for each jack-and-gage pair on Project site that are available for inspection. Exercise care in handling stressing equipment to ensure that proper calibration is maintained.

B. Stress tendons only under supervision of a qualified post-tensioning superintendent.

C. Do not begin initial stressing operations until concrete strength has reached 1500 psi as indicated by compression tests of field-cured cylinders.

D. Complete initial stressing within 48 hours of concrete placement.

E. Complete final stressing with 10 days of concrete placement.

F. Stage stress according to schedule shown on the Contract Drawings.

G. If detensioning and restressing of tendon is required, discard wedges used in original stressing and provide new wedges.

H. Mark and measure elongations according to PTI's "Field Procedures Manual for Unbonded Single Strand.

I. Submit stressing records within one day of completion of stressing. If discrepancies between measured and calculated elongations exceed plus or minus 7 percent, resolve these discrepancies to satisfaction of Architect.

J. Prestressing will be considered acceptable if gage pressures shown on stressing record correspond to required stressing force and calculated and measured elongations agree within 7 percent.

K. If measured elongations deviate from calculated elongations by more than 7 percent, additional testing, restressing, strengthening, or replacing of affected elements may be required.

3.7 TENDON FINISHING

A. Do not cut strand tails or cover anchorages until stressing records have been reviewed and approved by Architect.

B. Cut strand tails as soon as possible after approval of elongations.

C. Install caps and sleeves on intermediate anchorages within one day of stressing.

D. Cut strand tails and install caps on stressing-end anchorages within one day of Architect's acceptance of elongations.

E. Patch stressing pockets within one day of cutting strand tail. Clean inside surface of pocket to remove laitance or post-tensioning coating before installing patch material. Finish patch material flush with adjacent concrete.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Before concrete placement, special inspector will inspect the following for compliance with post-tensioning installation drawings and the Contract Documents:

a. Location and number of tendons.
b. Tendon profiles and cover.
c. Installation of backup bars, hairpins, and other nonprestressed reinforcement shown on post-tensioning installation drawings.
d. Installation of pocket formers and anchorage devices.
e. Repair of damaged sheathing.
f. Connections between sheathing and anchorage devices.

2. Special inspector will record tendon elongations during stressing.
3. Special inspector will immediately report deviations from the Contract Documents to Architect.

3.9 PROTECTION

A. Do not expose tendons to electric ground currents, welding sparks, or temperatures that would degrade components.

B. Protect exposed components within one workday of their exposure during installation.

C. Prevent water from entering tendons during installation and stressing.

D. Provide weather protection to stressing-end anchorages if strand tails are not cut within 10 days of stressing the tendons.

3.10 REPAIRS

A. Submit repair procedure to Architect for evaluation and approval.

B. Do not proceed with repairs requiring removal of concrete unless authorized in writing by Architect.

END OF SECTION 033816

SECTION 116500
ATHLETIC EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following work: Contractor shall provide and install Athletic Equipment shown on the plans and listed in this Section.
   1. Basketball Equipment
      a. outdoor goals
   2. Tennis Equipment
      a. posts and net
      b. bleachers

1.03 SUBMITTALS

A. Product data in the form of manufacturer's technical data, specifications, and cut sheets for each product specified.

B. For each product specified, the Contractor shall submit color samples of manufacturer's standard color range of finishes for review and approval.

1.04 SHOP DRAWINGS

A. Provide drawings of the manufacturer's recommended installation and foundation requirements for review prior to actual field installation work.
   1. Contractor shall be responsible for retaining the services of a licensed structural engineer who shall work with the equipment manufacturer and the local geotechnical conditions to develop required shop drawings for equipment foundations.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has at least three years of experience and has completed at least five projects with same material and of similar scope to that indicated for this Project with a successful construction record of in-service performance.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify layout information shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements. Report any discrepancies to the Architect prior to installation.

1.07 COORDINATION

A. Contractor shall be solely responsible for ensuring items are properly coordinated and sequenced for the orderly completion of the Project including installation of Athletic Equipment.

B. Installation of Athletic Equipment occurs in varying locations and configurations. Contractor shall familiarize himself with the manufacturers' installation requirements prior to beginning construction activities.
   1. Specific instances of coordination include (but are not limited to):
      a. Coordinate construction of footings and installation of goals, corner flags, and covered player benches with construction of synthetic turf playing field.

C. Equipment specified herein may have lengthy manufacturing lead times. Contractor is not entitled to relief from any other Conditions of the Contract due to product lead times.

1.08 REFERENCE

A. NFHS Court and Field Diagram Guide – Latest Edition

B. ASTM International Standards

PART 2 PRODUCTS

2.01 BASKETBALL EQUIPMENT

A. Basketball Goal:
   1. By: First Team, Inc., 800.649.3688, www.firstteaminc.com; or approved equal.
      a. Vertical Pole: FT 1905, FT 1905 NC
      b. Backboard: FT 267 Perforated Aluminum
      c. Rim: FT 172 D Unbreakable Fixed
      d. Net: FT11, Steel Basketball Net (premium steel safety net)
      e. Install per manufacturer's instructions
      f. Warranty: Lifetime Unconditional for pole, backboard, and rim

2.02 TENNIS POSTS AND NET

A. By Douglas, www.douglas-sports.com , or approved equal.
   1. Posts: Douglas Premier Round 3" OD Tennis Net Post, color: as selected by Owner.
      a. 3" OD round 11 gauge steel.
      b. Complete with welded lacing rods.
      c. Baked on polyester powder coated finish.
      d. Cast aluminum alloy caps and gear housings.
      e. Internally wound with a self-locking gear mechanism.
      f. Removable handle.
      g. Gear function is 30 to 1 self-locking.
      h. Chrome plated gear plate and handle.
      i. Steel plated gears.
      j. Small gear is case hardened.
   2. Net: Douglas TN-45 Professional Tennis Net.
      a. Double thick 100% polyester headband weight 48 oz.
      b. 3.5mm braided polyethylene netting 325# break strength.
      c. 5 year warranty.
   3. Bleachers:
      a. By: National Recreation Systems, Inc., 888.568.9064, https://www.bleachers.net, or approved equal
         1) National Series Deluxe Model Aluminum Bleachers and Frame with Guardrails
         2) Non-elevated angle frame bleachers
         3) 5-Row
         4) Length: 21'
         5) Anodized seat plank
         6) Double mill finish foot planks and riser planks on all rows
   4. Install per manufacturer's instructions.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide, assemble, place, and install equipment according to manufacturer's recommendations.

END OF SECTION

SECTION 129300
SITE FURNISHINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included: Provide site furnishings where shown on Drawings, as specified herein, and as needed for a complete and proper installation of the following:
   1. Bench.

1.02 QUALITY ASSURANCE

A. Set items in a timely manner in accordance with manufacturer's recommendations.

B. PVC coating material shall be of the highest grade resin coating with plasticizers and stabilizers added to insure resistance to fading and shall be thermally fused and adhered to a primer that is thermally cured onto galvanized steel. Vinyl properties, when applied at 250 mils, shall be as follows:
   1. Specific Gravity ASTM-D792 1.30 Max. +/.03
   2. Hardness Durometer ASTM-D676 A90 +/- 5
   3. Tensile Strength ASTM-D412 2600 +/- 5%
   4. Ultimate Elongation ASTM-412 275% +/- 5%
   5. Dielectric Strength ASTM-D149 750
   6. Compress & Cut through Lbs. Bell Labs 1500
   7. Accelerated Aging Test ASTM-D1499 1500 Hrs@145o F

C. No degradation of PVC powder when exposed to 500,000 lanleys of ultraviolet exposure time using a fresnel-reflecting concentration employed in the EMMAQUA test method in accordance with ASTM-E838, ASTM-D4364 and ASTM-D4141.

