

**CONTRACT DOCUMENTS
AND
SPECIFICATIONS
FOR
PROJECT NO. SW-2025-21
ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG**

ATTENDANCE AT PRE-BID CONFERENCE IS MANDATORY

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ERIC LEE, DIRECTOR

Account Numbers:

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Tulsa, Oklahoma 74103
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CONTRACT DOCUMENTS

PROJECT NO. SW-2025-21
ARKANSAS RIVER WEST BANK STABILIZATION

OWRB LOAN NO.ARP-23-0012-DPG

PUBLIC WORKS DEPARTMENT

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**NOTICE TO BIDDERS
SEALED BIDS FOR
PROJECT NO. SW-2025-21 ARP-23-0012-DPG**

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 30th day of January, 2026** for furnishing all tools, materials and labor and performing the work necessary to be done in the construction of the following:

**PROJECT NO. SW-2025-21 ARKANSAS RIVER WEST
BANK STABILIZATION ARP-23-0012-DPG**

The entire cost of the improvement shall be paid from Account No.

Funding for this project is provided through American Rescue Plan Act (ARPA) grant program. As such, compliance with Labor Standards Contract Provisions is mandatory. Compliance with the Davis Bacon Act is mandatory if the total project cost exceeds \$10,000,000 (ten million dollars).

A **MANDATORY** Pre-Bid Conference is scheduled for **Tuesday, January 6, 2026 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 or D.**

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 Contract Administration, 175 E. 2nd St., 13th Floor, Tulsa, OK 74103 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.

This project is to be financed by the ARPA grant program managed by the Oklahoma Water Resources Board (OWRB) and shall be referred to as Project No. ARP-23-0012-DPG. The following requirements and regulations must be complied with:

A. "Equal Opportunity in Employment: All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, age or physical handicap. Bidders on this work will be required to comply with the President's Executive Order No. 11246, as amended. The requirements for bidders and contractors under this order are explained in the specifications."

B. "Each bidder must fully comply with the requirements, terms and conditions of the Environmental Protection Agency's Disadvantaged Business Enterprise Requirements, which have been adopted for the OWRB ARPA program, and include employing the six (6) good faith efforts and soliciting disadvantaged business enterprises during the performance of this contract. Requirements are contained in OWRB's Guidance and Procedures, ARP-267. The bidder commits itself to following the good faith efforts to solicit disadvantaged business enterprises contained herein and all other requirements, terms, and conditions of these bid conditions by submitting a properly signed bid."

C. If the total project cost exceeds \$10,000,000 (ten million dollars) "Davis Bacon Act wage rules shall apply. All laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of Chapter 31 of Title 40, United States Code and 29 CFR parts 1,3, and 5. The Department of Labor provides all pertinent information related to compliance with labor standards, including prevailing wage rates and instructions for reporting. More information is available at <http://www.sam.gov/> and <https://www.dol.gov/agencies/whd/government-contracts/construction>

D. System for Award Management (SAM) registration is required for all Applicants and Awardees (Entities, Prime Contractors, Subcontractors, Vendors) in order to receive funds from the ARPA program. SAM replaced the Central Contractor Registration/Federal Agency Registration, Online Representations and Certifications Application, and Excluded Parties List System. Applicants and awardees are required to complete a one-time free registration to provide basic information relevant to procurement and financial transactions. On April 4, 2022, the unique entity identifier used across the federal government changed from the DUNS Number to the Unique Entity ID (generated by SAM.gov). Registrants must retain an active status to be eligible for ARPA funding. Applicants and Awardees can go to SAM.gov to complete the registration process.

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.

The bidding for this project is subject to a local preference law as defined in Oklahoma Statutes, Title 61, Section 103. For purposes of Section 103 a "local bid" means a bid submitted by a business entity that is authorized to do business in the State of Oklahoma and maintains its primary office or principal place of business within the State of Oklahoma. If the conditions outlined in Title 61 are met, The City of Tulsa must select the second lowest bid if

within 5% of the lowest bid and the second lowest bid is a local bid and the lowest bid is not a local bid (i.e. non-local/out of state). Accordingly, when the local bid is required to be selected under the State law, the local bidder must agree to do the work at the lowest bid price to be awarded the project.

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 30th day of January, 2026.

Dated at Tulsa, Oklahoma, this 19th day of December, 2025.

(SEAL)

Christina Chappell
City Clerk

INSTRUCTIONS TO BIDDERS

B-1. BIDS

Each bid Proposal shall be completed, signed, and submitted. 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. SW-2025-21
ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG**

Pre-qualification Certificate Number _____.

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

All addenda to the contract documents should be denoted on the last page of the Proposal in the space provided.

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 a bidder shall be sufficient reason for rejecting bidder's bid, or shall make any contract between the City of Tulsa and the Contractor that is based on bidder's 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. 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 bidder 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, bidder may submit to Contract Administration and 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. The addendum will be posted on the City of Tulsa website and emailed to all the pre-bid attendees. 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. For all projects that will impact the public, a public meeting is required before any work is done. 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 Statutes, 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

Bound contract documents are no longer required.

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.

Information for Bidders

Notice is hereby given that The City of Tulsa (hereinafter called the "Owner") will receive sealed bids at 175 E. 2nd Street, Ste. 260 Tulsa, OK 74103, Tulsa County, Oklahoma, until the 30th day of January, 2026, for the SW-2025-21 ARKANSAS RIVER WEST BANK STABILIZATION ARP-23-0012-DPG

This project is to be financed by the ARPA grant program managed by the Oklahoma Water Resources Board (OWRB) and shall be referred to as Project No. ARP-23-0012-DPG. The following requirements and regulations must be complied with:

- A. "Equal Opportunity in Employment: All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, age or physical handicap Bidders on this work will be required to comply with the President's Executive Order No. 11246, as amended."
- B. " Each bidder must fully comply with the requirements, terms, and conditions of the Environmental Protection Agency's Disadvantaged Business Enterprise Requirements, which have been adopted for the OWRB ARPA program, and include employing the six (6) good faith efforts and soliciting disadvantaged business enterprises during the performance of this contract. Requirements are contained in OWRB's Guidance and Procedures, ARP-267. The bidder commits itself to following the good faith efforts to solicit disadvantaged business enterprises contained herein and all other requirements, terms, and conditions of these bid conditions by submitting a properly signed bid."
- C. **If the total project cost exceeds \$10,000,000 (ten million dollars)** "Davis Bacon Act wage rules shall apply. All laborers and mechanics employed by contractors and sub-contractors on projects funded directly by or assisted in whole or in part by and through the Federal Government shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of Chapter 31 of Title 40, United States Code and 29 CFR parts 1,3, and 5. The Department of Labor provides all pertinent information related to compliance with labor standards, including prevailing wage rates and instructions for reporting. More information is available at <https://www.dol.gov/agencies/whd/government-contracts/construction> and <http://www.sam.gov/>"

- D. System for Award Management (SAM) registration is required for all Applicants and Awardees (Entities, Prime Contractors, Subcontractors, Vendors) in order to receive funds from the ARPA program. SAM replaced the Central Contractor Registration/Federal Agency Registration, Online Representations and Certifications Application, and Excluded Parties List System. Applicants and awardees are required to complete a one-time free registration to provide basic information relevant to procurement and financial transactions. On April 4, 2022, the unique entity identifier used across the federal government changed from the DUNS Number to the Unique Entity ID (generated by SAM.gov). Registrants must retain an active status to be eligible for ARPA funding. Applicants and Awardees can go to SAM.gov to complete the registration process.

Each sealed envelope containing a bid must be plainly marked on the outside as “Bid for SW-2025-21 ARP-23-0012-DPG”, and the envelope should bear on the outside the bidder’s name, address, and license number (if applicable). If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner at 175 E. 2nd Street, Ste. 260 Tulsa, OK 74103.

All bids must be made on the required bid form, where all blank spaces for bid prices must be filled in, in ink or typewritten. The bid form must be fully completed and executed when submitted. Only one copy of the bid form is required. The Owner may waive any informalities or minor defects or reject any and all bids as allowed under Oklahoma Law. Any bid may be withdrawn prior to the above scheduled time for bid opening, or authorized postponement thereof. Bids received more than ninety-six (96) hours before the time specified, or those received after the time set for bid opening will not be considered and will be returned unopened. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the bidders.

Bidders must satisfy themselves of the accuracy of estimated quantities in the bid proposal by review of the Plans and Specifications, including any existing addenda, and by examination of the project site. Once a bid is submitted, the bidder shall not assert that there was a misunderstanding concerning the quantities or the nature of work to be performed. The failure or omission of any bidder to do any of the foregoing shall in no way relieve any bidder from any obligation in respect to its bid.

Prior to bidding, the Owner shall provide to the bidders all pertinent information that delineates and describes the land owned and rights-of-way acquired or to be acquired.

The Contract Documents contain the provisions required for the construction of the product. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the contractor or relieve the contractor from fulfilling

any of the conditions of the contract.

Each bid exceeding \$100,000 must be accompanied by a Bid Bond for five percent of the total amount of the bid and payable to the Owner. A certified check may be used in lieu of the Bid Bond. As soon as the bid prices have been compared, the Owner will return the bonds of all except the three lowest responsive, responsible bidders. The bid securities of the successful bidder and the two remaining unsuccessful bidders will be returned upon Owner's approval of the successful bidder's executed certificate of insurance and construction bonds.

Construction bonds (Performance, Statutory, and Maintenance) in the amount of 100 percent with a corporate surety approved by the Owner will be required for the faithful performance of the contract. Attorneys-in-fact who sign bid and construction bonds must file with each bond a certified and effective dated copy of their Power-of-Attorney.

The Owner shall award a contract to the lowest, responsive, responsible bidder or bidders within thirty (30) calendar days after bid opening. The Owner may extend the award period not to exceed fifteen (15) calendar days by formal recorded action and for good cause. The time may be extended further by mutual agreement between the Owner and the bidder per O.S. Title 61 Section 111, Public Competitive Bidding Act of 1974 (PCBA).

The Notice of Award shall be accompanied by the necessary contract, bonds, and insurance. In the event of failure of the bidder to execute the contract, the Owner may consider the bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

The party to whom the contract is awarded will be required to execute the contract and obtain the construction bonds (Performance, Statutory and Maintenance) and certificate of insurance within 14 calendar days (not to exceed 60 days) from the date when the Notice of Award is delivered to the bidder. The time may be extended further by mutual agreement between the Owner and the bidder per O.S. Title 61 Section 113 (PCBA).

With an acceptable contract, bonds and certificate of insurance signed by the party to whom the Contract was awarded, the Owner shall sign the contract and return to such party an executed duplicate. Should the Owner not execute the contract within the agreed upon period, the bidder may by written notice withdraw the signed contract. Such notice of withdrawal shall be effective upon its receipt by the Owner.

The Owner shall issue the Notice to Proceed after the execution of the contract, approval of bonds and certificate of insurance. If the Notice to Proceed has not been issued within the agreed upon period, the contractor may terminate the contract without further liability on the part of either party.

The Owner may make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of such bidders fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

A conditional or qualified bid will not be accepted. Tied bids are non-restrictive, and in order for a tied bid to be accepted it must be lower than the sum of low separate bids.

All applicable laws, ordinances, rules, and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout. The successful bidder will be required to meet all requirements of the Underground Facilities Damage Prevention Act when engaged in work within public rights-of-way.

When using alternate bids, they will be listed in numerical order, with the highest priority being number one, the second highest priority being number two, etc. The lowest bidder will be determined by comparing all bids that contain the selected alternates and computing the total value of the base bid plus the alternates.

All bidders and owners shall comply with the Oklahoma PCBA of 1974.

The awarded bidder shall supply the names and addresses of all subcontractors and material suppliers when required to do so by the Owner.

To avoid bypassing of raw sewage during construction, the contractor shall use the methods and/or schedule(s) described in Section _____ of these Specifications, or the method(s) and/or schedule(s) described as follows:

_____.

The Contractor will be required to begin work within 10 calendar days of the date shown on the Notice to Proceed. The time for completion is 240 calendar days. Liquidated damages will be \$ 2500.00 per calendar day.

In the event of a conflict between the Plans and the Specifications, the Specifications will govern.

The following items, included in this Bid Packet, shall be submitted along with the bid: Bid Proposal, Bid Bond, Non-Collusion Affidavit, Business Relationship Affidavit, Contractor's

Statement about Equal Opportunity (ARP-211), Contractor's Certificate of Non-Segregated Facilities (ARP-212), Sub-Contractor's Certificate of Non-Segregated Facilities (ARP-212a) Bidder's/Supplier's List (ARP-249), Subcontractor Performance form (ARP-6100-3), Subcontractor Utilization form (ARP-6100-4) and DBE documentation (if applicable).

The consulting engineer is HISINC, LLC. The consulting engineer's contact person for this project is Bill Smith, with phone number 918-865-6977.

Disadvantaged Business Enterprise Program (DBE) Guidance (ARP-267)

Important note: All OWRB ARPA information can be found at: <https://www.owrb.ok.gov/financing/grant/arpa.php>

The OWRB is administering the State of Oklahoma's ARPA funding for various wastewater and water quality projects. The ARPA program is federally funded, and one of the conditions of federal grant awards is for recipients and sub-recipients (i.e., prime contractors and subcontractors) make a good-faith effort to award a fair share of work to DBEs who are small business enterprises (SBEs), minority business enterprises (MBEs) and women's business enterprises (WBEs).

To ensure compliance with federal DBE requirements, both **Grant Recipients (Project Owners)** and **Prime Contractors** **must** undertake the good faith efforts to provide opportunities for DBE firms to participate in contracts. Federal regulations require evidence of the demonstration of the six good faith efforts in trying to achieve the DBE participation goals. The Oklahoma Department of Transportation has a Directory of Certified DBE Firms. This directory can be accessed at <https://okdot.gob2g.com/Default.asp>

Good Faith Efforts: EPA's Good Faith Efforts for the Clean Water State Revolving Fund (CWSRF) will be used for the OWRB ARPA grant program. The following good faith efforts will apply to all procurement categories involving ARPA funds (See Appendices A& B).

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For state and local government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For state and local government recipients, this will include dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the services and assistance of the Small Business Administration (SBE) and the Minority Business Development Agency of the Department of Commerce.
6. If the prime contractor awards subcontracts, require the prime contractor to take the above steps.

Please submit all information to:

Financial Assistance Division, OWRB
3800 North Classen Blvd, Oklahoma City, OK 73118
Phone: 405.530.8800, FAX: 405.530.8900
<http://www.owrb.ok.gov>

Disadvantaged Business Enterprise Program (DBE) Guidance

Demonstration of the Six Good Faith Efforts. See Appendices A & B for additional bidding instructions and contract administrative provisions.

A: Project Owners are required to create and maintain a bidders list in accordance with Subpart E of Part 33 of EPA's Disadvantaged Business Enterprise Program rule, (§ 33.501(b)). This requirement will be adopted for projects funded through the OWRB ARPA program. The list must include all firms that bid or quote on prime contracts, or bid or quote subcontracts, on competitively bid ARPA funded projects. The bidders list must only be kept until the project period for the identified grant has ended. The following information must be obtained from all prime and subcontractors and can be provided on Bidders List (ARP-249):

1. Entity's name with point of contact
2. Entity's mailing address, telephone number, and e-mail address
3. The procurement on which the entity bid or quoted, and when; and
4. Entity's status as an MBE/WBE or non-MBE/WBE

B: Project Owners are required to undertake good faith efforts. Steps 1 through 5 can be utilized during the project planning, design and/or pre-bidding phase, to assure that qualified DBE firms have procurement opportunities in construction, equipment, services, and supplies.

To provide procurement opportunities to DBE Firms, the Project Owner should undertake the following:

- Conduct pre-bid meetings to inform potential bidders/contractors about DBE requirements and provide guidance in undertaking the required good faith efforts.
- Use listings of certified DBEs from the U.S. Small Business Administration (SBA), Oklahoma Department of Transportation (ODOT), etc., to solicit DBE firms as prime contractors whenever they are potential candidates. Project Owners should advertise in minority, local and regional newspapers.
- Invite DBE firms, where appropriate, to meetings, conferences etc., to inform them of procurement opportunities and develop, where possible, reasonable contract and delivery schedules that encourage and facilitate participation by DBE's. This includes, whenever possible, a minimum of 30 calendar days for bids or request for proposals.
- Determine if a project can be broken down into smaller components/contracts to allow opportunity for DBE firms to bid both as prime-contractors and as sub-contractors.
- For projects broken down into smaller components (e.g., painting, roofing, excavation, pipe laying, etc.,) ensure that the delivery schedules are reasonable.
- Encourage DBE firms, where appropriate, to apply as a consortium of DBEs, when a contract is too large for one of these firms to handle individually.
- **Require prime contractor to complete ARP Form 6100-3 & ARP Form 6100-4 and submit with bid proposal to Project Owner.**

C: Project Owners must require the prime contractor to undertake steps 1 through 5 of the Good Faith Efforts in providing DBE firms opportunity for sub-contracts.

Project Owner must provide the **DBE Guidance (ARP-267)** and associated forms to Prime Contractors for utilization of DBEs in the bidding documents.

**APPENDIX A: Project Owner, Prime Contractor and
Sub-Contractor Responsibilities**

EPA's Disadvantaged Business Enterprise Program rule applies to contract procurement actions funded in part by EPA assistance agreements awarded after May 27, 2008. The rule is found at Federal regulation Title 40, Part 33. Specific responsibilities are highlighted below.

Project Owner Responsibilities:

- Include OWRB's DBE guidance (ARP-267) in each contract with a primary contractor.
- Employ the six Good Faith Efforts during prime contractor procurement (§33.301).
- Require prime contractor to comply with the following prime contractor requirements of Title 40 Part 33:
 - a) To employ the six Good Faith Efforts steps in paragraphs (a) through (e) of § 33.301 if the prime contractor awards subcontracts (§ 33.301(f)).
 - b) To provide **ARP form 6100-2 – DBE Subcontractor Participation Form to all DBE subcontractors** (Optional submittal by subcontractors) (§ 33.302(e)).
 - c) To submit **ARP form 6100-3 – DBE Program Subcontractor Performance Form** and **ARP form 6100-4 – DBE Program Subcontractor Utilization Form with bid package or proposal.** (§ 33.302 (f) and (g)).
 - d) To pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the recipient (§ 33.302(a)).
 - e) To notify recipient in writing by its prime contractor prior to any termination of a DBE subcontractor for convenience by the prime contractor (§ 33.302(b)).
 - f) To employ the six good faith efforts described in § 33.301 if soliciting a replacement subcontractor after a DBE subcontractor fails to complete work under the subcontract for any reason. (§ 33.302(c)).
 - g) To employ the six good faith efforts described in § 33.301 even if the prime contractor has achieved its fair share objectives under subpart D of Part 33. (§33.302(d)).
 - h) Provide Project Owner DBE participation achievements with bid proposal – this includes all information necessary for the Owner to complete the **Bidders List (ARP-249)**. The Owner may allow the prime contractor to complete the **Bidders List (ARP-249)**; however, the Owner is responsible for review and submittal.
- Maintain records documenting compliance with the requirements of Title 40 Part 33, including **Bidders List (ARP-249)** and documentation of the good faith efforts (§ 33.301(a)) by the project owner and prime contractor.

Prime Contractor Responsibilities:

- Employ the six Good Faith Efforts steps in paragraphs (a) through (e) of § 33.301 if the prime contractor awards subcontracts (§ 33.301(f)).