D. In addition to the above, the PVC material shall be impervious to the following alkalies, acids and oils: Sulfuric acid, hydrochloric acid, citric acid, sodium hydroxide, petroleum, mineral and synthetic urine.

1.03 SUBMITTALS

A. Comply with provisions of Section 01340.

B. Samples:
   1. Accompanying the Shop Drawings, submit samples of all finishes including actual materials on suitable substrates for true representation of color and textures of products called out under this Section.

1.04 DELIVERY, STORAGE AND HANDLING

A. Comply with provisions of Section 1640 Product Handling.

B. Components should be covered or otherwise protected to prevent any use until after final inspection.

PART 2 PRODUCTS

2.01 BENCH

A. Acceptable Products:
   1. Bench by: Ultra Site, 1675 Locust Street, Red Bud, IL 62278, 618.282.8200, www.ultraplay.com; or approved equal
      a. 975 Series (6' length)
      b. With arms
      c. Surface mount with non-corrosive tri-groove security bolt anti-theft hardware
      d. Recycled plastic slats
      e. Colors as selected from manufacturer's standards
      f. Install per manufacturer's instructions

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper execution of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Coordinate as required with other trades to assume proper interface with the work of this Section.

B. Install the work of this Section in strict accordance with the design, approved shop drawings and the manufacturer's recommendations.

C. Upon completion of the installation, touch-up all scratches and abrasions to be completely invisible to the unaided eye from a distance of five feet.

END OF SECTION

SECTION 260000

BASIC MATERIALS AND METHODS (ELECTRICAL)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions of the Contract, including drawings, apply to the work of this section.

1.02 DESCRIPTION

A. Furnish and install all electrical wiring, systems, equipment and accessories in accordance with the Specifications and Drawings.

B. Capacities of equipment and cable are, in general, indicated on the Drawings.

C. All ampacities herein specified or indicated on the Drawings are based on copper conductors with conduit and raceways accordingly sized.

1.03 WORK INCLUDED

A. Work in this section includes electrical service utilities tie-in for tennis court lighting, and additional circuit wiring in the building. Also includes lighting system, lighting poles, fixtures and control boxes. The work of this section is not limited to the above but is composed of all work specified in this section and indicated on the electrical plans.

B. Provide all necessary labor, tools, equipment, and materials necessary to accomplish the work. Pay all required local, State and federal fees and obtain and bear all costs of permits required.

1.04 MINIMUM REQUIREMENTS

A. The following codes and standards are hereby made a part of these specifications. Work and material furnished under these specifications shall be constructed and designed in accordance with the applicable requirements of these codes and standards, except to the extent that more stringent requirements are indicated or required by governing regulations.

B. Whenever a particular standard is referenced, it is the latest edition of that standard to which is referred. In addition to the following list, comply with all state and municipal building and safety laws, ordinances and regulations relating to public health and safety.

	Reference Abbreviation	Name and Address
1.	ADA	The Americans With Disabilities Act U. S. Department of Justice Civil Rights Division Office on the Americans With Disabilities Act P. O. Box 6611B Washington, D.C. 20035-6118
2.	ANSI	American National Standards Institute, Inc. 1430 Broadway New York, New York 10018 USA
3.	ASTM	American Society for Testing Materials 1916 Race Street Philadelphia, Pennsylvania 19103 USA
4.	BOCA	Building Officials & Code Administration International, Inc. 17926 South Halsted Street Homewood, Illinois 60430 USA
5.	IES	Illuminating Engineering Society 345 East 47th Street New York, New York 10017 USA
6.	NEC	National Electrical Code (by NFPA)
7.	NFPA	National Fire Protection Association Batterymarch Park Quincy, MA 02269
8.	NEMA	National Electrical Manufacturers Assoc. 2101 L Street, NW

Washington, D.C. 20037 USA

9. UL Underwriters Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

1.05 STRUCTURAL CONDITIONS

A. These Specifications and Drawings accompanying same are intended to cover an installation which will not interfere with the structural design of the building, which will fit into the several available spaces, and which will insure a complete and satisfactory system.

B. Contractor shall carefully examine the plans for all branches of the work and shall be responsible for the proper fitting of his material and apparatus into the building.

C. Should the particular equipment which any bidder proposes to install require other space conditions than those shown on the Drawings, he shall arrange for such space with the Engineer before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make necessary changes at his (the Contractor's) own expense.

D. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these Specifications and Plans, which shall be reviewed by the Engineer and approved before the work is started. Any interferences with the structural conditions shall be corrected by the Contractor before the work proceeds.

1.06 ACCESS PANELS

A. Furnish access panels for installation as specified, where indicated, or wherever required for accessibility of equipment, junction boxes, controls, etc. Cooperate to provide panels that will suit the architectural treatment of the areas where access panels are required. All panels shall be flush type factory prime painted steel, key operated, and of sufficient size to facilitate operation and maintenance of the device enclosed. Furnish shop drawings of access panels for the approval of the Architect before fabrication.

1.07 EQUIPMENT IDENTIFICATION

A. Furnish laminated phenolic engraved black plastic nameplates attached with stainless steel screws to each piece of equipment identified by name or number on the Drawings. Nameplate shall have condensed gothic letters no less than 1/4" high and be indented white on black background. Equipment requiring name tags includes panelboards, disconnects, and circuits within panelboards.

1.08 EQUIPMENT AND CONNECTIONS

A. All apparatus, equipment, devices, and appliances which are indicated to be electrically roughed-in shall be so equipped. Electrical connections to have JB with cover, disconnect or dedicated receptacle as shown on Drawings. These items must be coordinated with plans and equipment specifications.

B. Make complete final electrical power and electrical control connections to all equipment supplied under this contract and to all electrically powered equipment furnished or installed by others.

1.09 USE OF ALLOCATED SPACES

A. Consult the architectural plans, as well as the plans for all other trades, for spaces allocated to piping, conduits, equipment, etc. The electrical plans are essentially diagrammatic indicating approximate location of system components. The architectural plans and details shall take precedence in allocating space requirements for the various pipes, electric conduits, etc. All trades must consult with one another to the end that the available space is best utilized by all. Due consideration shall be given to the pipe, junction boxes, and conduit locations so that the accessibility of all the installed lines from access doors, hand holes, etc., is preserved; and space shall not be unnecessarily used by any contractor to save fittings, offsets, etc., whereby any interference results with other trades or where furring limits as shown on the architectural plans are exceeded. Each contractor shall consult the Engineer for space requirements for his equipment whenever same is not clearly indicated on the plans, or otherwise provided for. Failure to obtain clearance will leave the Contractor liable to removal and relocation of the affected equipment.

1.11 OPENINGS - CUTTING REPAIRING

A. Holes in Concrete: All holes through existing concrete shall be either core drilled or saw cut. All holes required shall have the approval of the Engineer prior to cutting or drilling. Dust containment shall be provided by the contractor. Fire seal around all floor and fire wall penetrations to ensure a 2-hour fire rating at penetration.

1.12 SUBSTITUTIONS

A. After execution of the contract, substitution of equipment of makes other than those specifically named in the contract documents will be approved by the Engineer for the following reasons only:

1. That the equipment proposed for substitution is equal to and/or superior to equipment named (in construction, efficiency, and utility) and further that the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence of work with other contractors, due to conditions beyond control of the contractor.

B. This does not, in any way, relieve the contractor of the responsibility of ordering equipment for proper sequential delivery.