- Provide **ARP form 6100-2 – DBE Program Subcontractor Participation Form** and **ARP form 6100-3 – DBE Program Subcontractor Performance Form** to each DBE subcontractor as part of the bid conference and prior to opening of the contractor's bid or proposal (§ 33.302(e) and (f)). Complete **ARP form 6100-4 – DBE Program Subcontractor Utilization Form** (§ 33.302(g)).
- Submit to recipient with bid package or proposal the completed **ARP form 6100-4**, plus an **ARP form 6100-3** for each DBE subcontractor used in the contractor's bid or proposal (§ 33.302(f) and (g)).
- Pay subcontractors for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the Project Owner (§ 33.302(a)).
- Notify the recipient in writing prior to prime contractor termination of a DBE subcontractor for convenience (§ 33.302(b)).
- Employ the six good faith efforts described in (§ 33.301) if soliciting a replacement subcontractor after a DBE subcontractor fails to complete work under the subcontract for any reason. (§ 33.302(c)).
- Employ the six good faith efforts described in (§ 33.301) even if the prime contractor has achieved its fair share objectives under subpart D of Part 33. (§33.302(d)).
- Provide Project Owner DBE participation achievements with bid proposal. This includes information necessary for Owner's completion of the **Bidders List (ARP-249)**.
- Maintain records documenting its compliance with the requirements of Title 40 Part 33, including **Bidders List (ARP-249)** and documentation of the good faith efforts (§ 33.301(a)) by the project owner and prime contractor.

Subcontractor Responsibilities:

- May submit **ARP form 6100-2 – DBE Subcontractor Participation Form** to Debra Bradford, EPA Region 6 DBE Coordinator (§ 33.302(e)). Submitted if concerns with EPA funded project (e.g., termination, late payment, etc.)
- Must complete **ARP form 6100-3 – DBE Program Subcontractor Performance Form** and submit it to the prime contractor soliciting services from the subcontractor prior to the opening of bids for the prime contract.

Summary of ARP Forms

ARP Form	Requirement	Provided By	Completed By	Submitted To
6100-2: DBE Subcontractor Participation Form	Project Owners required to have prime contractors provide form to Subcontractors	Prime Contractors to DBE Subcontractors	DBE Subcontractors if concerns with EPA funded project (e.g., termination, late payment, etc.)	EPA Region 6 DBE Coordinator, Debora Bradford
6100-3: DBE Subcontractor Performance Form	Project Owners required to have prime contractors provide form to Subcontractors	Prime Contractors to DBE Subcontractors	DBE Subcontractors with Prime Contractor's Signature. Completed when bidding on a job.	Project Owners as part of a bid or proposal package
6100-4: DBE Subcontractor Utilization Form	Project Owners required to have prime contractors complete the form	Project Owners to Prime Contractors	Prime Contractors to indicate the utilization of a DBE.	Project Owners as part of bid or proposal

APPENDIX B: TITLE 40 PART 33 SUBPART C—GOOD FAITH EFFORTS

§ 33.102 When do the requirements of this part apply?

The requirements of this part apply to procurement under ARPA Grant program agreements performed entirely within the United States, whether by a Project Owner or its prime contractor, for construction, equipment, services, and supplies.

§ 33.106 What assurances must ARPA Grant program recipients obtain from their contractors?

The recipient must ensure that each procurement contract it awards contains the term and condition specified in Appendix A to this part concerning compliance with the requirements of this part.

§ 33.206 Is there a list of certified MBEs and WBEs?

The Oklahoma Department of Transportation has a Directory of Certified DBE Firms. This database can be found at this website: <https://okdot.gob2g.com/Default.asp>.

§ 33.301 What does this subpart require?

A recipient, including one exempted from applying the fair share objective requirements by § 33.411, is required to make the following good faith efforts whenever procuring construction, equipment, services, and supplies under an ARPA Grant program agreement, even if it has achieved its fair share objectives under subpart D of this part:

- a) Ensure DBEs are made aware of contracting opportunities fully practicable through outreach and recruitment activities. For State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
- b) Make information on forthcoming opportunities available to DBE's, arrange periods for contracts, and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
- c) Consider in the contracting process whether firms competing for large contracts could subcontract with DBE's. For state and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
- d) Encourage contracting with a consortium of DBE's when a contract is too large for one of these firms to handle individually.
- e) Use the services and assistance of the SBA and the Minority Business Development Agency of the Department of Commerce.
- f) If the prime contractor awards subcontracts, require the prime contractor to take the steps in paragraphs (a) through (e) of this section.

§ 33.302 Are there any additional contract administration requirements?

- a) Project Owners must require its prime contractor to pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the recipient.
- b) Its prime contractor must notify Project Owner in writing prior to any termination of a DBE subcontractor for convenience by the prime contractor.
- c) If a DBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the six good faith efforts described in § 33.301 if soliciting a replacement subcontractor.
- d) A project owner must require its prime contractor to employ the six good faith efforts described in §33.301 even if the prime contractor has achieved its fair share objectives under §33.301 subpart D above.

- e) A recipient must require its prime contractor to provide **ARP Form 6100-2**—DBE Program Subcontractor Participation Form to all of its DBE subcontractors. **ARP Form 6100-2** gives a DBE subcontractor the opportunity to describe the work the DBE subcontractor received from the prime contractor, how much the DBE subcontractor was paid and any other concerns the DBE subcontractor might have, for example reasons why the DBE subcontractor believes it was terminated by the prime contractor. DBE subcontractors may send completed copies of **ARP Form 6100-2** directly to the appropriate EPA DBE Coordinator.
- f) A recipient must require its prime contractor to have its DBE subcontractors complete **ARP Form 6100-3**—DBE Program Subcontractor Performance Form. A recipient must then require its prime contractor to include all completed forms as part of the prime contractor's bid or proposal package.
- g) A recipient must require its prime contractor to complete and submit **ARP Form 6100-4**—DBE Program Subcontractor Utilization Form as part of the prime contractor's bid or proposal package.
- h) Copies of **ARP Form 6100-2**—DBE Program Subcontractor Participation Form, **ARP Form 6100-3**—DBE Program Subcontractor Performance Form and **ARP Form 6100-4**—DBE Program Subcontractor Utilization Form may be obtained from EPA OSDBU's Home Page on the Internet or directly from EPA OSDBU.
- i) A recipient must ensure that each procurement contract it awards contains the term and condition specified in the Appendix A concerning compliance with the requirements of this part. A recipient must also ensure that this term and condition is included in each procurement contract awarded by an entity receiving a grant under federal financial assistance agreement.

§ 33.410 Can a recipient be penalized for failing to meet its fair share objectives?

A recipient cannot be penalized or treated by EPA as being in noncompliance with this subpart, solely because its MBE or WBE participation does not meet its applicable fair share objective. However, EPA may take remedial action under § 33.105 for a recipient's failure to comply with other provisions of this part, including, but not limited to, the good faith efforts requirements described in subpart C of this part.

Source: *Federal Requirements and Contract Provisions for Special Appropriation Act Projects, US Environmental Protection Agency, Region III, June 2008*

APPENDIX C: RESOURCE LISTING AND CONTACT INFORMATION
FOR UTILIZATION OF MINORITY AND WOMEN'S BUSINESS ENTERPRISES

Resource Listing	Contact Information	Website if applicable
U.S. Small Business Administration (SBA) In addition to the national office, the SBA has local district and regional offices to assist small businesses in contracting with the public and private sector.	US Small Business Administration 409 3rd St, SW Washington DC 20416 Phone: 800-827-5722	https://www.sba.gov/
U. S. Small Business Administration (SBA) - OK. District Office	301 NW 6 th St. Oklahoma City, OK 73102 Phone: 405.609.8000	https://www.sba.gov/offices/district/ok/oklahoma-city
Minority Business Development Administration (MBDA): The MBDA is an agency within the U.S. Dept. of Commerce, created to foster the development and growth of minority businesses in the U.S. and coordinates resources in the public and private sectors to help MBEs.	1401 Constitution Ave NW Washington, D.C. 20230 Email: support@mbda.gov Phone: (202) 482-2000	http://www.mbda.gov/
Standard Industrial Classification Codes (SIC) or North American Industry Classification System (NAICS) codes visit the websites.	U.S. Bureau of Labor Statistics Postal Square Building, 2 Massachusetts Ave. NE Washington, DC 20212-0001 Phone: 1-202-691-5200	http://www.bls.gov/iag/tgs/iag_index_naics.htm
Oklahoma Department of Transportation (ODOT) and the <u>Minority/Disadvantaged Business Enterprise (ODOT – MBE/DBE)</u> . Project Owners and bidders may locate qualified M/WBE's through the MBE/WBE Directory	200 NE 21 st Street Oklahoma City, OK 73105 Phone: 405.521.2082	https://okdot.gob2g.com/Default.asp .
US EPA Office of Small and Disadvantaged Business Utilization (OSDBU): advocates and advances the business, regulatory, and environmental compliance concerns of small and socio-economically disadvantaged businesses. The Small Business Vendor Profile System contains information of number of small and disadvantaged companies registered with OSDBU.	USEPA Office of Small Programs 1200 Pennsylvania Ave. NW Mail Code 1230T Washington, D.C. 20460 Phone: 202 566-2075	https://www.epa.gov/aboutepa/about-office-small-and-disadvantaged-business-utilization-osdbu Select "search the OSBP Registry" Click on the search criteria of interest (ethnicity, size, SIC, etc.)

National Black Chamber of Commerce	4400 Jenifer St NW #331, Washington, DC 20015 Phone: 202 466-6888 Fax: 202 466-4918 Email: info@nationalbcc.org	http://www.nationalbcc.org
U.S. Hispanic Chamber of Commerce	424 K St NW #401, Washington, DC 20005 Phone: (202) 842-1212	http://www.usbcc.com
National Association of Minority Contractors (NAMC)	910 17th Street, NW, Suite 413 Washington, DC 20006 Phone: 202.296.1600 info@namcnational.org	http://namcnational.org/
National Association of Women's Business Owners (NAWBO)	601 Pennsylvania Ave NW South Building, Ste 900 Washington, DC 20004 Phone: 800-556-2926 Fax: 202-403-3788	www.nawbo.org
National Minority Supplier Development Council, Inc. (NMSDC)	1359 Broadway, 10th Floor, Suite 1000 New York, NY 10018 Phone: (212) 944-2430 Fax: (212) 719-9611	http://www.nmsdc.org/
Native American Development Corporation (NADC) - provides technical assistance, financial lending opportunities, and champions small businesses	17 N. 26th St. Billings, MT 59101 Phone: (406) 259-3804 Fax: (406) 259-4569 Email: nadceptac@nadc-nabn.org	http://www.nadc-nabn.org/
City of Tulsa – Small Business Enterprise Program Maintains a list of Minority and Female business Enterprises that are certified through the “building Resources in Developing and Growing Enterprises	175 E. 2nd St. Tulsa, OK. 74103 Phone: (918) 596-7818	https://www.cityoftulsa.org/developmentbusiness/small-business-enterprise-program/ Click on the ‘member list’
Southwest Minority Supplier Development Council: Maintains lists of certified Minority Business Enterprises in Oklahoma	7301 Broadway Ext Ste 224, OKC, OK 73116 Phone: (405) 767-9900	http://www.smsdc.org/

National Association of Women in Construction (NAWIC)	327 S. Adams Street Fort Worth, TX 76104 Phone: 800-552-3506 817.877.5551 Fax: 817.877.0324	http://www.nawic.org/
Bureau of Indian Affairs - Maintains a list of Native American Contractors and Suppliers by Trade	P.O. Box 368 (1 Mile North on Hwy 281) Anadarko, OK 73005 Phone: (405) 247-6673 Fax: (405) 247-5611	https://www.bia.gov/as-ia/ieed/division-economic-development/native-american-business-development
Oklahoma Department of Commerce Certification Programs and information	900 N Stiles Ave. Oklahoma City, OK 73104 Phone: (405) 815-6552 Toll-Free: (800) 879-6552	https://www.okcommerce.gov/doing-business/#business-services
Cherokee Nation Tribal Employment Rights Office - Maintains a directory of Indian-owned businesses	Cherokee Nation TERO Dept. P.O. Box 948 Tahlequah, OK 74465 Phone: (918) 453-5334 or Toll Free: 800-256-0671 ext. 5334	http://cherokeetero.com/

ARP-249 BIDDERS/SUPPLIERS LIST

To be completed by Project Owner with documentation from all bidding Prime Contractors & Subcontractors
(List of all firms that bid or quote on **Prime Contracts** and **Subcontracts** on the project including Services and Supplies)

Project Name: _____ OWRB Project Number: ARP- ____ - ____ - ____

Company Name:	
Address:	
Contact Name:	
Phone:	
Email:	
Quote/Bid Amount (\$)	
Date:	
Utilized: Yes <input type="checkbox"/> No <input type="checkbox"/>	If utilized and >\$10,000 then ARP 212a form is required (from all subcontractors and suppliers).
DBE: Yes <input type="checkbox"/> No <input type="checkbox"/>	If yes , MBE or WBE? _____ Check one: Construction <input type="checkbox"/> Equipment <input type="checkbox"/> Services <input type="checkbox"/> Supplies <input type="checkbox"/> ARP 6100-3 form is required for all DBEs that bid/quote, even if not utilized . <u>Submit with Bidders List.</u> If utilized submit the following with Bidders List: <ul style="list-style-type: none"> A copy of the companies MBE or WBE certificate is required. ARP 6100-4 form is also required.

Company Name:	
Address:	
Contact Name:	
Phone:	
Email:	
Quote/Bid Amount (\$)	
Date:	
Utilized: Yes <input type="checkbox"/> No <input type="checkbox"/>	If utilized and >\$10,000 then ARP 212a form is required (from all subcontractors and suppliers).
DBE: Yes <input type="checkbox"/> No <input type="checkbox"/>	If yes , MBE or WBE? _____ Check one: Construction <input type="checkbox"/> Equipment <input type="checkbox"/> Services <input type="checkbox"/> Supplies <input type="checkbox"/> ARP 6100-3 form is required for all DBEs that bid/quote, even if not utilized . <u>Submit with Bidders List.</u> If utilized submit the following with Bidders List: <ul style="list-style-type: none"> A copy of the companies MBE or WBE certificate is required. ARP 6100-4 form is also required.

Company Name:	
Address:	
Contact Name:	
Phone:	
Email:	
Quote/Bid Amount (\$)	
Date:	
Utilized: Yes <input type="checkbox"/> No <input type="checkbox"/>	If utilized and >\$10,000 then ARP 212a form is required (from all subcontractors and suppliers).
DBE: Yes <input type="checkbox"/> No <input type="checkbox"/>	If yes , MBE or WBE? _____ Check one: Construction <input type="checkbox"/> Equipment <input type="checkbox"/> Services <input type="checkbox"/> Supplies <input type="checkbox"/> ARP 6100-3 form is required for all DBEs that bid/quote, even if not utilized . <u>Submit with Bidders List.</u> If utilized submit the following with Bidders List: <ul style="list-style-type: none"> A copy of the companies MBE or WBE certificate is required. ARP 6100-4 form is also required.

ARP-6100-2 DBE Subcontractor Participation Form

OWRB American Rescue Plan Act Grant Recipients must require prime contractors to provide this form to their DBE subcontractors. This form gives a DBE subcontractor the opportunity to describe work received and/or report any concerns regarding the project.

Subcontractor Name		Project Name	
Bid/Proposal No.		Point of Contact	
Address			
Telephone No.		Email address	
Prime Contractor Name		Funding entity Oklahoma Water Resources Board	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.

Subcontractor Signature	Print Name
Title	Date

ARP-6100-3 DBE Subcontractor Performance Form

This form is intended to capture the DBE₁ subcontractor's₂ description of work to be performed and the price of the work submitted to the prime contractor. OWRB American Rescue Plan Act Grant Recipients must require prime contractors to provide this form to their DBE subcontractors.

Subcontractor Name		Project Name	
Bid/Proposal No.		Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Funding Entity Oklahoma Water Resources Board	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Price of Work Submitted to the Prime Contractor
DBE Certified By: <input type="checkbox"/> DOT <input type="checkbox"/> SBA <input type="checkbox"/> Other: _____		Meets/ exceeds EPA certification standards? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Unknown

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	Date

Subcontractor Signature	Print Name
Title	Date

ARP-6100-4 DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE¹ subcontractors² and the estimated dollar amount of each subcontract. OWRB American Rescue Plan Act Grant Recipients must require their prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name	Project Name	
Bid/Proposal No.		Point of Contact
Address		
Telephone No.	Email address	
Funding Entity Oklahoma Water Resources Board		

I have identified potential DBE certified Subcontractors	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
If yes, please complete the table below. If no, please explain:			
Subcontractor Name/ Company Name	Company Address/ Phone/ Email	Est. Dollar Amt.	Currently DBE Certified?

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	Date

Bidder's Statement about: **Equal Opportunity Clause (ARP-211)**

Mark **one**:

☐ I have participated in previous contract(s) or subcontract(s) subject to the equal opportunity clause under Executive Orders 11246 and 11375 or preceding Executive Orders 10925 and 11114. I have filed all reports due under the requirements contained in 40 CFR, Part C, 8.11.

☐ I have not participated in previous contract(s) subject to the equal opportunity clause under Executive Orders 11246 and 11375 or preceding Executive Orders 10925 and 11114.

☐ I will obtain a similar statement from any proposed subcontractor(s), when appropriate.

Bidder's Statement about: **Non-Segregated Facilities (ARP-212 and ARP-212a)**

☐ I hereby certify that I do not and will not maintain any facilities provided for my employees in a segregated manner or permit my employees to perform their services at any location under my control where segregated facilities are maintained; and that I will obtain a similar certification prior to the award of any subcontract exceeding \$10,000 which is not exempted from the equal opportunity clause.

Bidder's Statement about: **Bonds**

☐ I hereby certify that I will obtain and provide a Bid Bond along with my Bid.

☐ I hereby certify that, in the event of being awarded a Contract, I will provide a Performance Bond for 100% of the contract amount.

☐ I hereby certify that, in the event of being awarded a Contract, I will provide a Statutory/Payment Bond for 100% of the contract amount.

☐ I hereby certify that, in the event of being awarded a Contract, I will provide a Maintenance Bond for at least 1 year after construction completion, and 100% of the contract amount

Bidder's Statement about: **sam.gov registration**

Mark **one**:

- ☐ I have registered in SAM.gov and my status is "active".
- ☐ I am not currently registered in SAM.gov, but I will be registered and holding an "active" status prior to the beginning of any construction.

- ☐ I certify that I will actively review the SAM.gov status of all of the subcontractors in this work to verify they are registered and their status is "active".

Bidder's Statement about: **Davis Bacon Act**

If the total project cost exceeds \$10,000,000 (ten million dollars):

- ☐ I hereby certify that all of my employees will be paid according to the Davis Bacon Act.

Name and Title of Prospective Prime Contractor's Representative

Signature of Prospective Prime Contractor's Representative

Name and address of Prospective Prime Contractor

AFFIDAVITS

State of _____ ss.
County of _____

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid.

Non-Collusion

Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any government official or employee as to quantity, quality, or price in the prospective contract, or any other terms of said prospective contract; or in any discussions between bidders and any government official concerning exchange of money or other value for special consideration in the letting of a contract; that the bidder/contractor had not paid, given or donated or agreed to pay, give or donate to any officer or employee of the _____ (or other entity) any money or other thing of value, either directly or indirectly in the procurement of a contract or pursuant to this bid.

Business Relationships

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 relationship herein above mentioned exists, affiant should so state.

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

Notary Public Signature

My Commission Expires: _____

CLAIM OR INVOICE AFFIDAVIT

State of _____ ss.
County of _____

The undersigned (engineer or supervisory official), of lawful age, being first duly sworn, on oath says that this (invoice, claim, or contract) is true and correct. Affiant further states that the (work, services, or materials) as shown by this invoice or claim have been (completed or supplied) in accordance with the plans, specifications, orders, or requests furnished to the affiant. Affiant further states that (s)he has made no payment, given, or donated or agreed to pay, give, or donate, either directly or indirectly, to any elected official, officer, or employee of the State of Oklahoma, of money or any other thing of value to obtain payment or the award of this contract.

Engineer/Supervisory Official signature

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

Notary Public signature

My Commission Expires: _____

NOTICE OF AWARD

Date: ____/____/____

Project: _____

Grant#: ARP-____-____-____

The _____ has considered the bid submitted by
Owner
_____ for the above referenced project in response to the
Contractor
Advertisement for Bids dated ____/____/____ and Information for Bidders. You are hereby notified
that your bid has been accepted for items in the amount of \$_____.

You are required per the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Statutory Bond, Maintenance Bond, and Certificate of Insurance within ____ calendar days from the date of this Notice. If you fail to provide these in the specified time, the Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

Owner's Authorized Representative signature

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by _____,
Contractor's Representative name

Authorized Representative of _____.
Contractor

Contractor's Authorized Representative signature

____/____/____
Date

AGREEMENT

This Agreement made this ____ day of _____, 20____ between _____
(hereinafter called the Owner) and _____ (hereinafter called the Contractor).

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the work for:

_____.

2. The Contractor will furnish all of the materials, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the project described herein.

3. The Contractor will commence the work required by the Contract documents within _____ calendar days after the date of the Notice to Proceed and will complete the same within _____ calendar days unless the period for completion is extended otherwise.

4. The Contractor agrees to perform all the work described in the Contract documents and comply with the terms therein for the sum of \$ _____ or as shown in the Bid Schedule.

5. The term "Contract documents" means and includes the following:

- | | |
|--------------------------------------|------------------------------|
| (A) Advertisement for Bids | (I) Standard Requirements |
| (B) Information for Bidders | (J) Statutory Bond |
| (C) Bid Proposal | (K) Performance Bond |
| (D) Bid Schedule | (L) Maintenance Bond |
| (E) Business Relationships Affidavit | (M) Certificate of Insurance |
| (F) Non-collusion Affidavit | (N) Notice of Award |
| (G) Bid Bond | (O) Notice to Proceed |
| (H) Agreement | (P) Change Order |
| (Q) Drawings prepared by _____. | |

Numbers _____ through _____ and dated ____/____/____.

(R) Specifications prepared by _____, dated ____/____/____.

(S) ADDENDA:

No. _____, dated ____/____/____

No. _____, dated ____/____/____

No. _____, dated ____/____/____

No. _____, dated ____/____/____

6. The Owner will pay to the Contractor in the manner and at such times as set forth in the Standard Requirements such amounts as required by the Contract documents.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

8. It is understood that the following are also required of the Contractor in performance of this contract:

- a. Liquidated damages for failure to complete the work within the time specified shall be assessed at the rate of \$_____ per day for each additional calendar day until the work is completed.
- b. Contractor shall comply with the Underground Facilities Damage Prevention Act (63 O.S. 42.1 et seq.).

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in _____ copies each of which shall be deemed an original on the date first above written.

_____ Owner's Authorized Representative	_____ Title	_____ Signature	_____ / / Date
_____ Attested by	_____ Title	_____ Signature	_____ / / Date
_____ Contractor's Authorized Representative	_____ Title	_____ Signature	_____ / / Date
_____ Attested by	_____ Title	_____ Signature	_____ / / Date

NOTICE TO PROCEED

Date: ____/____/____

Project: _____

Grant#: ARP-____-____-____

Notice is hereby given to _____ to commence work on the above
Contractor
referenced project on or before ____/____/____. In accordance with the Agreement dated
____/____/____, you are to complete the work within ____ consecutive calendar days. The date of
completion of all work is ____/____/____.

Owner's Authorized Representative signature

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by _____,
Contractor's Representative name

Authorized Representative of _____.
Contractor

Contractor's Authorized Representative signature

____/____/____
Date

**CERTIFICATE OF APPROVAL OF CONTRACTS AND BONDS BY LOCAL
ATTORNEY**

I, the undersigned _____,
the duly authorized and acting legal representative of the _____,
after careful examination of the Contract between this Entity and
_____, and the surety bonds given by the contractor in
connection with the performance of said contract, do hereby certify that:

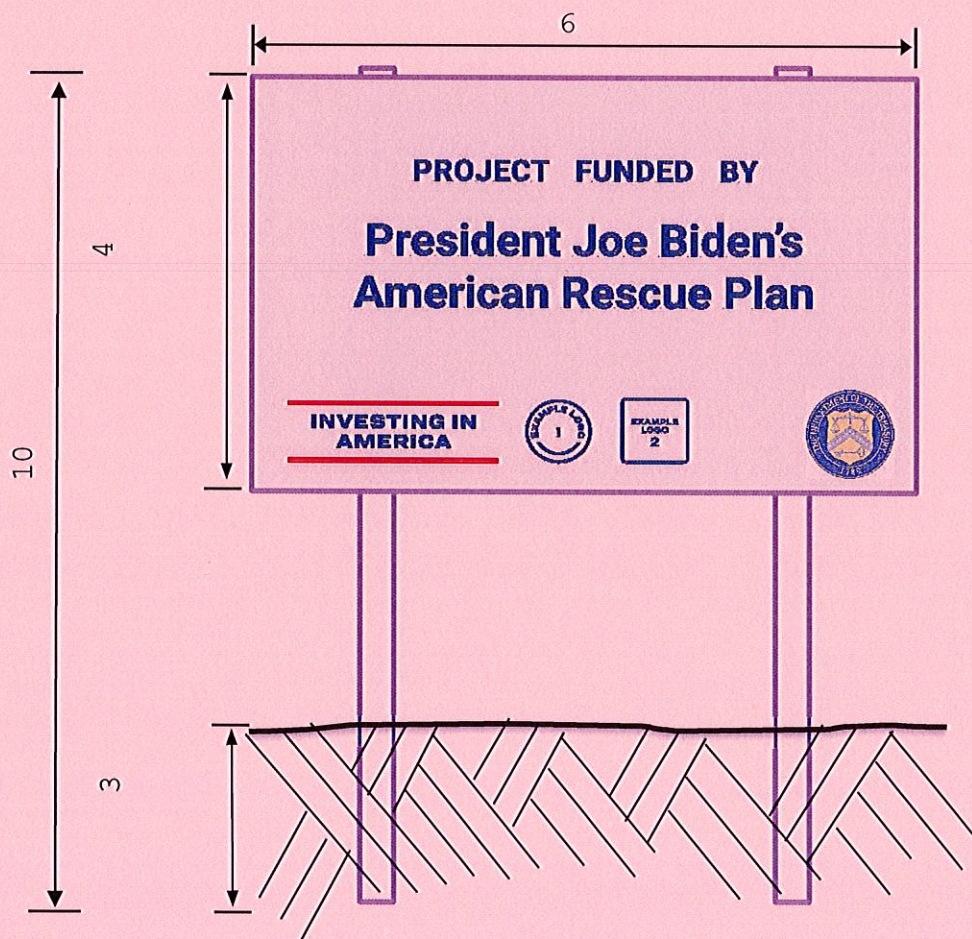
1. Each of the aforesaid agreements has been duly executed by the proper parties thereto, acting through their duly authorized representatives.
2. Said representatives have full power and authority to execute said agreements on behalf of the respective parties named therein.
3. The foregoing contract and surety bonds, as applicable, constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Dated this ____ day of _____, 20____.

Attorney's signature

PROJECT SIGN

- The general contractor shall erect and maintain for the life of the construction contract a suitable sign, 4' x 6' in size, and detailed hereon. Content of the Project sign should comply with the attached "Investing in America" signage guidelines, including use of the Department of Treasury logo found at https://www.state.gov/asia-edge-enhancing-development-and-growth-through-energy/seal_of_the_united_states_department_of_the_treasury/
- Sign shall be professionally painted. No separate bid item. Sign shall be the general obligation of the Contractor.
- The OWRB logo is required on the project sign if the project is funded in part with OWRB Financial Assistance Program funds. The OWRB logo is available at <http://www.owrb.ok.gov/about/index.php> or may be provided directly by OWRB.
- Redwood Posts shall be 4" x 4" x 10' buried securely a minimum of 3 feet below ground.
- Sign face shall be constructed of 3/4" x 4' x 6' – 5 ply Dura-plywood board & mounted to Posts with four (4) 5/8" x 6" Carriage Bolts.



INVESTING IN AMERICA

Investing In America Signage Guidelines

The Bipartisan Infrastructure Law

The CHIPS and Science Act

The Inflation Reduction Act

The American Rescue Plan

Last Updated: March 2, 2023



Office of Digital Strategy
White House Office, EOP

Meena Yi
Abbey Pitzer

Variations and Usage



There is one approved mark associated with the Investing In America logo. To preserve the integrity of the Investing In America logo mark, make sure to apply them correctly. Altering, distorting, or recreating the ‘marks’ in any way weakens the power of the image and what it represents. Layout and design of signs and communication materials will vary, so care must be taken when applying the logo mark.

Primary Logo Mark



Colors

The colors, graphics, and fonts used should conform to graphic standards.

COLOR	CMYK	RGB	HEX	PMS
 Blue	83, 48, 0, 48	22 / 68 / 132	#164484	PMS 7687 C
 Red	0, 100, 81, 0	255 / 0 / 49	#FF0031	PMS 185 C
 White	2, 2, 0, 3	242 / 244 / 248	#F2F4F8	Bright White

Logos



**INVESTING IN
AMERICA**

The logo consists of the words "INVESTING IN" stacked above "AMERICA" in a bold, blue, sans-serif font. The text is centered and flanked by two horizontal red lines, each composed of three parallel strokes.

White background: logo in red and blue



**INVESTING IN
AMERICA**

The logo consists of the words "INVESTING IN" stacked above "AMERICA" in a bold, blue, sans-serif font. The text is centered and flanked by two horizontal red lines, each composed of three parallel strokes.

Gray background: logo in red and blue

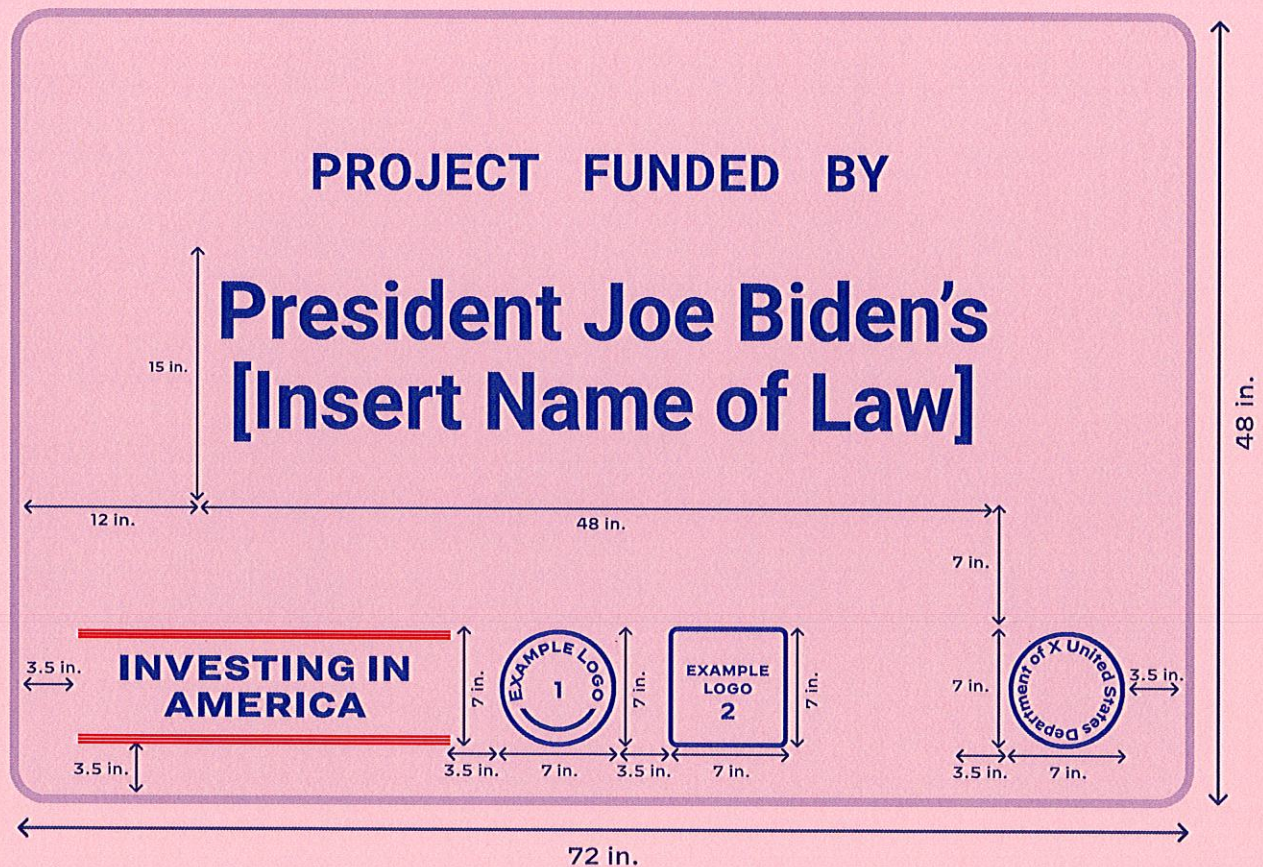


**INVESTING IN
AMERICA**

The logo consists of the words "INVESTING IN" stacked above "AMERICA" in a bold, white, sans-serif font. The text is centered and flanked by two horizontal white lines, each composed of three parallel strokes.

Blue background: logo in all white

Investing In America General Guidelines for Logo Applications



Sign Colors

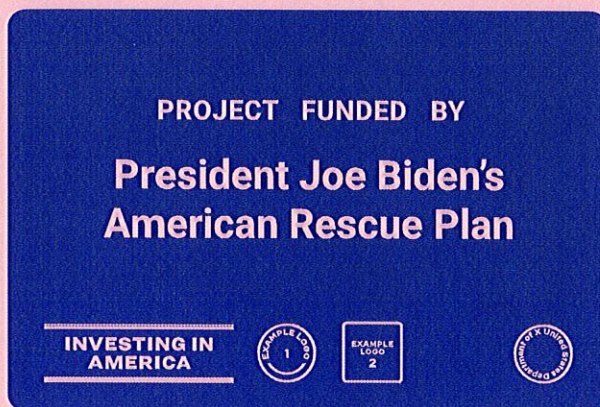
4. The American Rescue Plan



White



Gray

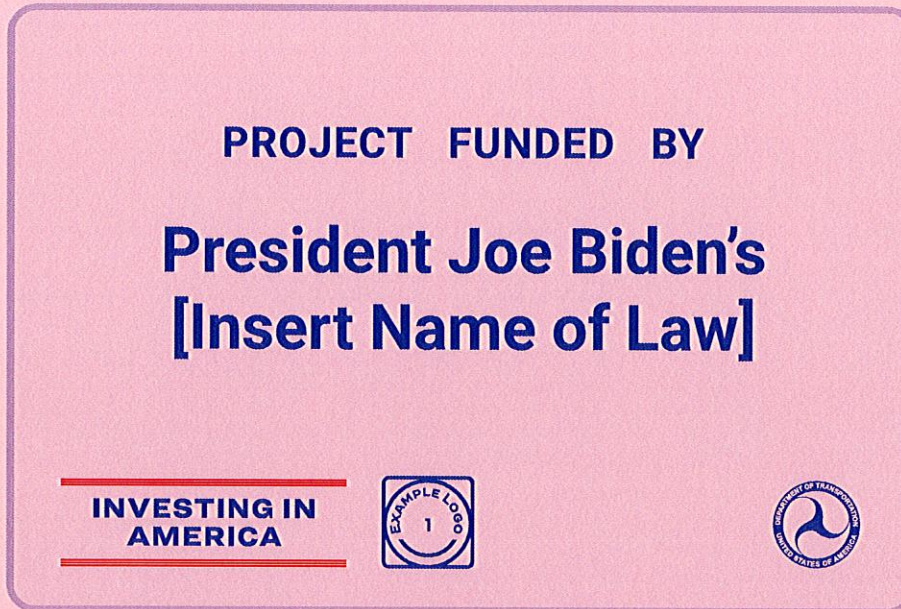


Blue

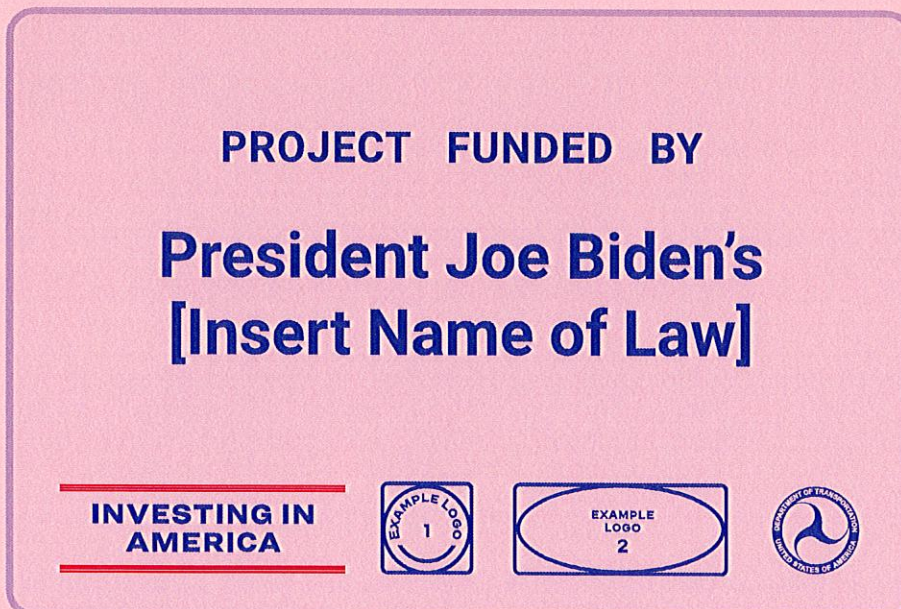


Red Border

State, City, and County Logo Variations

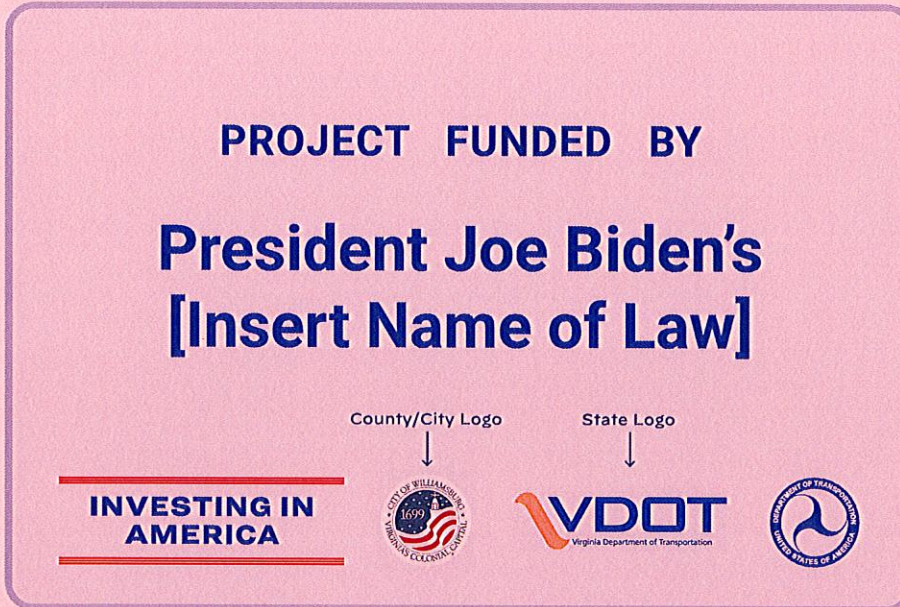


Square or Circular State Logo: 7x7 in.