1.13 SHOP DRAWINGS AND SUBMITTED DATA

A. Refer to Section 01 3300 for submittal requirements. No work indicated on any shop drawing shall be started until such drawings have been reviewed and approved by the Engineer.

B. Submittal data shall be referenced to section and paragraph numbers of the specifications and to fixture and equipment numbers listed or scheduled, and shall be assembled in numerical order of the specification paragraphs. Submittals shall be bound in sets between covers and all sets within a section shall be identical. Identification marks on submittals shall be made in black ink. Do not use red pencil or ink.

C. Where equipment manufacturers named as equivalent, or approved equal, are proposed for use by the Contractor, he shall be responsible to coordinate the change with all trades affected and bear cost of changes required by other trades to accommodate the equipment substitution. Submit for approval 1/4" scale working drawings of equipment rooms, plan and section.

1.14 CLEANING EQUIPMENT AND MATERIALS

A. Provide for the safety and good condition of all materials and equipment until final acceptance by the Owner. Protect all materials and equipment from damage. Provide adequate and proper storage facilities during the progress of the work.

1.15 INTERRUPTION OF SERVICES

A. While work is in progress, except for designated short intervals during which connections are to be made, continuity of service shall be maintained to all existing systems. Interruptions shall be coordinated with the Owner as to time and duration. The Contractor shall be responsible for any interruptions to service and shall repair any damages to existing systems caused by his operations.

1.16 GUARANTEE

A. Contractor shall guarantee all workmanship, materials, and labor for a period of one (1) year, after warranty date set at substantial completion, to be free from defects not due to normal wear or abuse.

1.17 OPERATION MANUALS

A. Furnish three bound sets of Operation Manuals along with the various warranties for mechanical and electrical equipment. Deliver Operation Manuals and Warranties to the Engineer prior to Final Inspection. Complete and satisfactory submittal of this material is a condition for final payment.

1.18 CONDITIONS OF FINAL INSPECTION

A. The following items must be accomplished and delivered to the Engineer before request for Final Inspection and final payment will be acknowledged:

1. Operating and Maintenance Instructions: Furnish three (3) complete sets of Operating and Maintenance Instructions for all equipment furnished under this contract.

2. All work and materials as called for by the contract must be complete.

3. All lamps shall be new. Personally make a special inspection trip to assure that the work on the project, as a whole, is ready for final acceptance before calling upon the Engineer to make a Final Inspection.

END OF SECTION

SECTION 260519

CABLE WIRE AND CONNECTORS - 600V AND UNDER

PART 1 - GENERAL

1.01 DESCRIPTION

A. Run all wire in metal raceways unless noted otherwise.

B. Provide cable, wire, and connectors in accordance with plans and specifications and in compliance with manufacturers' published application and installation recommendations.

1.02 QUALITY ASSURANCE

A. Comply with National Electrical Code (NFPA 70), and National Electrical Manufacturers Association/Insulated Power Cable Engineers Assoc. Standards.

B. Provide electric cable wire and connectors which have been listed and labeled by Underwriters Laboratories.

C. Remove from project site any damaged materials.

1.03 SUBMITTALS

A. Submit manufacturers' data on all cable wire and connectors to be used. See Section 01 3300 for specifics on equipment and material submittals.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Wire and Cable: Anaconda Wire and Cable, General Cable Corp., General Electric Co., Triangle, or acceptable equal.

B. Connectors: Amp, Burndy Corp, General Electric Co., Ideal Industries Inc., Minnesota Mining and Mfg. Co., 0.Z./Gedney Co., Thomas & Betts Co., or acceptable equal.

2.02 WIRE

A. Use soft drawn annealed copper having a conductivity not less than 98% of that of pure copper and with thermoplastic 600 volt insulation. Use no aluminum wire unless called for specifically on plans.

B. All lighting and power wire indicated on drawings is size 12 unless indicated otherwise. Use no wire smaller than size 12 for power or lighting.

C. Wire Sizes #12 and #10. Use solid copper dual rated THHN/THWN insulation temperature rated for 90 degrees C in dry locations and 75 degrees C in wet locations.

D. Wire Size #8 and Larger. Use stranded copper Type THW or THHN/THWN 75 degrees C temperature rated insulation for wet locations. And THHN/THWN 95 degrees C temperature rated insulation for dry locations.

E. Temperature Control Wire. Use stranded THHN copper wire with crimp spade lugs. Minimum size #16.

2.03 CONNECTORS

A. Provide factory made metal connectors of size, rating, material, type, and class as indicated by NEC, NEMA, or as indicated on plans.

B. Use pre-insulated spring-type pressure or crimp-type solderless connectors on wire sizes #12, #10, and #8. For wire sizes larger than #8, use solderless bolted or hydraulically die crimped compression type connectors.

C. Insulate all bolted splices and taps using preformed factory-made insulating boots with scotch fill and electrical tape.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Do not pull any wire into raceway until raceway is complete and all burrs and abrading surfaces have been removed.

B. A U.L. approved lubricant may be used where necessary to facilitate installation of conductors.

C. Use only continuous conductors without welds or splices or joints between boxes. Mains and feeders are to be run their entire length without splices.

D. Identify all conductors using color coded insulation or numbered linen or plastic Brady tags. Use the following color-coding chart for all lighting and power circuits.

120/208 Volts	
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground Wire	Green

Use numbered stick-on Brady wire tags to label all control wire ends according to the numbering scheme printed on the wiring diagram.

E. Install crimp type ring or spade lugs on ends of all control wires.

F. Install all wire cable and connectors as indicated and in accordance with manufacturers' written instructions, NEC requirements, and the National Electrical Contractors Association "Standard of Installation".

G. Insulate all splices and taps to produce an insulated assembly equivalent to, or better than, the electrical and mechanical strength of the conductors being insulated.

H. Use connectors compatible with the conductor and terminal materials.

I. Before energizing, check for short circuits and megger all circuits in accordance with NEC.

END OF SECTION

SECTION 260526

GROUNDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Equipment Grounding.

1. All metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be grounded for personnel safety and to provide a low impedance path for possible ground fault currents.

1.02 RELATED WORK

A. Section 260000, BASIC METHODS AND REQUIREMENTS (ELECTRICAL).

B. Section 01 3300 Submittal Process (submit on all grounding materials).

1.03 APPLICABLE PUBLICATIONS

A. The following specifications and standards, except as hereinafter modified, are incorporated herein by reference and form a part of this specification to the extent indicated by the references thereto. Except where a specific date is given, the issue in effect (including amendments, addenda, revisions, supplements, and errata) on the date of invitation for Bids shall be applicable. In text such specifications and standards are referred to by basic designation only.

1. National Fire Protection Association (NFPA) Publications:

No. 70.....National Electrical Code (NEC)

2. Underwriters Laboratories, Inc. (UL) Publications:

No. 83.....Thermoplastic Insulated Wires

No. 44.....Rubber-Insulated Wires and Cables

No. 467.....Electrical Grounding

and Bonding
Equipment

3. Institute of Electrical and Electronics Engineers, Inc. (IEEE)

No. 142.....Recommended Practice
for Grounding of
Industrial and
Commercial Power
Systems

PART 2 - PRODUCTS

2.01 GROUNDING WIRES.

A. Shall be UL and NEC approved types, copper, with TW or THWN/THHN or THW insulation color identified green.

B. B. Wire size shall not be less than shown on the drawings and not less than required by the NEC.

2.02 GROUND RODS

A. Shall be copperclad steel, 5/8-inch diameter by 8 feet long.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERALLY

A. Grounding shall be in accordance with the NEC, as shown on the drawings, and as hereinafter specified.

B. Conduit Systems.

1. Ground all metallic conduit systems.

2. Non-metallic conduit systems shall contain a grounding conductor.

3. Conduit provided for mechanical protection and containing only a grounding conductor shall be bonded to that conductor at the entrance and exit from the conduit.