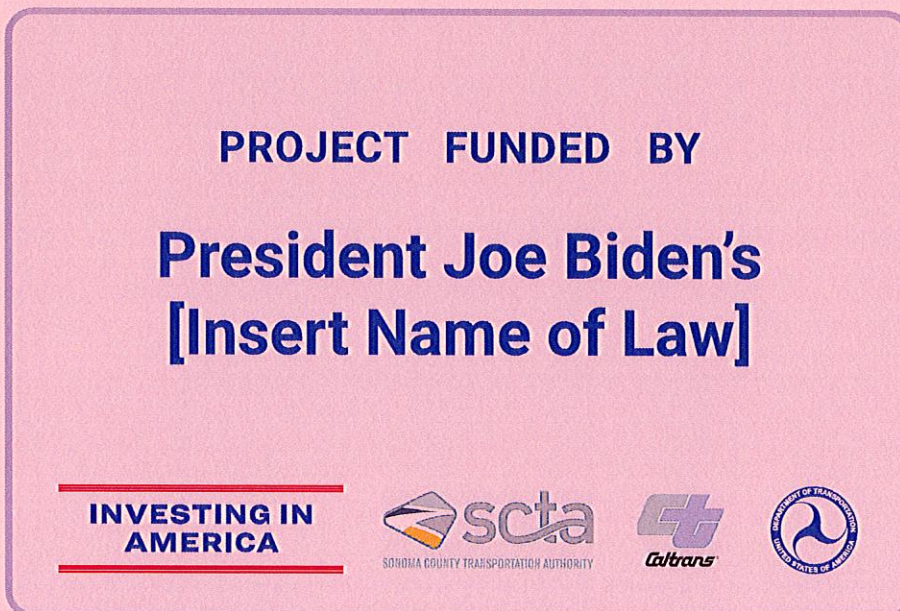


Rectangular or Oval State Logo: **not** to exceed 17.5 x 7 in.

3 Logo Samples

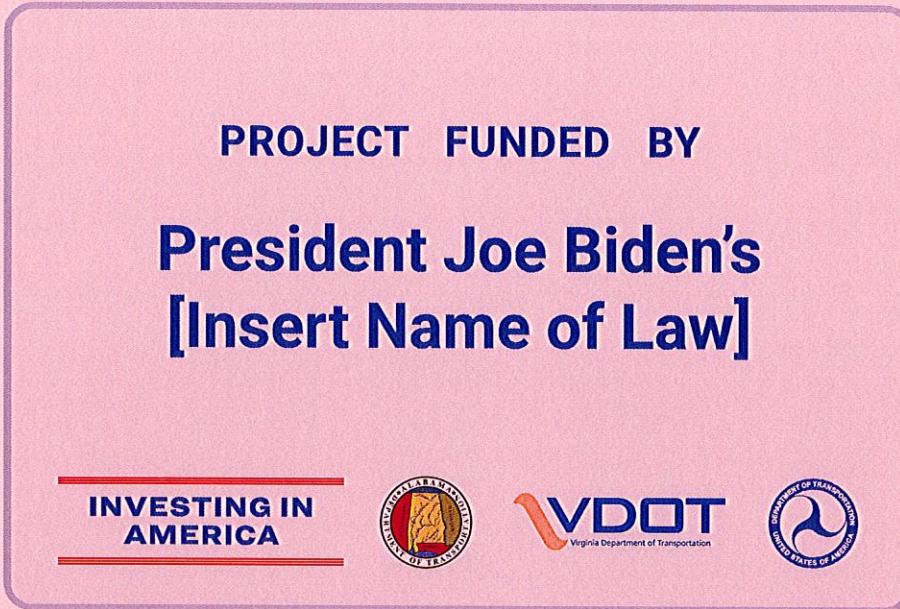


Circular City Logo 7 x 7 in. State rectangular logo should **not** exceed 17.5 x 7 in.

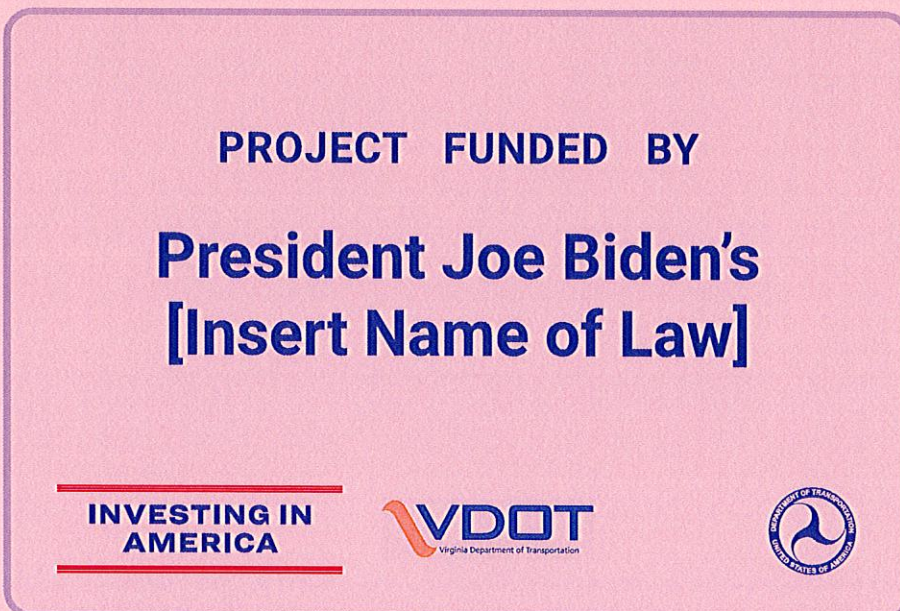


Rectangular State Logo: **not** to exceed 17.5 x 7 in.

2 Logo Samples



Circular State Logo: 7 x 7 in.



Rectangular State Logo: **not** to exceed 17.5 x 7 in.

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 improvement 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.

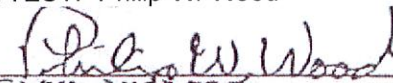
APPROVED, this 23rd day of August, 1988.

Rodger Randle



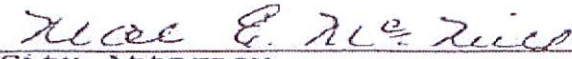
Mayor

ATTEST: Philip W. Wood



City Auditor

APPROVED: Neal E. McNeil



City Attorney

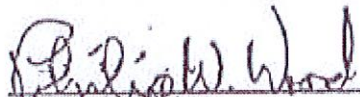
PASSED, with the emergency clause ruled upon
separately and approved this 23 day of August, 1988.

- APPROVED, this 23 day of August, 1988.



Mayor

ATTEST:



City Auditor

APPROVED:



City Attorney

CITY OF YULSA
FILED

AUG 23 1988

A.M. Office of City Auditor P.M.
By _____

(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 COMMISSION EXPIRES:

COMMISSION NO.:

(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.:

(Must be submitted at time of bid)
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. SW-2025-21 & ARP-23-0012-DPG

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.

LEGEND

- \$ 1.00 Cells Requiring Data Input.
\$ 1.00 Internal Data Transfer.
\$ 2.00 Calculated Results.

AGREEMENT FOR USING ELECTRONIC BID PROPOSAL

By and Between: HISINC, LLC , (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. SW-2025-21, Arkansas River West Bank Stabilization ARP-23-0012-DGP. 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.
Arkansas River West Bank
SW-2025-21 & ARP-23-0012-DPG**

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 150 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 BASE BID.

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

**PROPOSAL FOR
PROJECT NO.
ARKANSAS RIVER WEST BANK**

ITEM NUMBER	SPEC NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	DATA INPUT UNIT PRICE	AMOUNT
1	201(A)	CLEARING AND GRUBBING	ACRE	0.20		
2	202(A)	UNCLASSIFIED EXCAVATION	CY	100		
3	214	24 INCH GRADED RIPRAP	TON	25		
4	220	SWPPP DOCUMENTATION AND MANAGEMENT	LS	1		
5	221(C)	TEMPORARY SILT FENCE	LF	100		
6	221(D)	TEMPORARY SEDIMENT FILTER	EA	1		
7	230(A)	SODDING	SY	2,500		
8	232	SEEDING	SY	2,500		
9	501(E)	SELECT BORROW	CY	22,500		
10	619(A)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1		
11	641	MOBILIZATION	EA	1		
12	642	CONSTRUCTION STAKING	EA	1		
13	SPECIAL	LRD NO. 7 SLOPE PROTECTION WITH FILTER FABRIC	CY	8,950		
14	SPECIAL	QUICK SET FLOWABLE FILL	CY	1,500		
15	SPECIAL	RESTORATION	EA	1		
16	SPECIAL	OWNER ALLOWANCE	EA	20,000	\$1.00	\$20,000.00
17	SPECIAL	STABILIZED CONSTRUCTION ENTRANCE	EA	1		
18	SPECIAL	TREE REMOVAL	EA	1		
19	COT 327	SAFETY FECE	LF	500		
TOTAL						\$20,000.00

TOTAL BASE BID

\$20,000.00
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:

ATTEST:

Title:

Title: Corporate Secretary

Printed Name:

Printed Name:

(SEAL)

Address: _____

Telephone Number: _____

Fax Number: _____

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

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

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__.

Name printed: _____

Name Printed: _____

[ADD ADDITIONAL LINES FOR ADDITIONAL MEMBERS]



PUBLIC WORKS
Engineering

DATE:
Month Day, Year

{Company Name}
(Address)
{City, State Zip}

RE: City of Tulsa Project No. {number and Title}

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 {Date.}

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

CITY OF TULSA

Paul D. Zachary, P.E.
Deputy Director

cc: Ryan McKaskle

HAS:JR:kt

STED-1

EXTENSION OF TIME REQUEST
(to be submitted with each 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 _____, 2025, 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. SW-2025-21 ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG**

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:

**PROJECT NO. SW-2025-21 ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG**

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: 150 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.

ARTICLE VI. If the Contractor has 10 or more full-time employees, and this contract exceeds \$100,000 in total value, Contractor acknowledges and agrees that, in accordance with and pursuant to 21 O.S. 1289.31, Contractor verifies to City that: (i) it does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association, and (ii) will not discriminate against a firearm entity or firearm trade association during the term of this Contract.

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

this _____ day of _____, 2025.

CITY OF TULSA, OKLAHOMA
a municipal corporation

By: _____

ATTEST: (S E A L)

Mayor

Date: _____

City Clerk

Date: _____

APPROVED:

APPROVED:

City Attorney

Date: _____

Director

Date: _____

CONTRACTOR

By: _____

Printed Name _____

Title

Date: _____

Title

Date: _____

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 _____, 2025.

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 (\$) in
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. SW-2025-21 ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG

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: _____ Title: _____

Date: _____ Attorney In Fact

Date: _____ 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. SW-2025-21 ARKANSAS RIVER WEST BANK
 STABILIZATION ARP-23-0012-DPG** for the construction of certain public
 improvements Consisting of _____ 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 (\$) _____) in 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.

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: _____
Title: _____

Date: _____
Title: _____

Date: _____
Attorney-In-Fact **

Date: _____
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

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 (\$ _____) 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. SW-2025-21 ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG

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: _____
Title: _____

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. CPM SCHEDULE AND DRAWINGS TO BE FURNISHED BY CONTRACTOR:

The successful contractor shall furnish a CPM schedule per ODOT 108.03B. 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 meeting will be conducted to maintain coordination between all project entities.

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 City.

GC-13. TIME FOR COMPLETION:

For all projects that will impact the public, a public meeting is required before any work is started. The City of Tulsa requires a minimum of 25 days' notice to get the public meeting scheduled and invitations mailed out.

The Work shall commence within ten (10) 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 **One Thousand Dollars (\$1,000.00)** 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.

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 (\$1,000.00)** 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 ensure 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 7:00 p.m. and 7:00 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.

Work occurring within secured facilities will require the Contractor to obtain City of Tulsa issued ID badges for all employees and subcontractors requiring facility gate access. The Contractor will be responsible for all coordination with City Security as necessary to process background checks and issue badges. The City of Tulsa has the right to deny access to any individual based on evaluation of background check.

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 its 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 two and one-half percent (2.5%) for the balance of the remaining work; 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, flushings, 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 equipment 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. SW-2025-21 ARKANSAS RIVER WEST BANK STABILIZATION
ARP-23-0012-DPG

1. Apparent lowest, responsible bidder shall return their signed contract documents (including bonds and insurance) to the City of Tulsa, Contract Administration Section 175 E. 2nd Street, 13th Floor, OK 74103 within fifteen (15) days after notification by the City.
2. If the apparent lowest, responsible bidder provides their signed contract documents (including bonds and insurance) and the contract is executed by the City, the Pre-Construction Conference for this project will be held within sixty (60) days after bid opening.
3. The Notice to Proceed or written work order (NTP) will be issued in the normal time period (approximately within ten (10) days of the Pre-Construction Conference).

The City will grant up to **Zero (0) days** for a delayed (flexed) NTP after the Pre-Construction Conference. No delayed (flexed) NTP above this amount will be granted unless approved by the City Engineer or designee.

4. There will be no additional compensation due to the use of a delayed (flexed) NTP.
5. This Special Provision does not alter the Public Meeting requirements (and public notice) defined in the General Conditions.

SPECIAL PROVISIONS
INSURANCE REQUIREMENTS

In reference to Ordinance No. 24616 Adoption of State Specification for Highway Construction, Section 107.12 shall be modified as follows:

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 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 City.

SPECIAL PROVISIONS
TIME FOR COMPLETION

1. 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 prosecuted 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 shall fail 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 for failure to complete all work within the time specified. 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 in such event sustain. 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.
2. If the Contractor shall fail to complete reconstruction of a segment of roadway within **thirty (30)** days of beginning the reconstruction operation, then the Contractor agrees to pay the City, not as a penalty, but as liquidated damages for such breach of contract, the sum of **Two Thousand Five Hundred Dollars (\$2,500.00)** for each and every calendar day of failure to complete the work after the specified time. 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 in such event sustain. This time constraint applies only to roadways to be reconstructed and includes all subsidiary work items required to complete the reconstruction. Subsidiary items not required to complete the reconstruction are not subject to this time constraint.
3. If the Contractor shall fail to complete overlaying of any separately milled segment of roadway within **twenty (20)** days of beginning the milling operation, then the Contractor agrees to pay the City, not as a penalty, but as liquidated damages for such breach of contract, the sum of **Two Thousand Five Hundred Dollars (\$2,500.00)** for each and every calendar day of failure to complete the work after the specified time. 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 in such event sustain. The City will authorize when milling is to be done based on weather conditions. This time constraint applies only to segments to be milled and includes all subsidiary work items required to complete the overlay. Subsidiary items not required to complete the overlay are not subject to this time constraint.
4. The Contractor shall commence work within 24 hours of traffic control devices being established at the project location. If the Contractor shall fail to commence work within 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 for such breach of contract, the sum of **One Thousand Dollars (\$1,000.00)** 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 in such event sustain.

5. **The successful contractor shall furnish a CPM schedule per ODOT 108.03B.** 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.
6. The Contractor will be required to provide a full-time, onsite English speaking superintendent for this Project 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 decision. If the Contractor shall fail to provide a non-working superintendent on a day when work is being performed, then 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 (\$1,000.00)** for each and every calendar day of failure to provide a non-working superintendent at the work site. 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 in such event sustain.
7. It is further agreed that time is of the essence of 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.
8. Should the Contractor be delayed in the final completion of the work by any act or neglect of the City of Tulsa, or of any employees of either, or by strikes, injunctions, fire or other cause or causes outside of and beyond the control of the Contractor and which, in the opinion of the Engineer, could have been neither anticipated or 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 the delay in each case 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 included herein.
9. 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.

10. Extension of time may be granted for delays caused by unsuitable weather. Extension of time will not be granted for delays caused by ground condition, inadequate construction force, or the failure of the Contractor to place orders for equipment or materials a sufficient time in advance to ensure delivery when needed. Any extension of time by the City shall not release the Contractor and surety herein from the payment of liquidated damages for a period of time not included in the original contract or the time extension as herein provided.
11. Failure to complete project within specified time, as set forth in the Contract, may be grounds for disqualification for future consideration for contracts with the City of Tulsa.
12. Final Acceptance of the Project will be in strict accordance with ODOT Specification 105.17– Project Completion and Acceptance and ODOT Specification 104.10– Final Cleaning Up and defined as “The date on which the Request for Action (RFA) for final payment has been signed by the Mayor of the City of Tulsa.”
13. Contract Evaluation forms will be compiled by City staff upon completion of this Project to provide a record of the Contractor's performance for use in subsequent projects.

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.

TECHNICAL SPECIFICATIONS

WEST BANK REMEDIATION PROJECT
TECHNICAL SPECIFICATIONS

DIVISION 1 - LIST OF SECTIONS

- Section 01101 - Basic Requirements
- Section 01110 - Summary of Work and Pay Items
- Section 01201 - Price and Payment Procedures
- Section 01300 - Administrative Procedures
- Section 01321 - Scheduling of Construction
- Section 01323 - Construction Photographs
- Section 01325 - Sequence of Construction
- Section 01330 - Submittal Procedures
- Section 01421 - Reference Standards
- Section 01451 - Testing Laboratory Services
- Section 01521 - Field Offices and Sheds
- Section 01600 - Product Requirements
- Section 01770 - Closeout Procedures

SECTION 01101

BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section identifies and describes requirements regarding administrative and procedural subjects and temporary facilities for the Project, including:

1. Summary of Work:
 - a. Work By Owner
 - b. Contractor Use of Premises
 - c. Future Work
2. Contract Considerations:
 - a. Cash Allowances
 - b. Inspection and Testing Allowances
 - c. Schedule of Values
 - d. Applications for Payment
 - e. Alternates
3. Coordination and Meetings:
 - a. Coordination
 - b. Field Engineering
 - c. Cutting and Patching
 - d. Conferences
 - e. Progress Meetings
4. Submittals:
 - a. Submittal Procedures
 - b. Construction Progress Schedules
 - c. Proposed Products List
 - d. Shop Drawings
 - e. Product Data
 - f. Samples
 - g. Manufacturers' Instruction
 - h. Manufacturers' Certificates
 - i. Construction Photographs
5. Quality Control:
 - a. Quality Assurance/Control of Installation
 - b. References
 - c. Field Samples
 - d. Inspection and Testing Laboratory Services
 - e. Manufacturers' Field Services and Reports
6. Construction Facilities and Temporary Controls:
 - a. Temporary Electricity

- b. Temporary Lighting
- c. Temporary Heat
- d. Temporary Ventilation
- e. Telephone Service
- f. Temporary Water Service
- g. Temporary Sanitary Facilities
- h. Barriers and fencing
- i. Water Control
- j. Interior Enclosures
- k. Protection of Installed work
- l. Security
- m. Access Roads/Public Trails
- n. Parking
- o. Progress Cleaning
- p. Field Offices and Sheds
- q. Removal of Utilities, Facilities and Controls

- 7. Material and Equipment:
 - a. Products
 - b. Transportation, Handling, Storage and Protection
 - c. Products Options
 - d. Substitutions
- 8. Contract Closeout:
 - a. Contract Closeout Procedures
 - b. Final Cleaning
 - c. Adjusting
 - d. Project Record Documents
 - e. Warranties and Bonds

1.2 WORK BY OWNER (_____)

- A. See Section 1110 for Summary of Work.

1.3 CONTRACTOR USE OF SITE

- A. Limit use of site to allow:
 - 1. Owner occupancy and maintenance requirements
 - 2. Owner presence during installation of equipment, start-up and testing and pre- and – post commissioning
 - 3. Engineer presence during construction through completion of construction
 - 4. Inspections by Specialized Entities and Testing Laboratory

1.4 FUTURE WORK

- A. Project is not designed for any future expansion.
- B. The Contractor may be requested to provide tees, plugs, blind flanges, etc., as necessary for future installation of piping or equipment and this will be handled with a Request for Contractor Proposal.

1.5 CASH ALLOWANCES

- A. See Section 1201 Payment Procedure for details.

1.6 INSPECTION AND TESTING ALLOWANCES

- A. See Section 1201 Payment Procedure for details.

1.7 SCHEDULE OF VALUES

- A. See Section 1201 Payment Procedure for details.

1.8 APPLICATIONS FOR PAYMENT

- A. See Section 1201 Payment Procedure for details.
- B. Payment Period: Submit at intervals stipulated in the Owner-Contractor Agreement.

1.9 ALTERNATES

- A. See Section 01201 and the Bid Item Descriptions Section of Volume 1 Contract Documents, for description and schedule of alternates.

1.10 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various sections of the technical specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities, coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

1.11 FIELD ENGINEERING

- A. See Section 1300, part 1.3.

1.12 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching new Work; restore work with new products.

1.13 CONFERENCES

- A. Owner or Owner's Representative will schedule a Pre-construction conference after execution of the Owner-Contractor agreement for all affected parties.

1.14 PROGRESS MEETINGS

- A. See Section 01300, part 1.6.

1.15 SUBMITTAL PROCEDURES

- A. See Section 01330.

1.16 CONSTRUCTION PROGRESS SCHEDULES

- A. See Section 01321

1.17 PROPOSED PRODUCTS LIST

- A. Within 30 days after effective date of Owner-Contractor agreement, submit complete list of major Products proposed for use with name of manufacturer trade name, and model number of each Product.

1.18 SHOP DRAWINGS

- A. See Section 01330.

1.19 PRODUCT DATA

- A. See Section 01330.

1.20 SAMPLES

- A. See Section 01330.

1.21 MANUFACTURER'S INSTRUCTIONS

- A. See Section 01330.

1.22 MANUFACTURER'S CERTIFICATES

- A. See Section 01330.

1.23 CONSTRUCTION PHOTOGRAPHS

- A. See Section 01321

1.24 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions and/or recommendations. The Contractor will provide the Owner's Representative with copies of any major decisions between the Contractor and Manufacturer relating to the Project. This will be discussed in further detail in the Pre-construction conference.
- C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.25 REFERENCE STANDARDS

- A. Abbreviations and acronyms are included throughout the Contract documents to reference codes and standards which establish qualities, workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics. It is the Contractor's responsibility to verify the detailed requirements of the specifically referenced codes and standards and to verify that materials and products incorporated into the work conform to or exceed the specified requirements. Materials and products incorporated into the work which fail to conform to the specified requirements will be considered non-conforming work.
- B. Date of Issue for Reference Standards:
 - 1. Building Code References: Date included in the Code requirements.
 - 2. Non-code References: Date of edition in effect on the date of receiving bids.
- C. Should specified reference standard conflict with Contract Documents, request clarification from Owner's Representative before proceeding.

1.26 FIELD SAMPLES

- A. Construct field samples at the site for review as required by individual specification Sections. Acceptable samples will represent a quality level for the Work and may be required at discretion and at any time by Owner's Representative.

1.27 INSPECTION AND TESTING LABORATORY SERVICES

- A. Owner will appoint, employ, and pay for services of an independent firm to perform inspection and testing. Payment shall be made from Inspection and Testing Allowance as described in Section 01290.

1.28 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions and to initiate instruction when necessary.
- B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

1.29 TEMPORARY ELECTRICITY

- A. Contractor shall coordinate with the electric company or companies that provide existing power service to the location of the Project and connect to existing power service. All costs associated with providing temporary power shall be paid for by the Contractor at no additional expense to the Owner. Power consumption shall not disrupt Owner's need for continuous service. Owner to pay for power that it consumes for an on-site field office for its Owner's Representative. All electrical power requirements through completion of the Project, shall be borne by the Contractor.

- B. Provide power outlets for construction operations, branch wiring, distribution boxes, and flexible power cords, as required.

1.30 TEMPORARY LIGHTING

- A. Provide and maintain temporary lighting for construction operations.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

1.31 TEMPORARY HEAT

- A. Utilize temporary units as required to maintain specified conditions for construction operations and to protect materials and finishes from damage. All temperature controlled equipment is to be specifically protected and stored in controlled atmosphere and documentation of fulfillment is to be provided on a monthly basis in the form of a written report at the monthly Progress Meeting until completion of the Project.
- B. Contractor will pay for cost of energy used. Costs shall be included in bid item(s).
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications or at a higher temperature during the winter months if required by the manufacturer or supplier in writing.

1.32 TEMPORARY VENTILATION

- A. Provide ventilation of enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, and gases as required for construction.

1.33 TELEPHONE SERVICE

- A. Provide, maintain and pay for telephone service to field office(s) including Owner's Representative as required to accomplish work. Telephone service for Owner's Representative shall be paid by Owner.

1.34 TEMPORARY WATER SERVICE

- A. Provide, maintain and pay for suitable quality water service required by connection to existing water source for construction operations. Owner shall pay the cost of water usage. No wasting of water will be allowed.

1.35 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facilities may not be used.
- B. Maintain in clean and sanitary conditions.
- C. Portable toilets, if used, are to be maintained on a bi-weekly basis by the supplier.

1.36 BARRIERS AND FENCING

- A. Provide sufficient barriers or fencing to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage.
- B. Provide temporary gates and access points as necessary to facilitate construction. Provide set of keys to Owner for emergency access, if needed.
- C. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.
- D. Provide traffic control required to direct and maintain an orderly flow of traffic in public roadways and River Parks Trails affected by the Contractor's operations.
- E. Provide all components of Stormwater Prevention Pollution Plan (SWP3) including temporary construction entrances.

1.37 STORMWATER CONTROL

- A. Maintain excavations and site free of standing water. Provide, operate, and maintain pumping equipment. Upon completion of concrete placement test drainage patterns to assure proper drainage to outlet drop structure.

1.38 INTERIOR ENCLOSURES (NOT APPLICABLE)

- A. Provide temporary partitions (and ceiling) as required to separate Work areas from Owner occupied areas, if applicable, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; STC rating of 35 in accordance with ASTM E90; Flame spread Rating of 25 or less in accordance with ASTM E84.
- C. Paint surfaces exposed to view from Owner occupied areas.

1.39 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Prohibit traffic or storage upon waterproofed or roofed surfaces. (NOT APPLICABLE)

1.40 ACCESS ROADS/PUBLIC TRAILS

- A. Construct and maintain temporary roads accessing public thoroughfares (roads or trails) to serve construction area.

1.41 PARKING

- A. Provide temporary gravel parking areas to accommodate construction personnel that exceed the capacity of available parking. Avoid blockage of on-site roadways or trails

1.42 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

1.43 FIELD OFFICES AND SHEDS

- A. See Section 1521, Field Offices and Sheds.

1.44 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
- B. Remove underground installations to a minimum depth of 2 feet, unless specified otherwise in plans in demolition specifications. Grade site as indicated on the Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.45 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.
- B. Do not incorporate into the work any product or assembly containing asbestos.
- C. Use interchangeable components of the same manufacturer for similar components.
- D. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by the Contract documents.

1.46 TRANSPORTATION, HANDLING, STORAGE, AND PROTECTION

- A. Transport, handle, store and protect Products in strict accordance with manufacturer's instructions.

1.47 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by description only: Any Product meeting those standards or description.
- B. Products Specified by Naming One Manufacturer: Products of manufacturer named that comply with specifications, no options or substitutions allowed.
- C. Products specified by Naming more than One Manufacturer, or provision for Or Approved Equal: Submit a request for substitution for any manufacturer not named.

1.48 SUBSTITUTIONS

- A. Owner's Representative will consider requests for Substitutions only within 60 days after effective date of Owner-Contractor Agreement.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Document, including:
 - 1. Comparison of the qualities of the proposed substitution with that specified.
 - 2. Changes required in other elements of the work because of the substitution.
 - 3. Effect on the construction schedule.
 - 4. Cost data comparing the proposed substitution with the Product specified.
 - 5. Any required license fees or royalties.
 - 6. Availability of maintenance service, and source of replacement materials.
- C. Submit three copies of requests for substitution for consideration. Limit each request to one proposed substitution.
- D. Contractor's Representation:
 - 1. A request for substitution constitutes a representation that Contractor:
 - a. Has investigated the proposed product and determined that it equal to or superior to that specified.
 - b. Will provide the same warranties for bonds for the substitution as for the Product specified.
 - c. Will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the Work complete in all respects.
 - d. Waives claims for additional costs, under his responsibility which may subsequently become apparent.
- E. Owner's Representative will review request for substitutions with reasonable promptness, and notify Contractor, in writing, of the decision to accept or reject the requested substitution.

1.49 STARTING SYSTEMS

- A. See Section 01770, Closeout Procedures, for details.

1.50 DEMONSTRATION AND INSTRUCTIONS

- A. See Section 01770, Closeout Procedures, for details.

1.51 TESTING, ADJUSTING, AND BALANCING (NOT APPLICABLE)

- A. See Section 01770, Closeout Procedures, for details.

1.52 CONTRACT CLOSEOUT PROCEDURES

- A. See Section 01770, Closeout Procedures, for details.

1.53 FINAL CLEANING (REGARDLESS OF CONTRACT DURATION)

- A. Execute final cleaning by skilled workmen prior to final inspection.
- B. Clean debris from site, and drainage systems.
- C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.54 ADJUSTING

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

1.55 PROJECT RECORD DOCUMENTS (See Project Document Section for further details)

- A. Maintain on site, one set of Contract Documents to be utilized for record documents. Post addenda items on the affected Drawings and specification pages. Label each document "PROJECT RECORD" in neat, large printed letters.
- B. Record actual revisions to the work concurrent with construction progress. Do not conceal work until required information is recorded.
- C. Drawing shall be legibly marked to record the following:
 - 1. Depths of various elements of foundation in relation to finish first floor datum.
 - 2. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by Field Order or by Change Order.
 - 6. Details not on original Contract Drawings.
- D. Specifications: Legibly mark and record at each Product Section a description of actual Products installed. Include manufacturer's name, catalog number and name of supplier for each product.
- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction.

- F. Submit documents to Owner's Representative prior to submitting final Application for Payment.

1.56 OPERATION AND MAINTENANCE DATA

- A. See Section 01781, Operation and Maintenance Data, for details.

1.57 WARRANTIES AND BONDS

- A. Submit warranties and bonds as specified in the individual specification Sections and Contract Documents
- B. See Section 01770, Closeout Procedures, for details.

1.58 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. See Section 01781, Operation and Maintenance Data, for details.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01110

SUMMARY OF WORK AND PAY ITEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section summarizes the work to be accomplished as a part of the Project and provides a description of the individual pay items which comprise the Project.
- B. The Project includes the provision of all materials, equipment, labor, tools, supervision, supplies, appurtenances, preventative maintenance, and incidentals necessary to restore the Arkansas River bank at Area 34, Sites 1 and 2, and to repair the River Parks Trail and electrical damage.
- C. The total effort and the total cost of the Project shall be accounted for within and paid the Contractor according to, the Pay Items listed herein, whether or not said Pay Items explicitly describe the Contractor's total effort, components and parts of which are implicitly included in one or more of said Pay Items.
- D. All limits of excavation pay lines are the edges of all structures. Any temporary works shall be included in one or more of the pay items.

1.2 SUMMARY OF WORK AND PAY ITEMS

The following table summarizes the work, process or item included in the breakdown or recapitulation of pay items by which the Contractor shall be paid for all of the work required for the Project. The description of inclusive work is a summary and shall not be construed to constitute the entirety of the work, nature or extent of the effort necessary to accomplish the all of the work generally or specifically shown on the drawings, included in the specifications or required by implication or custom. This list is not intended to supersede, but compliment the description in the Special Conditions. If there is a conflict between the descriptions, the Bidder or Contractor shall request clarification in writing from the Engineer.

The quantities shown on the official Bid Proposal shall govern in the preparation of bids

Item	Description of Inclusive Work (in accordance with Project Specifications regardless of citation)
MOBILIZATION	Mobilization of work force, occupation of site, establishment of work offices and storage areas, temporary electric, water, sanitary sewer, communication, etc., bonds and fees, all other related work necessary to commence the project. Payable in two or more installments according to initial progress of the work.
DEMOBILIZATION	Demobilization of work force, Presentation of Record Drawings, Coordination with _____ on any specific maintenance issues.
SITE CLEARING	Removal and stockpiling of topsoil, removal of all interfering fences, structures, vegetation (trees and scrub shrub) and preparation of the site for new construction and disposal of demolished structures as needed.
CONSTRUCTION STAKING	Construction staking, layout, and checking sufficient to establish existing structure locations, alignment and slope of embankments, and existing fence layouts by the Contractor. The Contractor shall perform all survey layout for the Project. All available data will be provided to the selected Bidder during the Pre-Construction Meeting. Pre-construction survey and Post-Construction survey in AutoCAD format with 1 foot contours.
SITE GRADING AND UNCLASSIFIED EXCAVATION AND COMPACTED BACKFILL,HAUL	All site grading and excavation of any nature whatsoever, regardless of the material, soil , rock, etc. related to site preparation, grading for drainage, fill slope material. All other foundation excavation specifically connected with the Project are included this pay item. All excess material shall be hauled and disposed in locations acceptable to _____.
SITE INVESTIGATION AND POTHOLING	Independent excavation and potholing to enable the Contractor to identify existing underground piping, uncover or pothole said items, mark and measure same to check, verify or discover the locations of such items early in the Project to determine if adjustment of new embankment is required.
LRD NO. 7 RIP-RAP SLOPE PROTECTION	Provide, install, and maintain LRD No. 7 Slope Protection as shown on the Drawings or otherwise specified or as directed by the Owner's Representative
SODDING-FINAL SITE	Provide, install, and maintain as shown on the Drawings, otherwise specified or as directed by the Owner's Representative

Item	Description of Inclusive Work (in accordance with Project Specifications regardless of citation)
SEEDING-FINAL SITE	Provide, install and maintain as shown on the Drawings, otherwise specified or as directed by the Owner's, Representative.
CONTRACTOR SAFETY AND QUALITY CONTROL PROGRAMS	All safety operations, training, equipment or procedures are the responsibility of the Contractor. The Contractor shall provide a designated full time Quality Control Engineer for the Project
SITE CLEANUP AND RESTORATION	Final site cleanup is included in this bid item. The Contractor shall remove and dispose of all debris, restore the grade of the surface of all disturbed earth or gravel, trails, and all roadways as reasonably as may be done to the grade existing prior to construction, or final grades as shown on the Drawings. Upon completion of the work shall leave the site in as neat, clean and orderly condition as nearly as it was prior to construction as may be reasonable done. This item shall also include the cost of any re-grading operations during the first year of Project operation to correct any embankment settling or debris and rock removal associated with the Project construction.
MISCELLANEOUS CONSTRUCTION	Miscellaneous Construction is a "catch-all" bid item to supplemental other specific bid items listed above. The work under this item shall include the furnishing, and installing all labor, materials, equipment, etc. for any repair of the existing storm drainage outlet headwall(s), fencing, trail lighting, asphalt trail or parking lot patching. This work will be performed in consultation with the Engineer, _____ and River Parks Authority representative.

PART 2 PRODUCTS.

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01201

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section describes requirements regarding cash allowances, inspection and testing allowances, change procedures, and Product alternates.

1.2 CASH ALLOWANCES

- A. Costs Included in Allowances: Cost of Product to Contractor or Subcontractor delivered to the site, less applicable trade discounts.
- B. Costs Not Included in the Allowance: Product handling at the site, including unloading, uncrating, and storage, protection of Products from elements and from damage and labor for installation and finishing.
- C. Owner's Representative Responsibilities:
 - 1. Consult with Contractor in consideration and selection of Products and suppliers.
 - 2. Select Products in consultation with Owner and transmit decision to Contractor. Decisions are included and described in these specifications.
 - 3. Prepare Change Orders, if required.
- D. Contractor Responsibilities:
 - 1. On notification of selection by Owner's Representative, execute purchase agreement with designated supplier and installer (subcontractor) if required.
 - 2. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 3. Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Funds will be disbursed from Cash Allowances in accordance with partial payment procedures.
- F. Cash Allowances:

Not Used.

1.3 INSPECTION AND TESTING ALLOWANCES

- A. Costs Included in Allowances: Cost of engaging an inspection or testing firm, execution of inspection or tests, reporting results.
- B. Costs Not Included in the Allowance:
 - 1. Incidental labor and facilities required to assist inspection or testing firm.
 - 2. Costs of testing laboratory services required by Contractor separate from Contract Document requirements.
 - 3. Costs of retesting upon failure of previous tests as determined by Owner's Representative.
- C. Payment Procedures:
 - 1. Submit one copy of the inspection or testing firm's invoice with next application for payment.
 - 2. Pay invoice on approval by Owner's Representative.
 - 3. Final Payment total will be the accumulated total of all individual inspections costs.
- D. Inspection and Testing Allowances: Include the following as directed or approved by Owner's Representative:
 - 1. Include the sum of \$9,000 for payment of inspection and testing laboratory services as specified in Section 01451 and as outlined below:
 - a. Include the sum of \$2,000 for asphalt pavement testing specified in Sections 02747 and 02751.
 - b. Include the sum of \$7,000 for compaction testing of foundation excavations, soils and pavement base courses, and embankment compaction.
- E. Funds will be disbursed from inspection and testing allowances only upon receipt of satisfactory test results accompanied with invoices.

1.4 CHANGE PROCEDURES

- A. The Owner's Representative will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by the General Conditions by issuing supplemental instructions on Engineer's Request for Information (RFI) form.
- B. The Owner's Representative may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit an estimate within 10 days.

- C. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation.
 - D. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Work Directive Change. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
 - E. Work Directive Change: Owner's Representative may issue a directive, signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.
 - F. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Owner's Representative will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.
 - G. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
 - H. Change Order Forms: Engineer's Change Order or approved format alternative.
 - I. Execution of Change Orders: Owner's Representative will prepare Change Orders for signatures of parties as provided in the Conditions of the Contract.
- 1.5 ALTERNATES

- A. Alternates, if applicable, quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work as required to integrate the work included in Alternates accepted by the Owner.

PART 2 PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section describes requirements regarding coordination, field engineering and layout, cutting and patching, conferences and meetings.
- B. In any location in the Contract Documents (Plans or Specifications) references to "_____", "Owner", and "Client" generally refer to _____
Tulsa, Oklahoma.
- C. In the Contract Documents (Plans or Specifications) references to "Engineer" generally refer to the Design Engineer, HISINC, L.L.C. The "Construction Engineer", or "Owner's Representative" (to be determined) will assist _____ with Bidding and Construction Engineering Services and coordinating with the Resident Project Representative retained on-site by the _____. The Construction Engineer will provide Bidding Services for the Project including, but not limited to, coordination of advertising, coordination of mandatory Pre-Bid Conference, receipt and response to Bidder's questions through issuance of addendum, assistance in receipt of proposals, review of proposals for conformance with the Bid Documents, reference consultations, etc. The Construction Engineer will provide Contract Administration Services for the Project, including, but not limited to, coordination of Pre-Construction Meeting, monthly pay estimate meetings, monthly progress meetings, periodic observations of construction activities, review of Project schedule, etc. The Resident Project Representative may be on-site full time or part time during construction and will be the day-to-day interface with the Contractor. His responsibilities will include, but not be limited to, daily observation of construction activities, attending Progress-Pay Estimate meetings, writing and resolving Non-Conformance issues, coordinating with any specialized on-site inspectors, preparing the Preliminary and Final Punch List and resolving issues, etc.

Any reference in the Drawings or Specifications to "_____" may also refer to the Resident Project Representative for _____.

1.2 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements with provisions for accommodating items installed later.
- B. Coordinate completion and cleanup of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- C. After Owner's occupancy of premises, coordinate access to site for correction of defective Work as identified on the Preliminary and Final Punch Lists and Work not in accordance

with Contract Documents (Non-Conformance Reports), to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ a Land Surveyor licensed in the State of Oklahoma and acceptable to the Owner's Representative.
- B. Provide a full time Field Engineer (graduate Engineer, or Professional Engineer, or Construction Management degree) and a full or part-time Quality Control Engineer (as construction activities dictate) who is independent of the Contractor's field staff to independently review work quality and to coordinate directly with the _____ Resident Project Representative relating to Quality Control issues. Resumes for both positions are to be submitted for review and acceptance by the Owner's Representative and the Owner.
- C. Contractor shall locate and protect survey control and reference points.
 - 1. Report to Owner's Representative when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
 - 2. Request _____ ' surveyor to replace control points which become lost or destroyed, and shall reimburse the Owner for those survey costs.
- D. Existing horizontal and vertical control points for the Project are shown on Drawings. Contractor shall check and rationalize critical control points prior to excavation.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit a copy of registered site drawing and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.4 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request to Owner's Representative prior to cutting or altering elements which affect:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, operational life, or safety of element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:

1. Fit the several parts together, to integrate with other Work.
 2. Uncover Work to install, observe, or correct ill-timed Work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new Products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- I. Report any hazardous substance or condition exposed during the Work to the Owner's Representative.