C. Feeders and Branch Circuits: Install green grounding conductors with all feeders and branch circuits as follows:

1. Install grounding conductor with all feeders and branch circuits, including lighting and receptacle circuits.

2. Connect to all circuits serving fixed equipment and appliances.

3. Connect to all motors and motor controllers.

4. All items of equipment where the final connection is made with flexible metal conduit shall have a grounding wire.

5. All additional locations and systems as shown on the drawings.

6. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs for terminating the ground wires.

E. Lighting Fixtures: Shall be grounded through green ground wire. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

F. Electrical Appliances and Equipment: Fixed electrical appliances and equipment shall have a ground lug installed for termination of the green ground conductor.

END OF SECTION

SECTION 260533

RACEWAY SYSTEMS AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish and install complete systems of electrical raceways, including but not limited to, all conduit, fittings, outlet boxes, cover plates, wireways, gutters, expansion fittings, and accessories.

B. Feeds to main panels in individual units shall be routed in conduit. All exposed conduit outside shall be rigid galvanized steel. All buried conduit shall be schedule 40 PVC. EMT can be used in restrooms and corridors and non-corrosive areas or above ceilings. 1.02 QUALITY ASSURANCE

A. All raceway products shall have UL label stamp and shall comply with National Electrical Manufacturers Association standards and current edition of the National Electrical Code. All steel boxes, fittings, conduits and accessories shall be galvanized.

B. Submit manufacturer's data on all raceway system components.

PART 2 - PRODUCTS

2.01 CONDUIT AND FITTINGS

A. Rigid Steel Conduit

1. Hot dip galvanized inside and outside, standard pipe size, threaded wrought steel. ANSI: C80.1, Federal Spec. WW-C-581.

B. Weatherproof Outlet Boxes

1. Provide cast metal weatherproof outlet boxes of type and shape to suit the application with threaded conduit connections, gasketed spring hinged covers, and corrosion-proof hinges and fasteners.

2. Acceptable Manufacturer: Appleton, Crouse-Hinds, or acceptable equal.

C. Junction and Pull Boxes (Inside)

1. Provide galvanized steel junction and pull boxes with removable screw-fastened covers of size and gauge to comply with NEC and requirements of the application.

2.02 BOXES

A. General.

1. Provide metal boxes of shape, size, and mounting means to suit each respective location and usage, and to comply with NEC.

B. Outside pull boxes are to be sized per ODOT standard size I, in ground pull boxes. Boxes to have lids engraved with the word "Telephone" or Electric" as applicable. Boxes to be concrete or Gunnite, with openings in the bottom and lids flush with the grade. Provide submittals for exterior ground boxes and lids.

C. Interior and exterior receptacles and switches to have metal receptacle and switch cover plates except in pool room Chemical and Chlorine rooms, which are to have vinyl coated coverplates.

C. Wireways and Gutters

1. Provide steel wireways and gutters of size as indicated on plans with hinged or removable covers. Interior wireways to be bonderized enameled steel.

2. Acceptable Manufacturer: Square D, Appleton, or acceptable equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General. Conduit

1. I n general, conceal all conduit in walls and ceiling spaces and run as required. Run parallel or perpendicular to building walls and floors in straight runs, using bends and offsets as required. Make all conduit bends using proper bending tools with no more than 360 degrees in bends in a run of conduit without using pull boxes. Bends are to be made in such a manner that the internal diameter of the tubing will not be effectively reduced. Replace all flattened or crushed conduit prior to pulling wire. Ream all conduit ends. Swab all underfloor conduit, prior to pulling wire, and cap, or plug all conduit exposed to weather during construction. Wire shall be drawn into a completed conduit system so there is no danger to wire insulation.

2. Size all conduits as indicated on plans or as indicated in National Electrical Code, if not indicated on plans. In no case shall conduit be less than 3/4 inch when installed in poured concrete or underground. All conduit shall be of such size that required conductors may be drawn in without injury or excessive strain. No conduit may be less than 1/2 inch. Maintain a minimum of 3 inches between conduit and steam or hot water lines pipe insulation when running parallel with pipe. Maintain a minimum of 1 inch from the pipe insulation when crossing steam or hot water pipe. EMT is acceptable for interior conduits and conduits in voids and walls.

3. Support all conduit using pipe clamps spaced a maximum of 8 feet apart. PVC conduit supports shall be spaced per NEC. Support all raceway systems from building

structure, not from ceiling system or ceiling hangers or from other pipe or duct systems. Rigid non-metallic conduit shall be supported as per table 347-8 of NEC. Make final conduit connections to motors and other equipment, subject to vibration using liquid tite flexible metallic tubing minimum 12 inches long and maximum 24 inches long. Connection to 1 horsepower or smaller motors within a housing may use flexible metallic tubing.

4. Use liquid tite flexible metallic tubing where flexible conduit is required outdoors or in intermittent moisture environments. Install liquid tight flex conduit so that liquids run off of the surface without draining toward fittings. In areas subject to much vibration or strain, S.T. type connectors shall be used. Flexible conduit to only be used on short runs (3' or less) or to vibrating equipment.

5. Provide nylon pull cord in all empty conduits with ends marked to identify terminal points. When conduit passes through concrete or other structural outside walls below grade, a sleeve must be cast in place. Fill 1/4 inch gap between sleeve and pipe with silicone sealant and make entire installation water tight.

6. For conduit stub ups in floors, for future use, set threaded coupling flush with finished floor. Where stub is for future use, install threaded plug in coupler flush with finished floor.

B. Sleeves

1. Provide a sleeve constructed from Schedule 40 PVC conduit for each location where a conduit or hanger passes through a concrete slab, masonry wall, roof or other portion of the building structure. Make sleeve flush on both sides of the surface penetrated and pack around the conduit to maintain the fire rating of rated walls. Extend sleeves 1" above the finished floor in equipment rooms. Use PVC sleeves where PVC ground wire conduits pass through floors, or masonry walls.

C. Boxes

1. Install all outlet boxes with front of box within 1/4" of finished non-flammable surface and flush with finished ceiling or wall surface of a flammable surface. Use approved plaster rings to build out to wall surface when box is recessed.

2. Secure all boxes rigidly to building structural members.

3. Locate all boxes for ease of accessibility.

4. Provide knockout closures for knockouts not used.

D. Fittings

1. Use double lock nut bushings on all rigid steel conduit to box fittings, and secure all conduit tight to box.

2. Screw all compression type couplers and connectors tight to retain ground integrity of raceway system.

3. Use expansion fittings with bonding jumpers where rigid or EMT conduits cross building expansion joints.

END OF SECTION

SECTION 262416

PANELBOARDS AND ENCLOSURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish and install panelboards as indicated on drawings of voltage, phase, and current rating as indicated on drawings and schedules.

1.02 SUBMITTALS

A. Submit manufacturers' data on all panelboards and enclosures showing physical dimensions, voltage characteristics, ampacity, breakers, bussing arrangements, enclosure mounting configuration and all accessories. See Section 01 3300 for submittal requirements.

1.03 QUALITY ASSURANCE

A. Comply with all UL, NEC, NEMA, and ANSI standards and label with UL and IBEW stamps.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS.

A. General Electric, Square D, Cutler Hammer or pre-approved equal.

B. 2.02 PANELBOARDS

Lighting and Appliance Panelboards

1. Provide dead-front safety type lighting and appliance panelboards where indicated, with switching and protective devices in the number, rating, type and arrangement shown; with anti-burn solderless pressure type lug connectors approved for copper conductors, for connecting feeder to bus or main switch as scheduled; equipped with copper bus bars arranged for the service, voltage and capacity as scheduled and a full sized neutral bar with neutral bar mounted on opposite end of panel from main lugs; provide suitable lugs on neutral bus for each outgoing feeder required; provide a bare uninsulated grounding bar with lugs for each out-going feeder and suitable for bolting to the enclosure; and provide panelboards fabricated by the same manufacturer as enclosures. Panelboard to be adjustably mounted in its cabinet to permit an adjustment outward of at least 3/4" and to permit panelboard to be plumbed and centered.

C. Panelboard Enclosures

1. Provide sheet steel enclosures with minimum 4-1/2" side gutters and 8" end gutters, or as required by NEC Art. 373, which ever is larger; NEMA Type as required for the application; code gage, minimum 16 gage thickness, with multiple knockouts; provide doors with flush lock and key, with concealed hinges. Provide painted grey enamel finish over a rust inhibitor. Provide enclosures fabricated by the same manufacturer as panelboards to be enclosed.

D. Panelboard Accessories

1. Provide panelboard accessories including, but not necessarily limited to, cartridge and plug type circuit breakers, as recommended by the panelboard manufacturer for the ratings indicated.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Examine all areas and conditions where panelboards are to be installed and report to the Engineer any conditions detrimental to the installation of panelboards, or any areas where wall thickness is insufficient to fully recess flush mounted panels, prior to construction. Failure to report such conditions will cause the Contractor to be liable for cost of revising panelboard installation.

B. Provide typed panel directories permanently affixed in each panel identifying each circuit connected by function and room numbers served and spares.

C. Provide blank space fillers in all breaker spaces not occupied by breakers or switches.

D. Install panelboards in accordance with manufacturer's instructions adjusting all interiors flush with panel front and all panel fronts of recessed panels tight against finished walls. Anchor panel boxes firmly to walls or other approved structural support.

E. Handle panelboards and enclosures carefully to prevent breakage, denting and scoring the finish. Repair and paint, with manufacturer's specified paint, all dents and scratches. Store panelboards and enclosures inside and protect from weather. When necessary to store out-of-doors, elevate well above grade and enclose with durable, waterproof wrapping. A heat source is to be installed inside the equipment to prevent moisture buildup where such buildup could cause damage to the equipment.

END OF SECTION

SECTION 265100

LIGHTING FIXTURES, LAMPS, AND BALLASTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish and install all lighting fixtures complete with lamps, ballasts and accessories as indicated on the drawings. If a fixture type designation is missing, furnish and install fixtures of a type similar to those in other rooms of similar usage. Notify the Engineer prior to purchase or installation. Contractor to provide all mounting brackets, chains, adapters, connectors, etc. as for a complete system, whether specific items are identified on the plans or not.

1.02 QUALITY ASSURANCE

A. Fixtures to be UL listed and carry IBEW wiring and fabrication labels. Fixtures to meet NEC, NEMA, and ANSI requirements for the application.

1.03 SUBMITTALS

A. Submit manufacturer's data on all fixtures including construction details, ballasts, lenses, photometrics, and finishes. See Section 01-3300 for details on submittals.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fixtures.

1. Fixture wiring to be no less than #14 AWG stranded and in all cases, wiring shall be of sufficient size to handle the load and of an insulation type appropriate to the application.

2. All recessed fixture housings to be rust proof.

3. Starters and lamp holders in fluorescent lighting equipment to be Electrical Testing Laboratories and UL approved.

B. Ballasts.

1. Fluorescent ballasts to be ETL, CBM, and UL rated, Class P, high power factor type with thermal protection built into the windings unless noted otherwise. Ballasts to be Rapid Start and less than 10% total harmonic distortion. Use standard < 10% THD 0 degrees F rated ballasts for applications where ambient temperature may fall below 50°F.

2. Sound rating of all ballasts serving 32 watt rapid start fluorescent lamps to be Class A.

3. Ballasts serving lamps greater than 40 watts and located indoors shall be Advance ballasts and of the quiet encapsulated type.

4. Fluorescent ballasts to be specifically designed for dimming purposes where shown on the plans. Dimmer wall boxes to be specifically identified and matched to the diming ballast selected.

5. High intensity discharge type ballasts used indoors are to be encapsulated for sound rating improvement and shall be equipped with inline fuses in each ungrounded conductor.

C. Lamps.

1. Incandescent lamps - 130V inside frost unless noted otherwise.

2. Fluorescent lamps – F32T8, 4100 degree Kelvin by Sylvania, unless noted otherwise. All fluorescent lamps shall carry the ECO designation for non-hazardous disposal at end of life.

3. Use standard F32T8/4100° K lamps in environments where temperatures may drop below 60 degrees F.

4. Where shown, specialty fixtures shall not be substituted unless the engineer and owner have verified substituted items are both electrically and esthetically equal.

D. LED Fixtures

1. Where LED fixtures are indicated, any alternate fixture must have equal or better performance in regard to lumen output, efficacy, and have an identical appearance. Vendor must have available,

for review LM80 and TM21 standard test data for review in order for fixtures to be accepted.. Fixtures must be UL listed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Check architectural finishes and verify that fixtures are ordered with proper trim, frames, supports, hangers, and miscellaneous accessories regardless of catalog numbers prefixes or suffixes shown in fixture schedule.

B. Provide additional support to ceiling systems to adequately support light fixtures and to comply with all applicable codes and regulations. Furnish and install the required supports. Provide 1-1/2" spacers when mounting fluorescent fixtures to fiber ceilings.

C. Clean all fixtures and wipe lenses inside and outside immediately prior to final acceptance. Adjust trim and flanges to provide proper fit against ceilings or walls without gaps. Test each fixture and lamp prior to final inspection and replace all broken, marred or inoperative components.

D. Provide with lighting submittal, information on the proposed proximity switches to be used and indicate where the items are to be used, if there are different sensors provided.

END OF SECTION

SECTION 31 1000
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 1 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities.
   2. Division 1 Section "Temporary Tree and Plant Protection" for protecting trees remaining on-site that are affected by site operations.
   3. Division 1 Section "Execution" for verifying utility locations and for recording field measurements.
   4. 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

2.01 **SOIL MATERIALS**

A. Satisfactory Soil Materials: Requirements for satisfactory 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 31 1100

STORMWATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.01 **RELATED DOCUMENTS**

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

1.02 **SUMMARY**

A. This Section includes the following:
   1. Stormwater Pollution Prevention Plan.

B. Related Sections include the following:
   1. Division 02 Section "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
   2. Division 02 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.03 **QUALITY ASSURANCE**

A. Preform Work in accordance with Oklahoma Department of Transportation Standard Specifications for Highway Construction and Oklahoma Department of environmental Quality. Maintain one copy on site.

PART 2 PRODUCTS – Not applicable.

PART 3 EXECUTION

3.01 **EXECUTION**

A. Contractor shall review and familiarize himself with all aspects of the Stormwater Pollution Prevention Plan and perform work accordingly.

B. Contactor is responsible for filling out and submitting the NOI along with the SWPPP to ODEQ for review and approval.

C. Contractor is responsible for filling out and submitting the NOT upon completion of permanent erosion control measures.

END OF SECTION

SECTION 31 2000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. 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.

1.3 UNIT PRICES

A. Unit prices for earthwork are included in Division 01 Section "Unit Prices."

1.4 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.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Each type of plastic warning tape.
2. Controlled low-strength material, including design mixture.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 698 for each soil material proposed for fill and backfill.