1.5 PRE-CONSTRUCTION CONFERENCE

- A. Owner or Owner's Representative will schedule a Pre-Construction conference after execution of the Owner-Contractor Agreement.
- B. Attendance Required: Owner's Representative, Engineer, Resident Project Representative, Contractor's Project Manager, Field Superintendent, Field Engineer, Quality Control Engineer, Major Subcontractors and Suppliers.
- C. Agenda:
1. Project Scope and Special Requirements.
 2. Submittal of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submittal of list of Subcontractors, list of Products, Schedule of Values, and Progress Schedule.
 5. Designation of personnel representing the parties in Contract, major subcontractors and suppliers, and the Engineer, Owner's Representative, Resident Project Representative.

6. Procedures and processing of field decisions, interpretation requests, submittals, substitutions, applications for payments, proposal request, Changes, Record Drawings, and Contract closeout procedures.
7. Scheduling.
8. Housekeeping.
9. Site Security/Photography.
10. Owner and Contractor Comments.

1.6 PROGRESS MEETINGS

- A. Contractor shall schedule, administer and "run" meetings throughout progress of the Work at not less than monthly intervals on the first Wednesday of each month.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two (2) days to Owner's Representative, participants, and those affected by decisions made. Comments and corrections are to be made at the next meeting during agenda item at the beginning of meeting.
- C. Attendance Required: Contractor's Project Manager and job superintendent, Field Engineer, Quality Control Engineer, major Subcontractors and suppliers, Owner's Representative, and others as appropriate to agenda topics for each meeting.
- D. Agenda:
 1. Introduction/Guests.
 2. Review minutes of previous meeting, include attendee's names with comments and corrections to minutes.

Engineering, Construction Progress and Operational Items

3. Summary of Work Completed Last Month.
4. Summary of Work Planned for This Month.
5. Schedule, including offsite fabrication and delivery schedule.
6. Issues, Solutions and Observations. Announce, highlight or present any unresolved or anticipated issues along with suggested solutions with focus on obtaining clarification or guidance. Present any general or specific observations about the course of work which require Engineer's input or Owner's approval. Each attendee offers such issues and observations or participates in the discussion at the time that each relevant topic is raised.
7. Testing Completed and Planned.
8. Safety- Incidents, Observations and Future Work.

Administrative Items

9. Status of Submittals.
10. Coordination Issues: Plant, Subs, Others.
11. Status of Request for Contractor Proposal Requests and Change Orders (RCP)(CO).
12. Status of Contractor Clarifications/Request for Information (RFI).
13. Status of Request for Field Construction Clarification (FCC).
14. Application for Payments: (Include Schedule of Values, Updated Progress Schedule, Application for Payment, _____ application form with Affidavits, Payment for materials, equipment by invoice, Extension of time request with justification, and Weather Delay notification with justification). Failure to provide time requests within the required time period specified will be cause for denial of any consideration of time extension.
15. Other Business (Call on each attendee to offer any additional comments or observations not previously covered).
16. Set Next Meeting Date, time and location.

1.7 PRE-INSTALLATION CONFERENCES

- A. When required in individual specification Section, convene a pre-installation conference at work site prior to commencing work of the Section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific Section.
- C. Notify Owner's Representative seven (7) calendar days in advance of meeting date.
- D. Prepare agenda, preside at conference, record minutes, and distribute copies within two (2) calendar days after conference to participants, with two (2) copies to Owner's Representative.
- E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01321

SCHEDULING OF CONSTRUCTION PHASE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes procedural requirements for preparation, submittal, and updating of Contractor's construction progress schedules using Microsoft Project 2010.

1.2 FORMAT

- A. Prepare Schedules as a horizontal bar chart with separate bar for each major portion of Work or operation, identifying first workday of each week.
- B. Sequence of Listings: The chronological order of the start of each item of work.
- C. Scale and Spacing: To provide space for notations and future revisions.
- D. Sheet Size: 11" x 17".
- E. As acceptable to the Owner's Representative, the Contractor's schedule submittal should reflect and be complimentary with the Contractor's Pay Application each month. Additional breakdown on activities of the Project features from the Project Schedule initially submitted may be necessary to facilitate progress on both the review of the Pay Application and the Contractor's Project Schedule.

1.3 CONTENT

- A. Show the complete sequence of construction by activity, with dates for beginning and completion of each major element of construction. Specifically list:
 - 1. Site Clearing and Preparation.
 - 2. Site Utilities (removal and replacement).
 - 3. Embankment Excavation
 - 4. Embankment Fill and Compaction
 - 5. Slope Protection.
 - 6. Roadway/Trail construction and repairs.
 - 7. Concrete Work.
 - 8. Subcontractor Work.
 - 9. Final Cleanup

- B. Show accumulated percentage of completion of each item and total percentage of work completed as of the twenty-fifth day of each month which is the Pay Estimate Cut-off date each month.
- C. Provide separate schedule of submittal dates for technical submittals, shop drawings, product data, and samples; show:
 - 1. Dates for Contractor's submittals.
 - 2. Dates submittals will be required for Owner-furnished products.
 - 3. Dates approved submittals will be required to be returned by the Owner's Representative.
- D. Products Delivery Schedule. Show the delivery dates for all major product items.

1.4 SUBMITTALS

- A. Submit initial progress schedules within fifteen (15) days after effective date of Owner-Contractor Agreement.
- B. Participate in review of initial schedules jointly with Owner's Representative. Reviews shall be limited to verifying that specific activities and dates pertaining to the following have been included:
 - 1. Milestone dates required by the Contract Documents.
 - 2. Adequate review times for Owner's Representative to review technical submittals, shop drawings, product data and samples. Review time will be determined by the Owner's Representative on the basis of submittals which conform to requirements of the Contract Documents in both form and substance, but will not include time required for review of substitutions or submittals that are at variance with requirements of the Contract Documents.
 - 3. Dates for Owner occupancy requirements.
 - 4. Activities pertaining to Owner-furnished materials, products and equipment.
 - 5. Activities required to coordinate with separate contracts for other portions of the Project.

If required, make necessary revisions to initial schedules and resubmit within seven (7) days.

- C. Submit updated progress schedules with each application for payment and participate in joint review when requested by Owner's Representative. Submit the number of submittals in quantity same as specified in Project Document Requirement section. Only the following activities and dates will be reviewed:
 - 1. Milestone dates required by the Contract Documents.

2. Submittal requirements for technical submittals, shop drawings, product data and samples.
3. Dates of Owner occupancy requirements.
4. Activities pertaining to Owner-furnished materials, products and equipment, or decisions.
5. Activities required to coordinate with separate contracts for other portions of the project.

If required, make necessary revisions and resubmit within ten (10) days.

- D. Submit the number of opaque reproductions which the Contractor requires, plus one reproducible transparency.
- E. Neither the requirement to submit construction schedules; the authority of the Owner's Representative to review the schedules; or any decision made in good faith by the Owner's Representative to exercise or not exercise such authority; shall give rise to any duty or responsibility of Owner or Owner's Representative to the Contractor, Subcontractor, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

1.5 PROGRESS UPDATING

- A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- B. Identify changes occurring since previous submittal of schedule, including:
 1. Major changes in scope.
 2. Activities modified since previous submission.
 3. Revised projections of progress and completion.
 4. Other identifiable changes.
- C. Provide a narrative report to define:
 1. Problem areas, anticipated delays, and the effect on the schedule.
 2. Corrective action taken or proposed, and its effect, including the effect of changes on schedules of separate subcontractors.

1.6 DISTRIBUTION

- D. Distribute copies of current schedules to:
 1. Jobsite file.
 2. Subcontractors and suppliers.
 3. Owner's Representative

4. Other concerned parties.

E. Instruct recipients to promptly report to the Contractor, in writing, problems anticipated by the projections indicated in the schedules.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01323

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section describes requirements for submitting construction photographs to support Applications for Payment and to supplement Record Documents.
- B. Prior to any on-site photography specific authorization by _____ is required.

1.2 PHOTOGRAPHY

- A. Submit digital photographs of site and construction throughout Progress of Work produced by a photographer, acceptable to the Owner's Representative.
- B. Take photographs on or before cutoff date (25th of each month) for each scheduled Application for Payment; and as follows:
 - 1. Completion of mobilization and Progress of site clearing.
 - 2. Progress and Completion of individual excavations.
 - 3. Progress and Completion of individual foundations or structures.
 - 4. Final completion.

PART 2- PRODUCTS

Not used.

PART 3- EXECUTION

3.1 VIEWS AND PRINTS

- A. Each month, submit digital photographs on a CD or DVD to Owner's Representative with Application for Payment.
- B. Photographs: Take photos from the following locations:
 - 1. Looking southerly or southwest or southeast; northerly or northwest, or northeast to include work area of all disturbed or new features. Periodic photos from River Parks West Bank Trail area to the east and from the River Parks East Bank Trail to the west.
 - 2. Other multiple locations necessary to capture the progress of the works not otherwise covered above.

3. Include views of excavation and fill of the river embankment. In these instances, photos shall be used for both historical archives and purposes of preparing Record Drawings.
 - C. Take additional minimum of ten (10) site photographs from differing directions indicating the relative progress of the Work. Provide on CD or DVD.
 - D. Identify photographs on CD or DVD with date, time, orientation, intent of photograph, and project identification.
 - E. Provide an electronic copy of the digital construction photographs on a CD disk and forward with each submittal. Photographs shall be of good quality and taken from a minimum quality 5 Mega pixel camera or better.
- 3.2 TECHNIQUE
- A. Provide factual presentation.
 - B. Provide correct exposure and focus.
 1. High resolution and sharpness.
 2. Maximum depth-of-field.
 3. Minimum distortion.
- 3.3 SEQUENCES.
- A. Photograph from locations to adequately illustrate condition of construction and state of progress.
 - B. At successive periods of photography, take at least one photograph from the same overall view as previously and as noted above.
 - C. Provide non-aerial photographs from 2 views at each specified time, until Date of Substantial Completion.
 - D. Consult with Owner's Representative at each period of photography for instructions concerning additional views required.
- 3.4 SUBMITTALS
- A. Deliver compact disc CD or DVD of photographs to Owner's Representative to accompany each Application for Payment.

END OF SECTION

SECTION 01325

SEQUENCE OF CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for sequencing construction to minimize the interference with the existing park operation during construction.
- B. Since this is generally adjacent to a public use area (West Bank Soccer Club and River Parks Authority West Bank Trail), the general intent for the Project is to expedite construction and complete the Arkansas River embankment repair and miscellaneous construction in an efficient manner.
- C. Prior to construction the Contractor shall submit a construction schedule in accordance with Section 01321.

1.2 STORMWATER PIPING AND DROP INLETS

- A. Not Applicable for this Project

1.3 TRAIL PAVING:

- A. This work will be performed following completion of underground work and re-grading.

1.4 COORDINATION WITH CONSTRUCTION SCHEDULE

- A. The Contractor shall note that there is an existing electrical line that provides power to the lighting system of the River Parks Trail and to determine if there are conflicts with the proposed remediation of the riverbank fill.
- B. Contractor shall incorporate the key elements outlined in this Section in the Construction Schedule as outlined in Section 01321.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 The Contractor shall comply with the Stormwater Pollution Prevention Plan, which may include some sequence of construction procedures to mitigate potential sediment pollution to the Arkansas River.

END OF SECTION

SECTION 01330

SUBMITTALS PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section describes administrative and procedural requirements for submittals, including Construction Progress Schedules, Submittal Schedule, Proposed Products List, Shop Drawings, Product Data, Samples, Manufacturer's Instructions, Manufacturer's Certificates, and Construction Photographs. This Section shall be compatible with the Project Document Requirements.

1.2 SUBMITTAL PROCEDURES

- A. Sequentially number the transmittal forms. Re-submittals to have original number with a numeric suffix separated by a dash. See transmittal sample at the end of this Section.
- B. Submittal cover sheet should include the Identify Project, Contractor, Subcontractor, or supplier; pertinent Drawing sheet and detail number(s), and specification Section detailed number, location usage noted, as appropriate.
- C. Affix Contractor's stamp, signed or initialed and dated to each drawing sheet, product booklet and sample transmittal sheet, certifying that review, verification of Products required, field dimensions, quantities, adjacent construction Work, and coordination of information are in accordance with the requirements of the Work and Contract Documents. The stamp shall contain the following information and certification:

"Name of Project & Contract Number

Contractor's Project Number

Architect/Engineer's Project Number

Submittal Number

Drawing Reference and installation location(s)

Specification Section Reference detailed to the specific submittal requirement number

CONTRACTOR'S CERTIFICATION:

Contractor has determined or verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, and has coordinated the information within the submittal with the requirements of the contract documents, and assumes full responsibility for so doing.

Name of Contractor By _____ Date _____"

Failure to affix and sign or initial such stamp will be cause for a submittal to be returned to the Contractor without review by Owner's Representative.

- D. Schedule submittals to expedite the Project, and deliver to Owner's Representative at address identified in the Pre-construction conference. Coordinate submittal of related items. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals. The Owner's Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received. Contractor to coordinate the submittals with other Project work and related system or package, as acceptable to Owners Representative.
- E. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work. Any substitution shall be marked clearly as a substitution with call out note statement "Material Substitution from Specified" where applicable.
- F. Provide space for Contractor and Architect/Engineer review stamps.
- G. Make re-submittals in the same form and number of copies as initial submittal. Revise and re-transmit submittals as required, identify all changes made since previous submittal(s).
- H. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions. Unless otherwise stated or indicated, submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Owner's Representative and Owner.
- I. Allow enough time for submittal review including time for re-submittals, as follows. Time for review shall commence on Owner's Representative's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
- J. The Owner's Representative reserves the right to require a submittal for any product or material to be incorporated into the project.

1.3 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule. Submit the number of copies which the Contractor requires, plus the amount required for the Owner's Representative and Owner.
- B. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
- C. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
 - 1. Scheduled date for the first submittal.
 - 2. Related Section number.

3. Submittal category.
 4. Name of subcontractor.
 5. Description of the part of the Work covered.
 6. Scheduled date for resubmittal.
 7. Scheduled date the Architect's final release or approval.
- D. Distribution: Following response to initial submittal, print and distribute copies to the Owner's Representative, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- E. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.
- 1.4 PROPOSED PRODUCTS LIST
- A. Within fifteen (15) days after effective date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- 1.5 SHOP DRAWINGS
- A. Submit in the form of four opaque reproductions. Submit the number of copies which the Contractor requires, plus two (2) copies which will be retained by the Owner's Representative and Owner. It is acceptable to include an original CD or DVD copy as one of the required copies of the submittal.
 - B. After review, distribute in accordance with Article on Procedures above and for Record Documents.
- 1.6 PRODUCT DATA
- A. Submit the number of copies which the Contractor requires, plus three (3) copies which will be retained by the Owner's Representative and Owner.
 - B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
 - C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents.
- 1.7 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for selection by the Owner's Representative.
- C. Include identification on each sample, with full Project information.
- D. Submit the number of samples specified in individual specification Sections; one of which will be retained by the Owner's Representative.
- E. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.8 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify, in writing, any conflicts between manufacturers' instructions and Contract Documents. The Owner's Representative will respond to the Contractor's written notice of conflict.

1.9 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to Owner's Representative for review, in quantities specified for Product Data.
- B. A "Manufacturers' Certificate of Proper Installation" may be required for specialized and process specific equipment or installations during the Project as required by the Owners Representative or where called for in an individual specification section. If required, the "certificate" would include a letter or form certification from the manufacturer, where the manufacturers' representative certifies and accepts the equipment and/or installation is meeting the Manufacturers' requirements and can be put into service for the contract requirements'. The "certificate" shall be provided by the Manufacturer as a service and integral part of the procurement for the contract. The Contractor shall coordinate the submittal and involvement of the Manufacturer as needed. The "certificate" should include applicable information such as project information, equipment information, installation location and any tests, as acceptable and acceptable to the Owners Representative.
- C. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Certificates may be recent or previous test results on material or Product, but must be acceptable to Owner's Representative.

1.10 CONSTRUCTION PHOTOGRAPHS

- A. Each month, submit photographs to Owner's Representative with Application for Payment.

- B. Refer to section 01323 Construction Photographs for complete requirements.

1.11 ACTION NOTATIONS

- A. Where action and return is required, the Owner's Representative will review each submittal, indicate action taken, and return within a reasonable period of time.
- B. Action Stamp: The Owner's Representative will stamp submittals if required, with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
 - 1. Final Unrestricted Release: Where submittals are marked "Approved" or "No Exceptions Taken" that part of the Work covered by the submittal may proceed provided it complies with all requirements of the Contract Documents; final acceptance will depend upon that compliance. It is the Contractor's requirement to assure that all equipment fully complies with the submittal, or a subsequent submittal may need to be submitted for consideration.
 - 2. Final-But-Restricted Release: When submittals are marked "Approved as Corrected," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance. The Contractor shall confirm in writing that all notations or corrections on the submittal are understood and compliant.
 - 3. Returned for Resubmittal: When submittal is marked "Not Approved" or "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay.
 - 4. Do not permit submittals marked "Not Approved" or "Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
 - 5. Other Action: If a submittal is received and is not a required submittal, it will be returned, marked "Not Reviewed and Action Not Required", or "Received for Information Only".
 - 6. A response from the Architect/Engineer on the review stamp does not alleviate or modify any Contract requirements. A subsequent identification by the Architect/Engineer of a non-conforming item or issue on a previous submittal with a "No Exceptions Taken" status does not imply or authorize a Change Order or additional cost for the Contractor. The Contractor shall comply with the Contract requirements regardless of the status of the submittal.
- C. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

[illegible]

TYPES OF SUBMITTALS

PD - PRODUCT DATA

SD - SHOP DRAWINGS

S – SAMPLES

QUALITY CONTROL SUBMITTALS

DD - DESIGN DATA

TR - TEST REPORT

C – CERTIFICATES

MI - MANUFACTURER'S INSTRUCTIONS

MFR - MANUFACTURER'S FIELD REPORT

CONTRACT CLOSEOUT SUBMITTALS

PRD - PROJECT RECORD DOCUMENTS

OM - OPERATION AND MAINTENANCE

DW - DATA WARRANTY

END OF SECTION

SECTION 01421

REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section includes requirements for compliance with Reference Standards used in the individual Product specification Sections and for requiring copies of standards at the site.

1.2 QUALITY ASSURANCE

- B. For Products or workmanship specified by association, trades, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- C. Issue Date of Standards:
 - 1. Code Listings: Comply with the issue date published in the referenced Building Code.
 - 2. Non-Code Listings: Comply with the issue date current as of the date for receiving bids.
- D. Obtain copies of standards direct from publication source when needed for proper performance of the Work, or when required for submittal by Contract Documents.
- E. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.
- F. Verify that products and workmanship provided meet or exceed the specified requirements. Those which fail to meet the specified requirements will be considered non-conforming.
- G. Should specified reference standards conflict with Contract Documents, request clarification from the Owner's Representative before proceeding.