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

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

B. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

PART 2 - PRODUCTS

2.1 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) 5 to 18 and Liquid Limit equal to or <40
   b. Containing at least 15 percent fines (material passing the No.200, based on dry weight)
   c. Shall not contain rock fragments greater than 3 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

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. 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.

2.3 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.

2.4 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

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

E. After stripping and completing all cuts, proof-roll the exposed subgrade with a fully-loaded, pneumatic-tired, 10-wheeled tandem-axle dump truck weighing not less than 25 tons. Overexcavate and replace soft, unstable or unsuitable materials with approved engineered fill if they cannot be stabilized in place.

F. After completing proof-rolling and before placing any fill, scarify the exposed subgrade to a minimum depth of 8 inches, moisture condition to a level within 2 percent above the material's optimum moisture content, and compact to at least 95 percent of its maximum standard Proctor dry density.

3.2 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.

3.3 EXPLOSIVES

A. Explosives: No explosives are allowed.

3.4 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. Excavations along the building perimeter footings in shorter segments (less than 10 feet in length parallel to any existing foundation) and backfilling with properly compacted engineered fill with hand-held or smaller sized equipment having a maximum pre-compacted thickness of 4 to 6 inches prior to moving to the next section.

3. Excavations adjacent to existing foundations shall not impose on an area extending outward at a 1:1 slope from the bottom of any footings of existing structures.

4. 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.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch m). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.7 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.

3.8 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsuitable soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. After stripping and completing any cuts, the subgrade shall be proofrolled. Proof-roll subgrade under the observation of the geotechnical engineer, with a loaded, tandem-axle dump truck weighing at least 25 tons, to locate any zones that are soft or unstable. The Proofrolling should involve overlapping passes in mutually perpendicular directions. Where rutting or pumping is observed during proof-rolling, the unstable soils shall be over-excavated and replaced with low volume change soils.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated on-site suitable soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, sub-drainage, damp-proofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Place and compact initial backfill of , free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

D. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit.

E. Backfill voids while installing and removing shoring and bracing.

F. Place and compact final backfill to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

H. Construct clay "trench plug" that extends at least 5 feet out from the face of the building exterior. The plug material shall consist of clay compacted at a water content at or above the soils optimum water content. The clay fill shall be placed to completely surround the utility line and be compacted to at least 95% standard proctor density.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use on-site soils.
2. Under walks and pavements, use engineered fill.
3. Under steps and ramps, use engineered fill.
4. Under 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 2 percent below to 2 percent above 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 a level 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. The existing soils in pavement subgrade areas shall be stabilized with Class "C" fly ash.
      a. A rate of 14 to 16 percent fly ash, based on the material's compacted dry unit weight, be used to treat the subgrade soils.
      b. The exposed subgrade shall be scarified to a depth of at least 8 inches, moisture conditioned to 2 percent below to 2 percent above the material's optimum moisture content and recompacted within a range of 95 percent to 97% of the material's standard proctor maximum dry density, determined in accordance with ASTM D-698, the standard proctor procedure.

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.

3.18 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Division 33 Section "Subdrainage."

3.19 BASE COURSES

A. Place base course on subgrade free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:

1. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Shape base course to required crown elevations and cross-slope grades.
3. Place base course in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D-698.

3.20 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

3.21 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Contact Engineer for subgrade proofrolling.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. 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 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, 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.

F. 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 31 2000

SECTION 32 1216
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. Retain this Article if specifying state or local DOT standard paving mixes; delete if specifying paving mixes other than those of state or local DOT.

B. 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. Delete this Article if pavement-marking materials are not required.

B. 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.

C. 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

C. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.

D. 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.

E. 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

B. 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.

C. 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.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.02 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.

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.

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 32 1313
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. Parking lots.
   3. Curbs and gutters.
   4. 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& M Construction 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. Water-Cementitious Materials Ratio at Point of Placement: 0.25 - 0.44.
   3. Slump Limit: 2 inches plus or minus 1 inch.
      a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 9 inches after adding admixture to plant- or site-verified, 2- to 3-inch slump.
   4. Air Content: 6.5 percent plus or minus 1.5 percent for 3/4-inch (19-mm) nominal maximum aggregate size

C. Calcium Chloride shall not be permitted in concrete mixtures.

D. Chemical Admixtures: Conform to ODOT specifications for highway construction.
   1. Use water-reducing admixture high-range, water-reducing admixture high-range, water-reducing and retarding admixture plasticizing and retarding admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

E. 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 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

C. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

D. 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."

E. 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.
   2. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
   3. Provide tie bars at sides of pavement strips where indicated.
   4. 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.
   6. 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.

3.06 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

B. 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 321823.53
TENNIS COURT SURFACING

PART 1 GENERAL

1.01 SUMMARY

A. Tennis court surface system for new concrete court. Preparation of court for color finish, application of color finish (2 colors - 1 for inner court and 1 for outer court) and marking of court for tennis. This work shall not be done until the area is secured. Allow prepared surfaces to cure for the time interval recommended by coating manufacturer.

B. Related Sections:
   1. Standards: work shall be done in accordance with American Sports Builders Association (ASBA) guide specifications.
   2. Site Investigation: Refer to ASBA guide specification 1.B.
   3. Vegetation Control: Refer to ASBA guide specification 1.D.
   4. Site Preparation, Earthwork, Drainage, Sub-base Construction: Refer to ASBA. guide specification 1.C.
   5. Reference Structural for post-tensioned concrete pavement.

1.02 SCOPE OF WORK

A. Court shall be cleaned using a stiff bristle broom and gas powered blower or water based pressure spray unit capable of generating 2500 psi at the nozzle tip, to remove all dirt and debris.

B. Repair cracks and depressions per manufacturer's instructions utilizing manufacturer's approved products.

C. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary for the installation of the tennis court included in this contract.

1.03 QUALITY CONTROL

A. Application: Five years documented experience as applicator for approved products.

B. Certified installer of approved product.

1.04 SUBMITTALS

A. Submit manufacturer's data.

B. Submit color samples on suitable substrate for selection.

C. Submit court striping layout.

D. Submit verification that the specification requested herein are in conformance with the manufacturer's recommendations for proper use of these products. In the event the manufacturer's recommendations differ, submit those alternate procedures to the Architect for approval.

PART 2 PRODUCTS

2.01 COURT SURFACE MATERIAL

A. Approved products and manufacturers:
   1. Plexipave, a Division of California Products, 150 Dascomb Road, Andover, MA 01810, 800.225.1141
   2. Laykold, as manufactured by Advanced Polymer Technology Corp., 109 Conica Lane PO Box 160, Harmony, PA 16037, 724.452.1330
   3. Novacrylic, as manufactured by Nova Sports U.S.A., 6 Industrial Rd., Bldg. #2., Milford, MA 01757. 800-USA-NOVA
   4. Approved equal.

B. Coatings shall be pure acrylic, containing no asphaltic or tar emulsions, nor any vinyl, alkyd or non-acrylic resins.
   1. The color system shall be factory-mixed compounds requiring only the addition of water at the jobsite. Materials shall be delivered to the jobsite in sealed containers with the

manufacturer's label affixed.

PART 3 EXECUTION

3.01 APPLICATION

A. Vapor barrier must be installed prior to pouring concrete, minimum 15-mil thick polyolefin geo membrane.

B. No wax or curing agents that are not certified as coatable shall be used.

C. New concrete shall cure for twenty-eight days prior to application of any surfacing materials.

D. Concrete shall have a medium broom finish.

E. Contractor shall notify the Architect of all applications, 48 hours prior to installation.

F. Etch concrete with a Phosphoric Acid solution; allow to set and flush completely with water.

G. The surface to be coated shall be inspected and made sure to be free of grease, oil, dust, dirt and other foreign matter before starting work.

H. The surface shall be flooded. Any ponding water remaining that is deep enough to cover the thickness of a five-cent piece shall be corrected using a manufacturer- approved patch mix and applied per manufacturer's directions.

I. Application shall proceed only if the surface is dry and clean and the temperature is at least fifty degrees (50°F) and rising, and the surface temperature is not in excess of one hundred forty degrees (140°F). Do not apply coatings when rain is imminent.

J. Each coat in this system must dry completely before next application. Between each coat, inspect entire surface. Any defects should be repaired. Scrape surface to remove any lumps, and broom or blow off all loose matter.

K. Apply one (1) coat of approved Concrete Primer. Application may be with squeegee, broom or roller. Allow primer to dry thoroughly.

L. Approved product finish system shall be applied on the clean, dry underlying surface in 3 applications to obtain a total quantity of not less than 0.15 nor more than 0.23 gallons per square yard of area, based on the material prior to dilution. No application shall be covered by a succeeding application until thoroughly dried.

3.02 LINE MARKINGS

A. Upon completion and acceptance of the surface, Contractor shall prepare and paint lines for tennis. Submit dimensioned layout for approval.

B. All lines are to be applied by painting between masking tape with a paintbrush or roller, according to NFHS requirements.

C. Prime masked lines with approved product. Allow application to dry.

D. Paint lines with approved line paint. Allow application to dry.

E. Remove masking tape immediately after lines are dry.

F. Protect adjacent areas and structures (fences, posts, sidewalks, buildings, etc.), which are not to be coated. In the event that coatings are applied to above, remove immediately before drying is complete.

3.03 COMPLETION

A. Upon completion, the Contractor shall insure proper removal of all construction debris, surplus materials, empty containers and wash water, and shall leave the site in a condition acceptable to the Owner. The court is to be left secure so as to prevent vandalism.

3.04 LIMITATIONS

A. Apply coatings only when ambient temperature is fifty degrees (50°F) and rising, and the surface temperature is not in excess of one hundred forty degrees (140°F).

B. Coatings are waterborne and cannot cure in cold temperatures or when subject to moisture. Care should be taken not to apply coatings when rain is forecast or sudden drop of

temperature is expected. Climatic conditions such as very cool evenings and high dew points dictate that work should be completed early in the day so the coatings can be exposed to enough warm sunlight to form a film before sunset. The opposite applies during times of high heat, low humidity and drying breezes: under these conditions, work very early in the morning or very late in the day. If the product seems to be drying too fast in hot weather, mist the pavement with water to make the application easier. Care must be taken to allow each application to dry thoroughly prior to recoating.

END OF SECTION

SECTION 323113
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fence framework, fabric, and accessories.

B. Wire fabric.

C. Concrete.

D. Manual gates with related hardware.

E. Windscreen.

F. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

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

C. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric 2011a (Reapproved 2022).

D. ASTM A428/A428M - Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles 2021.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.

F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.

G. ASTM F567 - Standard Practice for Installation of Chain-Link Fence 2014a (Reapproved 2019).

H. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and Other Polymer-Coated Steel Chain Link Fence Fabric 2017 (Reapproved 2022).

I. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework 2018 (Reapproved 2022).

J. ASTM F1665 - Standard Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence 2008 (Reapproved 2022).

1.04 SUBMITTALS

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

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, and hardware anchorage.

D. Color samples: provide manufacturer's full range on suitable substrate.

E. Sample copy of warranty.

F. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines [_____].

1.05 QUALITY ASSURANCE

A. The Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified. The on-site supervisor shall not have less than five years of documented experience with the specified system.

1.06 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, materials shall be checked to ensure that no damages occurred during shipping or handling. Damaged materials shall be replaced at no cost to the Owner. Materials shall be stored in such a manner to ensure proper ventilation and drainage and to protect against damage, weather, vandalism and theft.

1.07 WARRANTY

A. Provide in accordance with Contract Closeout Procedures:
   1. Factory finish: 15 years warranty against cracking, peeling, and blistering under normal use.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain Link Fences and Gates:
   1. Ameristar; www.ameristar.com.
      a. Ameristar PermaCoat PC-40 Fence Pipe (commercial weight)
   2. Approved equal.

2.02 MATERIALS – CHAIN LINK STEEL FRAMEWORK

A. Color: the framework shall be Black in accordance with ASTM F934.

B. The steel material used to manufacture Fence Pipe shall be zinc-coated steel strip, galvanized by the hot-dip process conforming to the criteria of ASTM A653/A653M and the general requirements of ASTM A924/A924M.

C. The zinc used in the galvanizing process shall conform to ASTM B6. Weight of zinc shall be determined using the test method described in ASTM A90 and shall conform to the weight range (external and internal) of ASTM F1043, Type B.

D. The framework shall be manufactured in accordance with commercial standards to meet the strength (50,000 psi minimum yield strength) and coating requirements of ASTM F1043, Group IC, Electrical Resistance Welded Round Steel Pipe, heavy industrial weight.

E. The exterior surface of the electrical resistance weld shall be recoated with the same type of material and thickness as the basic zinc coating.

F. The manufactured framework shall complete thermal stratification coating process (multi-stage, high-temperature, multi-layer) including, as a minimum, a six-stage pretreatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish.

G. The material used for the base coat shall be a (gray color) thermosetting epoxy; the minimum thickness of the base coat shall be two (2) mils. The material used for the finish coat shall be a thermosetting "no-mar" TGIC polyester powder; the minimum thickness of the finish coat shall be two (2) mils. The stratification coated pipe shall demonstrate the ability to endure a salt-spray resistance test in accordance with ASTM B117 without loss of adhesion for a minimum exposure time of 3,500 hours. Additionally, the coated pipe shall demonstrate the ability to withstand exposure in a weather-ometer apparatus for 1,000 hours without failure in accordance with ASTM D1499 and to show satisfactory adhesion when subjected to the cross-hatch test, Method B, in ASTM D3359. The polyester finish coat shall not crack, blister or split under normal use.

H. The strength of Fence Pipe shall conform to the requirements of ASTM F1043; the minimum weight shall not be less than 90% of the nominal weight. The strength of line, end, corner and pull posts shall be determined by the use of 4' or 6' cantilevered beam test. The top rail shall be determined by a 10' free-supported beam test. An alternative method of determining pipe strength is by the calculation of bending moment. Conformance with this specification can be demonstrated by measuring the yield strength of a randomly selected piece of pipe from each lot and calculating the section modulus. The yield strength shall be determined according to the methods described in ASTM E8. For materials under this specification, the 0.2 offset method shall be used in determining yield strength. Terminal posts, line posts and top/bottom

rails shall be precut to specified lengths.

2.03 MATERIAL – FENCE FABRIC

A. Color: The coating color for the fence fabric shall be Black. Reference ASTM F668 and ASTM F934.

B. The material for chain link fence fabric shall be manufactured from galvanized steel wire. The weight of zinc shall meet the requirements of ASTM F668, Table 4. Galvanized wire shall be PVC-coated to meet the requirements of ASTM F668.

C. Selvage: Top and Bottom edges shall be knuckled.

D. Wire Size: The size of the steel wire core shall be 0.148; the finished size of the coated wire shall be 6 gauge.

E. Fabric Extrusion Type: Class 2A.

F. Height: reference Drawings.

G. Mesh Size: two inches.

2.04 MATERIAL – FENCE FITTINGS

A. Color: The coating color for the fence fittings shall be Black. Reference ASTM F668 and ASTM F934.

B. The material for fence fittings shall be manufactured to meet the requirements of ASTM F626. The coating for all fittings shall be the same color coating system required for the framework. All fasteners shall be galvanized steel.

2.05 MATERIAL – CHAIN LINK GATES

A. Color: The coating color for the gates shall be Black. Reference ASTM F668 and ASTM F934.

B. Swing gates shall be manufactured and coated to match the fence, and meet the requirements of ASTM F900.

C. Nominal size: reference Drawings.

D. Hardware: Equip gates with manufacturer's standard hardware required for functional operation.

E. Hinges: Size and type as determined by manufacturer. Provide 2 hinges for each leaf up to [6 feet] [1829 mm] height and 1 additional hinge for each additional [24 inches] in height or fraction thereof.

F. Latch: [3/4 inch] slide bolt to accommodate padlock.

G. For double gates provide padlockable, center cane bolt assembly with manufactured strike plate.

H. Wheels: at sliding gates, and swing gates greater than 4' wide, provide gate wheel assembly.

2.06 WINDSCREEN

A. Polypropylene Lathe Leno open mesh windscreen for tennis court.
   1. 9' high.
   2. 4.85 ounce open polypropylene.
   3. Three-ply reinforced hems and built-in brass grommets every 18 inches.
   4. 87% shade and wind factor.
   5. 4 year warranty.
   6. Color as selected by Architect from manufacturer's standards.
   7. Install per manufacturer's instructions.

PART 3 EXECUTION

3.01 FENCE INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Place fabric on spectator side of posts and rails.

C. Provide top rail through line post tops and splice with 6 inch (150 mm) long rail sleeves.

D. Do not stretch fabric until concrete foundation has cured 28 days.

E. Stretch fabric between terminal posts or at intervals of 100 feet (30 m) maximum, whichever is less.

F. Position bottom of fabric 2 inches (50 mm) above finished grade.

G. Fasten fabric to top rail, line posts, braces, and bottom rail with tie wire at maximum 15 inches (380 mm) on centers.

H. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

3.02 GATE INSTALLATION

A. Gate posts shall be spaced according to approved shop drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

B. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm).

B. Maximum Offset From True Position: 1 inch (25 mm).

C. Do not infringe on adjacent property lines.

3.04 CLEANING

A. The Contractor shall clean the jobsite of excess materials.

B. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION

SECTION 329223
SODDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Fertilizing.

D. Sod installation.

E. Maintenance.

1.02 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.03 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding 2006.

1.04 SUBMITTALS

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

B. Certificate: Certify grass species and location of sod source.

1.05 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Project location.

B. Installer Qualifications: Company approved by the sod producer.

1.06 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod in rolls. Protect exposed roots from dehydration.

B. Protect exposed roots from dehydration.

C. Do not deliver more sod than can be laid within 24 hours.

1.08 MAINTENANCE

A. See Section 017000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: TPI, Certified Turfgrass Sod quality; cultivated grass sod; type indicated below; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft (100 sq m). Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.

1. Bermuda Grass Type 'U3'.

B. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay, or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.

C. Fertilizer: Recommended for specified grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated

by analysis.

D. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.02 ACCESSORIES

A. Herbicide: Pre and Post Emergent Herbicide effective for controlling the germination or growth of weeds.

2.03 SOURCE QUALITY CONTROL

A. Provide analysis of topsoil fill under provisions of Section 014000.

B. Submit topsoil testing analysis for review:
   1. Analyze to ascertain percentage of nitrogen, phosphorus, potash soluble salt content, organic matter content, and pH value.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION

A. Scarify subsoil to a depth of 6-inches.

B. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels profile and contours. Make change in grade gradual. Blend slopes into level areas.

C. Remove foreign materials, weeds, and undesirable plants and their roots. Remove contaminated subsoil.

3.03 PLACING TOPSOIL

A. Spread approved topsoil to a minimum compacted depth of six inches over area to be sodded. Prepare until smooth.
   1. Existing topsoil excavated and stockpiled on-site may be utilized.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material while spreading.

D. Grade to eliminate rough, low, or soft areas, and to ensure positive drainage away from structures.

E. Finish ground level firm and sufficient to prevent sinkage pockets when irrigation is applied.

3.04 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions at a rate of 3 lb./100 square feet.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches (50 mm) of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.05 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Remove and dispose of plastic net backing.

C. Lay sod immediately after delivery to site to prevent deterioration. Sod pallet time shall not exceed 24 hours.

D. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches (300 mm) minimum. Do not stretch or overlap sod pieces.

E. Where new sod adjoins existing grass areas, align top surfaces.

F. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1 inch (25 mm) below top of hard surface.

G. Water sodded areas immediately after installation. Saturate sod to 3 inches (76 mm) of soil which is approximately 1-inch of water per day for the first 2-3 weeks.

H. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.06 MAINTENANCE

A. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

B. Contractor shall water (irrigated and non-irrigated) sodded areas as required until grass is well established and exhibits a vigorous growing condition.

C. Mowing:
   1. U3 Bermuda:
      a. Mow grass at regular intervals to maintain at a maximum height of 2-inches. Do not cut more than 1/3 of grass blade at any one mowing.
      b. Mow every 5-7 days during the active growing season.

D. Neatly trim edges and hand clip where necessary.

E. Roll surface to remove irregularities.

F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions for the specified turfgrass type. Remedy damage resulting from improper use of herbicides.

G. Immediately replace sod to areas that show deterioration or bare spots.

H. Watering Post Establishment:
   1. Apply 1-inch of water in a single application about once per week during hot and dry conditions. To promote a deep, durable root system, deep soaking water applications are preferred over short and frequent shallow water applications.

END OF SECTION

SECTION 33 4100

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 & pipes.
   2. Precast concrete manholes.

1.03 DEFINITIONS

A. Retain abbreviations that remain after this Section has been edited.

B. EPDM: Ethylene-propylene-diene-monomer rubber.

C. LLPE: Linear low-density, polyethylene plastic.

D. PE: Polyethylene plastic.

E. PVC: Polyvinyl chloride plastic.

F. TPE: Thermoplastic elastomer.

1.04 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pipe joints shall be at least silt tight, unless otherwise indicated.

1.05 SUBMITTALS

A. Product Data: For the following:
   1. Catch Basins
   2. Pipe and fittings
   3. Manholes
   4. Stormwater Inlets
   5. Trench Drains
   6. End Sections/Headwalls
   7. Pond Outlet

B. Shop Drawings: For the following:
   1. Catch Basins, Pond Outlet, Headwalls, Trench Drains and Stormwater Inlets. Include plans, elevations, sections, reinforcement, 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 manholes, 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.

2. 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 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.

1. HP Storm – Dual Wall – PP Pipe by ADS or approved equal.

B. Polypropylene compound shall be impact modified copolymer meeting the material requirements of ASTM F2881, Section 5 and AASHTO M330, Section 6.1.

2.04 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.

2.05 CONCRETE PIPE AND FITTINGS

A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, with bell-and-spigot or groove and tongue ends.

1. Gasketed joints with ASTM C 443, rubber gaskets, "omni-flex" or equal
2. 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

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.

1. Top-Loading Classification(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.

B. Cast-in-Place Concrete, Catch Basins: Construct of reinforced concrete; designed according to ASTM C 890 for structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
2. Channels and Benches: Concrete.
3. 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.

2.11 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

2.12 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.

2.13 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.

2.14 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

2.15 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318/318R.

2.16 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.

2.18 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.

2.19 **CLEANING**

A. Clean interior of piping of dirt and superfluous materials.

PART 3 EXECUTION

3.01 **EARTHWORK**

B. 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.

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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