1.3 SCHEDULE OF REFERENCES

AAA
ALUMINUM ASSOCIATION
900 19TH ST., NW, SUITE 300
WASHINGTON, DC 20006
(202) 862-5100

AABC
ASSOCIATED AIR BALANCE COUNCIL
1518 K ST., NW, SUITE 503
WASHINGTON, DC 20005
(202) 737-0202

AASHTO
AMERICAN ASSOCIATION OF STATE HIGHWAY
AND TRANSPORTATION OFFICIALS
444 NORTH CAPITOL STREET, N.W., SUITE 225
WASHINGTON, DC 20001
(202) 624-5800

ACI
AMERICAN CONCRETE INSTITUTE
BOX 19150
DETROIT, MI 48219
(313) 532-2600

ADC
AIR DIFFUSION COUNCIL
230 NORTH MICHIGAN AVENUE, SUITE 1200
CHICAGO, IL 60601
(312) 372-9800

AGC
ASSOCIATED GENERAL CONTRACTORS OF AMERICA
1515 WILSON BOULEVARD
WASHINGTON, DC 22209
(703) 841-8400

AI
ASPHALT INSTITUTE
ASPHALT INSTITUTE BUILDING
COLLEGE PARK, MD 20740
(301) 277-4258

AIA
AMERICAN INSTITUTE OF ARCHITECTS
1735 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20006
(202) 626-7300

AISC
AMERICAN INSTITUTE OF STEEL CONSTRUCTION
400 NORTH MICHIGAN AVENUE
EIGHTH FLOOR
CHICAGO, IL 60611
(312) 670-2400

AISI
AMERICAN IRON AND STEEL INSTITUTE
1133 FIFTEENTH ST., NW
WASHINGTON, DC 20005
(202) 452-7100

AITC
AMERICAN INSTITUTE OF TIMBER CONSTRUCTION
333 W. HAMPDEN AVENUE
ENGLEWOOD, CO 80110
(303) 761-3212

AMCA
AIR MOVEMENT AND CONTROL ASSOCIATION
30 WEST UNIVERSITY DRIVE
ARLINGTON HEIGHTS, IL 60004
(312) 394-0150

ANSI
AMERICAN NATIONAL STANDARDS INSTITUTE
1430 BROADWAY
NEW YORK, NY 10018
(212) 354-3300

APA
AMERICAN PLYWOOD ASSOCIATION
BOX 11700
TACOMA, WA 98411
(206) 565-6600

ARI
AIR-CONDITIONING AND REFRIGERATION INSTITUTE
1501 WILSON BOULEVARD
ARLINGTON, VA 22209
(703) 524-8800

ASHRAE
AMERICAN SOCIETY OF HEATING, REFRIGERATING
AND AIR CONDITIONING ENGINEERS
1791 TULLIE CIRCLE, N.E.
ATLANTA, GA 30329
(404) 636-8400

ASME
AMERICAN SOCIETY OF MECHANICAL ENGINEERS
345 EAST 47TH STREET
NEW YORK, NY 10017
(212) 705-7722

ASPA
AMERICAN SOD PRODUCERS ASSOCIATION
ASSOCIATION BUILDING
NINTH AND MINNESOTA
HASTINGS, NE 68901

ASSE
AMERICAN SOCIETY OF SANITARY ENGINEERING

P.O. BOX 40362
BAY VILLAGE, OH 44140
(216) 835-3040

ASTM
AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 RACE STREET
PHILADELPHIA, PA 19103
(215) 299-5400

AWS
AMERICAN WELDING SOCIETY
P.O. BOX 351040, 550 LE JEUNE ROAD, NW
MIAMI, FL 33135
(305) 443-9353

AWWA
AMERICAN WATER WORKS ASSOCIATION
6666 WEST QUINCY AVENUE
DENVER, CO 80235
(303) 794-7711

AWI
ARCHITECTURAL WOODWORK INSTITUTE
2310 SOUTH WALTER REED DRIVE
ARLINGTON, VA 22206
(703) 671-9100

AWPA
AMERICAN WOOD-PRESERVERS' ASSOCIATION
P.O. BOX 849
STEVENSVILLE, MD 21666
(301) 643-4163

CDA
COPPER DEVELOPMENT ASSOCIATION
BOX 1840, GREENWICH OFFICE PARK 2
GREENWICH, CT 06836
(203) 625-8210

CLFMI
CHAIN LINK FENCE MANUFACTURERS INSTITUTE
1101 CONNECTICUT AVENUE
WASHINGTON, DC 20036

CRSI
CONCRETE REINFORCING STEEL INSTITUTE
933 PLUM GROVE ROAD
SCHAUMBURG, IL 60195
(312) 490-1700

EJCDC
ENGINEERS' JOINT CONTRACT DOCUMENTS COMMITTEE
AMERICAN CONSULTING ENGINEERS COUNCIL
1050 15TH STREET, N.W.
WASHINGTON, DC 20005

EJMA
EXPANSION JOINT MANUFACTURERS ASSOCIATION
707 WESTCHESTER AVENUE
WHITE PLAINS, NY 10604

FGMA
FLAT GLASS MARKETING ASSOCIATION
3310 HARRISON, WHITE LAKES PROFESSIONAL BUILDING
TOPEKA, KS 66611
(913) 266-7013

FM
FACTORY MUTUAL SYSTEM
1151 BOSTON-PROVIDENCE TURNPIKE
NORWOOD, MA 02062
(617) 762-4300

FS
FEDERAL SPECIFICATION
GENERAL SERVICES ADMINISTRATION
SPECIFICATIONS AND CONSUMER INFORMATION
DISTRIBUTION SECTION (WFSIS)
WASHINGTON NAVY YARD, BLDG. 197
WASHINGTON, DC 20407

GA
GYPSUM ASSOCIATION
1603 ORRINGTON AVENUE
EVANSTON, IL 60201
(312) 491-1744

IEEE
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
345 EAST 47TH STREET
NEW YORK, NY 10017
(212) 705-7900

IMIAC
INTERNATIONAL MASONRY INDUSTRY ALL-WEATHER COUNCIL
INTERNATIONAL MASONRY INSTITUTE
815 15TH STREET, N.W.
WASHINGTON, DC 20005

MFMA
MAPLE FLOORING MANUFACTURERS ASSOCIATION

60 REVERE DR., SUITE 500
NORTHBROOK, IL 60062
(312) 480-9138

MIL
MILITARY SPECIFICATION
NAVAL PUBLICATIONS AND FORMS CENTER
5801 TABOR AVENUE
PHILADELPHIA, PA 19120

ML/SFA
METAL LATH/STEEL FRAMING ASSOCIATION
600 S. FEDERAL ST., SUITE 400
CHICAGO, IL 60605
(312) 922-6222

NAAMM
NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS 600 S. FEDERAL
ST., SUITE 400
CHICAGO, IL 60605
(312) 922-6222

NEBB
NATIONAL ENVIRONMENTAL BALANCING BUREAU
8224 OLD COURTHOUSE ROAD
VIENNA, VA 22180
(703) 790-9890

NEMA
NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION
2101 L STREET, N.W., SUITE 300
WASHINGTON, DC 20037
(202) 457-8400

NFPA
NATIONAL FIRE PROTECTION ASSOCIATION
BATTERYMART PARK
QUINCY, MA 02269
(617) 770-3000

NFPA
NATIONAL FOREST PRODUCTS ASSOCIATION
1250 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036
(202) 463-2700

NSWMA
NATIONAL SOLID WASTES MANAGEMENT ASSOCIATION
1120 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

NTMA
NATIONAL TERRAZZO AND MOSAIC ASSOCIATION
3166 DES PLAINES AVENUE
DES PLAINES, IL 60018
(312) 635-7744

PCA
PORTLAND CEMENT ASSOCIATION
5420 OLD ORCHARD ROAD
SKOKIE, IL 60077
(312) 966-6200

PCI
PRESTRESSED CONCRETE INSTITUTE
175 W. JACKSON BOULEVARD
CHICAGO, IL 60604
(312) 786-0300

PS
PRODUCT STANDARD
U.S. DEPARTMENT OF COMMERCE
WASHINGTON, DC 20203

RCSHSB
RED CEDAR SHINGLE AND HANDSPLIT SHAKE BUREAU
515 116TH AVENUE
BELLEVUE, WA 98004

RIS
REDWOOD INSPECTION SERVICE
591 REDWOOD HIGHWAY, SUITE 3100
MILL VALLEY, CA 94941
(415) 381-1304

SDI
STEEL DECK INSTITUTE
P.O. BOX 9506
CANTON, OH 44711
(216) 493-7886

SDI
STEEL DOOR INSTITUTE
712 LAKEWOOD CENTER NORTH
14600 DETROIT AVENUE
CLEVELAND, OH 44107
(216) 226-7700

SIGMA
SEALED INSULATION GLASS MANUFACTURERS ASSOCIATION
111 EAST WACKER DRIVE
CHICAGO, IL 60601

(312) 644-6610

SJI
STEEL JOIST INSTITUTE
1205 48TH STREET NORTH; SUITE A
MYRTLE BEACH, SC 29577
(803) 449-0487

SMACNA
SHEET METAL AND AIR CONDITIONING CONTRACTORS'
NATIONAL ASSOCIATION
P.O. BOX 70
MERRIFIELD, VA 22116
(703) 790-9890

SSPC
STEEL STRUCTURES PAINTING COUNCIL
4400 FIFTH AVENUE
PITTSBURGH, PA 15213
(412) 268-3327

TAS
TECHNICAL AID SERIES
CONSTRUCTION SPECIFICATIONS INSTITUTE
601 NORTH MADISON STREET
ALEXANDRIA, VA 22314

TCA
TILE COUNCIL OF AMERICA, INC.
BOX 326
PRINCETON, NJ 08540
(609) 921-7050

UL
UNDERWRITERS LABORATORIES, INC.
333 PFINGSTON ROAD
NORTHBROOK, IL 60062

WCLIB
WEST COAST LUMBER INSPECTION BUREAU
BOX 23145
PORTLAND, OR 97223
(503) 639-0651

PART 2 - **PRODUCTS** Not used.

PART 3 - **EXECUTION** Not used.

END OF SECTION

SECTION 01451

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section describes services to be provided by an independent testing laboratory selected by the Owner, including the Contractor's responsibilities.

1.2 SUBMITTALS

- A. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer, specialist and responsible officer.
- B. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.3 REFERENCES

- A. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.4 SELECTION AND PAYMENT

- A. Owner will employ services of an independent testing laboratory to perform specified inspection and testing; Contractor shall pay costs of services from allowance specified in Section CONTRACT CONSIDERATIONS.

1.5 QUALITY ASSURANCE

- A. Comply with "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories.
- B. Comply with basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete Steel, and Bituminous Materials as Used in Construction." ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- C. Laboratory: Authorized to operate in the state of Oklahoma.
- D. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
- E. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.6 LABORATORY RESPONSIBILITIES

- A. Cooperate with Owner's Representative and Contractor; provide qualified personnel at the site after due notice.
- B. Test samples of mixes submitted by Contractor.
- C. Perform specified inspections, sampling, and testing of materials in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Owner's Representative and Contractor of observed irregularities or non-conformance of work or products.
- F. Perform additional inspections and tests required by Owner's Representative.
- G. Attend conferences and progress meetings, when requested.

1.7 LABORATORY REPORTS

- A. Promptly submit written report of each test and inspection; one copy each to Owner's Representative, Owner, Contractor, and one copy to Record Document 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 Time of Sampling or Inspection.
 - 6. Record of Temperature and Weather Conditions.
 - 7. Date of Test.
 - 8. Identification of Product and Specification Section.
 - 9. Location of Sample or Test in the Project.
 - 10. Type of Inspection or Test.
 - 11. Results of tests and compliance with Contract Documents.
- B. Provide interpretation of test results, when requested by Owner's Representative.

1.8 LIMIT ON AUTHORITY OF TESTING LABORATORY

- A. 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.
 - 4. Stop the Work.

1.9 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to Work and to manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site or at source of Products to be tested, to facilitate tests and inspections, storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
- G. Notify Owner's Representative 24 hours prior to expected time for operations requiring inspection and testing.
- H. Pay costs of testing laboratory services from Allowance specified in section PRICE AND PAYMENT PROCEDURES, Section 01201 on approval of invoices by Owner's Representative.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01521
FIELD OFFICES AND SHEDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section describes basic requirements for temporary buildings and furnishing required during construction, provided and maintained by the Contractor, and removed when the Work is completed.

1.2 USE OF EXISTING FACILITIES

- A. Existing facilities shall not be used for field offices or for storage.

1.3 USE OF PERMANENT FACILITIES

- A. Permanent facilities shall not be used for field offices or for storage.

1.4 USE OF VEHICLE

- A. The Contractor's vehicle may be used for a field office, but not for storage.
- B. The Engineer's vehicle is acceptable for use as an office space.

PART 2 - PRODUCTS

2.1 MATERIALS, EQUIPMENT, FURNISHINGS

- A. Materials, Equipment, Furnishings: Serviceable, new, or used, adequate for required purpose.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Fill and grade sites for temporary structures are to provide drainage away from buildings.

3.2 INSTALLATION

- A. Consult with Owner's Representative on location, access, and related facilities, prior to installation of offices and sheds.
- B. Install office spaces ready for occupancy ten (10) days after effective date of Notice to Proceed.

- C. Parking: One gravel surfaced parking spaces for use by the Owner's Representative.
- D. Mount thermometer at convenient outside location, not in direct sunlight.

3.3 CONSTRUCTION

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weathertight enclosures for office and storage spaces. Maintain during progress of Work; remove at completion of Work.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
- D. Exterior Materials: Weather resistant, finished.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 ft-C at desk-top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: Appropriate type fire extinguisher at each office and each storage area.
- H. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

3.4 ENVIRONMENTAL CONTROL

- A. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain 68 degrees F heating and 76 degrees F cooling.
- B. Storage Spaces: Heating and Ventilation as needed to maintain products in accordance with Contract Documents; adequate lighting for maintenance and inspection of products.

3.5 CONTRACTOR OFFICE AND FACILITIES (TO BE DETERMINED AT PRE-CONSTRUCTION MEETING)

- A. Size: For Contractor's needs and to provide space for Project meetings.
- B. Telephone: One direct line with instrument.
- C. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and Project Record Documents. Conferences may be held at the River Parks Authority office located at 2424 E. 21st Street, Suite 300, Tulsa, Oklahoma in lieu of providing a conference area.
- D. Other Furnishings: Contractor's option.

- E. Equipment: Six adjustable band protective helmets for visitors, one 10-inch outdoor weather thermometer.

3.6 OWNER-REPRESENTATIVE OFFICE (NOT APPLICABLE – WILL SHARE CONTRACTOR'S OFFICE SPACE, OR USE VEHICLE FOR OFFICE)

- A. Separate space for sole use of Owner and Architect/Engineer, with separate entrance door with new lock and two keys.
- B. Area: Minimum 120 sq ft, minimum dimension 8 ft.
- C. Windows: Minimum one (1); minimum total area of five (5) percent of floor area, with operable sash and insect screens. Locate to provide views of construction area.
- D. Electrical Distribution Panel: Two (2) circuits minimum, 110 volt, 60 hz service.
- E. Minimum four (4) 110-volt duplex convenience outlets, one on each wall.
- F. Telephone: One direct line with instrument and call waiting feature, if available. DSL and/or fax line separate if available.
- G. Sanitary Facilities: Convenient access to drinking fountain or water cooler and lavatory-toilet facilities.
- H. Furnishings:
 - 1. One (1) desk per occupant, 54 x 30 inch, with three drawers.
 - 2. One (1) drafting table, 36 x 72 inch, with one equipment drawer.
 - 3. Plan rack to hold working Drawings, shop drawings, and Record Documents.
 - 4. One (1) standard four-drawer, legal size, metal filing cabinet with locks and two keys per lock.
 - 5. Six (6) linear feet of bookshelves.
 - 6. One (1) swivel armchair per occupant.
 - 7. Two (2) straight chairs.
 - 8. One (1) drafting stool.
 - 9. One (1) waste basket per desk and table.

3.7 STORAGE AREAS AND SHEDS

- A. The specific location of contractor's office trailer and storage area shall be determined during the Pre-Construction meeting. Size to storage requirements for products of individual Sections. Allow for access and orderly provision for maintenance and for inspection of products. Do not stage or store project material within the limits of the existing trail.

- B. Heating and Ventilation: Adequate to maintain temperatures specified in the individual Specification Sections for the Products stored.

3.8 MAINTENANCE AND CLEANING

- A. Biweekly janitorial services for offices; periodic cleaning and maintenance for storage areas.
- B. Maintain approach walks free of mud, water, and snow.

3.9 REMOVAL

- A. At completion of Work, remove temporary office, sheds, foundations, utility services, and debris. Re-grade the site to required elevations, seed and/or sod, and clean the areas.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 - GENERAL

- 1.1 DESCRIPTION. This Section describes administrative and procedural requirements concerning selection of products for use in the Project.

- 1.2 DEFINITIONS. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories", and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.

"Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "new material", "equipment", "machinery", "components", "systems", "fixtures" and terms of similar intent. Products may also include existing materials or components required for reuse.

"Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturers' published product literature that is current as of the date of the Contract Documents.

"Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

"Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping. Does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the Work.

- 1.3 QUALITY ASSURANCE. Provide products of the same kind, from a single source. Provide interchangeable components of the same manufacturer, for similar components.

Manufacturer's Instructions: When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Owner's Representative. Maintain one set of complete instructions at the job site during installation and until completion.

- 1.4 PRODUCT DELIVERY. Deliver, store and handle Products in accordance with manufacturer's instructions, including any environmental requirements. Arrange deliveries of Products in accordance with construction schedules; coordinate to avoid conflict with work and conditions at the site. All material deliveries shall be coordinated through River Parks Authority's superintendent or the Resident Project Representative.

Deliver Products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible. Immediately on delivery, inspect shipments to assure that products comply with requirements of Contract Documents and

approved submittals, and quantities are correct. Provide equipment and personnel to handle Products by methods to prevent soiling or damage.

- 1.5 **STORAGE AND PROTECTION.** Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store products subject to damage by the elements in weather tight, climate controlled enclosures. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

Exterior Storage: Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover Products which are subject to deterioration with impervious sheet coverings, provide ventilation to avoid condensation. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter. Arrange storage in a manner to provide easy access for inspection. Periodically inspect to assure that Products are undamaged and maintained under specified conditions. Any identification of drainage issues by the Owner's Representative that affect any stored material shall be immediately remediated upon notification.

- 1.6 **EXCLUSION OF PRODUCTS CONTAINING HAZARDOUS MATERIALS.** If Contractor during the course of work observes or discovers that a product or assembly contains hazardous materials, Contractor shall promptly notify the Plant Manager. The Contractor shall not incorporate into the work any product or assembly containing such materials.
- 1.7 **TRANSFER OF MATERIALS TO OWNER.** If Contractor during the course of the work is required to transfer any materials to the Owner, a written documentation of transfer shall be provided, and all equipment or material shall be properly protected from the weather or other elements prior to final transfer.

PART 2 - PRODUCTS

- 2.1 Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- 2.2 **Contractor's Options:** Products specified by Reference Standards or by Description only: Select any product meeting that standard or description. Products specified by naming more than one Product or Manufacturer: Select any one of the products or manufacturers named, which complies with the specifications; submit a request for substitution for any manufacturer not named. Products specified by naming only one Product and Manufacturer: No option or substitution allowed following receipt of bids.
- 2.3 **Visual Selection:** Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Engineer will select the color, patterns and texture from the product line selected.
- 2.4 **Substitutions.** For a period of 15 days after effective date of Contract, the Engineer will consider written requests from Contractor for substitution of Products. Substitution Submittal Procedure: Submit three (3) copies of each request and limit each request to

one proposed substitution, supported with complete data, drawings, and samples as appropriate, including:

- Comparison of the qualities of the proposed substitution with that specified.
- Changes required in other elements of the work because of the substitution.
- Effect on the construction schedule.
- Cost data comparing the proposed substitution with the Product specified.
- Any required license fees or royalties.
- Availability of maintenance service, and source of replacement materials.

2.5 The Owner's Representative shall be the judge of the acceptability of the proposed substitution and will review request with reasonable promptness, notify Contractor, in writing, of the decision to accept or reject the requested substitution. A request constitutes a representation that Contractor:

- Has investigated the proposed product and determined that it meets or exceeds the quality level of the specified Product.
- Will provide the same warranty or bonds for the substitution as for the specified Product.
- Will coordinate installation and make changes to other work as may be required for Work to be complete with no additional cost to the Owner.
- Waives claims for additional costs and time extension which may subsequently become apparent.
- Will reimburse Owner for review or redesign services.

Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

PART 3 - EXECUTION

- 3.1 Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
- 3.2 Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
- 3.3 Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.
- 3.4 Should job conditions or specified requirements conflict with manufacturer's instructions, request clarification from the Owner's Representative before proceeding.

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Administrative and procedural requirements for Project closeout, including final cleaning, Punch List items, Project Record documents, operation and maintenance data, lien releases, and warranties. All warranty work, problem response, defect repair, and maintenance will be directed to the General Contractor by either the Owner's Representative or Owner, whom shall do all coordination required to ensure that issues are resolved in a timely manner.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following.
 - 1. All Punch List Items are to be completed and resolved.
 - 2. All operation training of Owner's Operators is completed
 - 3. All maintenance training of the Owner's personnel is completed
 - 4. All Record Drawings, including Pre-Construction and Post-Construction Survey (1-foot Contours) in AutoCAD format, have been submitted and reviewed by Owner's Representative
 - 5. All Non-conformances are resolved and signed off by Owner's Representative
 - 6. Advise Owner of pending insurance changeover requirements.
 - 7. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 8. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates, lien releases, and similar releases.
 - 9. Deliver tools, spare parts as described in each manufacturers' O&M Manual, extra stock, and similar items.
 - 10. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions. (NOT APPLICABLE)

11. Provide any necessary instructions to the Owner's Operating and Maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

12. Complete final clean up requirements.

B. Inspection Procedures: On receipt of a request for inspection, the Owner's Representative will either proceed with inspection or advise the Contractor of unfilled requirements. The Owner's Representative will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Owner's Representative will repeat inspection when requested and assured that the Work has been substantially completed.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.3 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following:

1. Submit the Final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. Include releases and supporting documentation not previously submitted and accepted and certificates of insurance for products and completed operations where required.

2. Submit consent of surety to final payment.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: The Owner's Representative will inspect the Work upon receipt of notice that the Work, including inspection Punch List items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Owner's Representative.

1. Upon completion of re-inspection, the Owner's Representative will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, re-inspection will be repeated.

C. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for final inspection by the Owner's Representative, the Owner, and any lending institution personnel.

D. Provide submittals to Owner's Representative that are required by governing or other authorities.

- E. Owner may occupy portions of the Project prior to acceptance of the entire Project. (MAY NOT BE APPLICABLE)
- F. Provide two (2) copies of each specified Manufacturer's training on video tape as completed with Owner's staff. (NOT APPLICABLE)

1.4 PROJECT RECORD DOCUMENT SUBMITTALS

- A. Maintain on site one set of the following record documents and record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Technical Submittals, Shop drawings, product data, and samples.
- B. Store Record Documents separately from documents used for construction, and label each document "PROJECT RECORD" in neat, large printed letters. Provide access to record documents for the Owner Representative's reference during normal working hours.
- C. Record information concurrent with construction progress.
- D. Record Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturer's name and product model and number, and name of supplier.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.
- E. Record Drawings and Shop Drawings: Legibly mark each item to record the actual installation where the installation varies from the Work as originally shown, including:
 - 1. Measured depths of foundations in relation to finish first floor datum.(NOT APPLICABLE)
 - 2. Measured horizontal and vertical locations of underground utilities, including electrical duct bank and conduits, and appurtenances referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.

5. Details not on original Contract Drawings.
 6. Changes made by Field Directed Work Order or by Change Order.
 7. Where shop drawings are used, record a cross-reference at the corresponding location on the Contract Drawing.
- F. Delete Architect/Engineer title block and seal from all documents.
- G. Submit Record Documents to Owners' Representative prior to final Application for Payment.
- 1.5 OPERATION AND MAINTENANCE DATA (MAY NOT BE APPLICABLE)
- A. Submit Operation and Maintenance Data manuals prior to final acceptance, in accordance with specifications Section 1781 and Project Document Requirements.
- 1.6 WARRANTIES AND BONDS
- A. Submit warranties and bonds as specified in the individual specification Sections, and as outlined in the Contract Documents.
- B. Provide notarized copies.
- C. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- D. Provide Table of Contents and assemble in a three D-size ring binder with durable plastic cover.
- E. Submit prior to final Application for Payment.
- F. For items of Work delayed beyond date of Final Acceptance, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period. Should the Project time be extended beyond the original Contract completion date, the Contractor shall extend the warranty periods from the date of Final Acceptance of the Project.
- 1.7 SPARE PARTS AND MAINTENANCE MATERIALS (NOT APPLICABLE)
- A. Provide products, spare parts, maintenance, and extra materials in quantities specified in individual specification Sections or as documented in the Manufacturers' Operation and Maintenance Manual.
- B. Deliver to Owner at Project site and place in location as directed; obtain receipt prior to final payment.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 INSTRUCTION OF OWNER'S PERSONNEL (NOT APPLICABLE)

- A. Prior to final inspection, fully instruct Owner's designated personnel in operation, adjustment, and maintenance of all products, equipment, and systems, at agreed upon times. Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction and detailed training (to be videoed) in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items, as applicable:
 - 1. Maintenance manuals.
 - 2. Record documents.
 - 3. Spare parts and materials.
 - 4. Tools.
 - 5. Lubricants.
 - 6. Fuels.
 - 7. Identification systems.
 - 8. Control sequences.
 - 9. Hazards.
 - 10. Cleaning.
 - 11. Warranties and bonds.
 - 12. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
 - 1. Start-up.
 - 2. Shutdown.
 - 3. Emergency operations.
 - 4. Noise and vibration adjustments.

- 5. Safety procedures.
 - 6. Economy and efficiency adjustments.
 - 7. Effective energy utilization.
 - 8. Trouble-shooting of issues
- C. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months.
- D. Use operating and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operations and maintenance.

The training of Owner's personnel shall be coordinated between and scheduled at least two (2) weeks in advance by the Contractor and the Owner at regularly-scheduled monthly project progress meetings. "On-the-fly", ad hoc, unscheduled, impromptu or informal hand-off or training sessions are insufficient and not acceptable for the intended purposes of these specifications and required effort.

3.2 FINAL CLEANING

- A. Execute final cleaning by experienced workers or professional cleaners prior to final inspection. Final cleaning may be required more than one time should issues on the Punch List require a time frame that causes the facilities to become dirty or additional debris is accumulated.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces. (NOT APPLICABLE)
- C. All concrete and pipe surfaces shall be washed-down using detergent and water and thoroughly rinsed. (NOT APPLICABLE)
- D. Clean equipment and fixtures to a sanitary condition. (NOT APPLICABLE)
- E. Clean debris from roofs, gutters, downspouts, and drainage systems. (NOT APPLICABLE)
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

3.3 ADJUSTING

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

END OF SECTION

WEST BANK REMEDIATION PROJECT
TECHNICAL SPECIFICATIONS

DIVISION 2 - LIST OF SECTIONS

Section 02200 - Utility Excavation Trenching and Backfill
Section 02220 - Site Demolition
Section 02223 - Utility Demolition
Section 02226 - Structure Excavation and Backfill
Section 02230 - Site Clearing
Section 02276 - Rip-rap
Section 02310 - Site Grading
Section 02316 - Trench Excavation and Backfill
Section 02320 - Compaction Control and Testing
Section 02532 - Aggregate Base Course
Section 02533 - Gravel Road Surfacing
Section 02747 - Bituminous Concrete Pavement
Section 02821 - Chain Link Fences and Gates
Section 02891 - Traffic Signs
Section 02900 - Planting
Section 02901 - Landscape Work
Section 02911 - Topsoil
Section 02917 - Soil Preparation
Section 02923 - Seeding
Section 02925 - Sodding

SECTION 02200

UTILITY EXCAVATION, TRENCHING, AND BACKFILLING

PART 1 - GENERAL

1.01 GENERAL

The provisions set forth in this section shall be applicable to all underground utility piping installations, regardless of location, unless prior approval is received from the Owner's Representative for special design considerations. All excavations shall be properly shored, sheeted and braced or cut back at the proper slope to provide safe working conditions, to prevent shifting of material, to prevent damage to structures or other work and to avoid delay to the work, all in compliance with the U.S. Department of Labor Occupational Safety and Health Act (OSHA), and under Section 107 of the Contract Work Hours and Safety Standards Act (Public Law 91-54 or as amended). The minimum shoring, sheeting, and bracing for trench excavations shall meet the general trenching requirements of the safety and health regulations. In all cases where a conflict exists in the requirements of OSHA Regulations, and these specifications, the requirements of the state agency shall prevail.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. SHEETING AND BRACING:

1. Wood sheeting to be left in place shall be pressure treated with preservative in accordance with the current requirements of the American Wood Preservers Association Manual of Recommended Practice.
2. Steel sheeting to be left in place shall be as specified in ASTM Designation A328.

B. CONCRETE:

Required concrete shall have a minimum 3,000 pounds per square inch compressive strength.

PART 3 – EXECUTION

3.1 TRENCHING:

- A. Trench Dimensions: The minimum width of the trench shall be equal to the outside diameter of the pipe, plus 12 inches, and the maximum width of trench, measured at the top of the pipe, shall not exceed the outside pipe diameter plus two feet, unless otherwise shown on the drawing details or approved by the Owner's Representative.

- B. Trench Grade: Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as six inches below the outside of the bottom of the utility, which six inches shall be backfilled with extra utility bedding material. Excavation below trench grade that is done in error shall be backfilled to trench grade with granular material and compacted.
- C. Utility Bedding: The bottom of the trench shall be shaped to provide a firm bedding for the utility pipe. The utility shall be firmly bedded in undisturbed firm soil, or hand-shaped unyielding material. The bedding shall be shaped so that the pipe will be in continuous contact therewith for its full length and shall provide a minimum bottom segment support for the pipe equal to the spring line of the pipe or one-half of the outside diameter of the barrel. Bedding shall be installed in accordance with ANSI/AWWA C150/A21.50. Special bedding may be required, due to depth of cover, impact loadings, or other conditions.
- D. Unsuitable Material Below Trench Grade: Soil unsuitable for a proper foundation encountered at or below trench grade, such as muck or other deleterious material, shall be removed for the full width of the trench and to the depth required to reach suitable foundation material, unless special design considerations receive prior approval from the Owner's Representative. Backfilling below trench grade shall be in compliance with the applicable provisions of Subsection M, "Backfill", with material as specified under Paragraphs M.1. and M.2 of this section.
- E. Extra Utility-Bedding Material: When rock or other non-cushioning material is encountered at trench grade, excavation shall be extended to six inches below the outside of the bottom of the utility, and a cushion of granular material rock shall be provided. Utility-bedding material shall be installed as specified under Paragraph M.2.
- F. Sheeting and Bracing: In order to prevent damage to property, injury to persons, erosion, cave-ins, or excessive trench widths, adequate sheeting and bracing shall be provided, as required, and/or directed by the Owner's Representative, in accordance with accepted standard practice. When the situation arises, sheeting and bracing shall be used as necessary to protect the integrity of the road shoulder. Sheeting shall be removed when the trench has been backfilled to at least one-half its depth, or when removal would not endanger the construction of adjacent structures. When required, to eliminate excessive trench width or other damage, sheeting, bracing, or shoring shall be left in place and the top cut off at an elevation of 5.0 feet below finished grade, unless otherwise directed.
- All sheeting and bracing will be in accordance with OSHA.
- G. Excavated Material: Excavated material to be used for backfill shall be neatly and safely deposited at the sides of the trenches where space is available. Whenever possible, excavated material near a roadway should be deposited on the

right-of-way side of the trench away from the travel way. Where stockpiling of excavated material is required, the Contractor shall be responsible for obtaining the sites to be used and shall maintain his operations to provide for natural drainage and not present an unsightly appearance. All sites shall be restored after fill is removed.

- H. Material Disposal: Excess, unsuitable, or cleared and grubbed material resulting from the utility installation shall be removed from the work site and disposed of a location(s) secured by the Contractor, and in accordance with the agency having jurisdiction. Excess excavated material shall be spread on the disposal site and graded in a manner to drain properly and not disturb existing drainage conditions, in accordance with applicable permit requirements.
- I. Borrow: Should there be insufficient satisfactory material from the excavations to meet the requirements for fill material, borrow shall be obtained from pits secured by the Contractor. All borrow shall meet the provisions of these specifications.
- J. Earth Excavation: Earth excavation shall be defined as excavation of any natural substance that is above or below "rock", as defined in Paragraph K that can be removed by a one cubic yard bucket and does not require the use of explosives and/or special impact tools such as jackhammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock. For this Contract all excavation is considered as Unclassified Excavation relating to payment for excavation under Bid Item No. 5.
- K. Rock Excavation: Rock excavation shall be defined as excavation of any hard natural substance that cannot be removed by a one cubic yard bucket and requires the use of explosives and/or special impact tools such as jackhammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock. For this Contract all excavation is considered as Unclassified Excavation relating to payment for excavation under Bid Item No. 5.
- L. De-watering: Utilities shall be laid "in the dry," unless otherwise approved by the Owner's Representative. Trench excavations may be dewatered by using one or more of the following methods: well point system, sumps with pumps, or other methods(s) as approved by the Owner's Representative. Dewatering systems shall be utilized in accordance with good standard practice and must be efficient enough to lower the water level in advance of the excavation and maintain it continuously to keep the trench bottom and sides firm and dry. If the material encountered at trench grade is suitable for the passage of water without destroying the sides or utility foundation of the trench, sumps may be provided at intervals at the side of the main trench excavation, with pumps used to lower the water level by taking their suction from said sumps. Discharge from dewatering shall be disposed of in such a manner that it will not interfere with normal drainage of the area, in which the work is being performed, create a public nuisance, or form pending. All discharge shall be in accordance with any SWP3 issued permits. The operations shall not cause injury to any portion of the work completed, or in progress, or to the surface of streets, or to private property. The proposed dewatering method(s) and schedule shall be approved by the Owner's Representative and necessary regulatory agencies prior to construction.

Additionally, where private property will be involved, advance permission shall be obtained in writing by the Contractor.

- M. Obstructions: It shall be the Contractor's responsibility to acquaint himself with existing conditions and to locate structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, work shall be coordinated with the facility owner and performed so as to cause as little interference as possible with the service rendered by the facility disturbed. All affected utilities shall be notified prior to excavation in their vicinity.

N. Backfill in Existing Traffic Zones:

1. General: Backfill material shall be clean earth fill composed of sand, clay, and sand, sand and rock, crushed rock, or an approved combination thereof. Backfilling shall be divided into three specified areas: First, from trench grade to a point 12 inches above the top of the utility, called the pipe zone; second, from the top of the pipe zone to the bottom of the sub-grade; and third, from the bottom of the replacement base course to the replacement surface, see standard details. Where encasements or other below-grade concrete work have been installed, backfilling shall not proceed until the concrete has obtained sufficient strength to support the backfill load. The frequency of density testing is to be specified by the Owner's Representative on the Construction Drawings or in the Specifications.

At a minimum, density testing will be at each manhole and tested at one point between manholes as specified by the Drawings or Specifications. On a Sanitary Sewer force main line, or the Sludge Waste Line density testing is required at least one point along the run when the service line is under pavement or roadway.

2. Pipe Zone: Granular material shall be carefully placed and tamped around the lower half (springline) of the utility. Backfilling shall be carefully continued until the fill is 12 inches above the top of the utility, using the best available material from the excavation, if approved by the Owner's Representative. The material shall be lowered to within two feet above the top of pipes before it is allowed to fall, unless the material is placed with approved devices that protect the pipes from impact. The pipe zone shall exclude stones, or rock fragments larger than one inch for either ductile iron or PVC pipe.
3. Second Area: The remainder of the trench, about the pipe zone and below the sub grade, shall be backfilled and compacted in layers not exceeding 12 inches. Compaction of each lift shall be equal to 98% of maximum density as determined by AASHTO Specification T-99.
4. Compaction Methods: The above-specified compaction shall be accomplished using accepted standard methods (powered tampers, vibrators, etc.), with the exception that the first 12 inches of backfilling over the pipe shall be compacted by hand-operated tamping devices.

Flooding or puddling with water to consolidate backfill is not acceptable, except where sand is encountered and the operation has been approved by the Owner's Representative.

5. Density Tests: Density tests for determination of the above-specified compaction shall be made by a testing laboratory approved by the Owner's Representative and at the expense of the Contractor, or as otherwise specified. Test locations will be determined by the Owner's Representative. Tests shall also be made where a trench crosses a paved roadway or future paved roadway. If any test results are unsatisfactory, the Contractor shall re-excavate, re-compact the backfill, and re-test, at his expense until the desired compaction is obtained. Additional compaction tests shall be made to each side of an unsatisfactory test, as directed, to determine the extent of re-excavation and re-compaction necessary. Any Independent Testing re-tests for areas of failure shall be paid by the Contractor.
- O. Backfill in New Traffic Zones: Compaction and testing requirements for backfill in areas of new road construction shall be the same as for "Existing Traffic Zones," except:
 1. One compaction test shall be required 24 inches above the top of the pipe.
 2. Although the trench must be backfilled and compacted in 12-inch lifts as required in "Existing Traffic Zones," compaction tests are required in each 12-inch lift.
- P. Backfill in Non-traffic Zones: Backfill must be placed as specified in Subsection M for the pipe zone. Above the pipe zone, the trench must be backfilled to natural density or to 95% of AASHTO T-99, whichever is greater.
- Q. Protective Concrete Slab: Protective concrete slabs shall be installed where required by the Owner's Representative, to protect the installed utility against excessive loads, or when insufficient cover exists.
- R. Seed and Mulch: Fertilizing, seeding and mulching operations will be carried out in accordance with the requirements on Drawings and the SWP3.
- S. Sodding: Fertilizing and sodding operations will be carried out in accordance with the requirements on Drawings and the SWP3.

END OF SECTION

SECTION 02220

SITE DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Demolition of specific site improvements.
- B. Demolition may include removal and disposal of the following:
 - 1. Portland cement concrete surfacing, including base course, curbs, and gutters.
 - 2. Asphaltic concrete surfacing including base course, curbs, and gutters.
 - 3. Sidewalks.
 - 4. Fencing including posts, cables or fabric, gates, and fittings.
 - 5. Light poles, utility poles, and pole-mounted fixtures.
 - 6. Underground piping.
 - 7. Full or Partial demolition of existing drainage structures

1.2 SUBMITTALS

- A. Proposed schedule of operations, including coordination for shutoff, capping, and continuation of utility services as required.
- B. Provide a detailed sequence of demolition and removal work to ensure coordination with other work in progress or to minimize disruption of Owner's operations.
- C. Video tape(s) of existing adjacent structures and site improvements.

1.3 JOB CONDITIONS

- A. Traffic
 - 1. Conduct demolition operations and removal of debris in a manner that will ensure minimum interference with roads, driveways, walks, and other adjacent occupied or used facilities.
 - 2. Do not close or obstruct existing roads, driveways, walks, and other adjacent facilities without written permission from Owner's Representative.
- B. Protection of Existing Improvements
 - 1. Confine demolition activities to work areas, specifically including the underground and overhead electrical service and related appurtenances.
 - 2. Provide protection that will prevent damage to existing improvements and adjoining properties.
 - 3. Promptly repair damages caused to adjacent improvements by demolition operations.
 - 4. Preserve land areas outside the limits of work areas in their present condition.

C. Protection of Existing Utility Services:

1. The location and depths of existing utilities and yard piping shown on the plans are taken from the best available records provided by the Owner. Where visible, surface features such as manholes, valve boxes, and transformers were field located and the location of underground utilities were approximated from these surface features. The Owner and the Owner's Representative do not warrant the locations of existing utilities and yard piping shown on the plans, or the existence of other utilities not shown on the plans.
2. Verify exact location of all existing utility lines shown or not shown on the Drawings prior to installation of proposed improvements. [Work required hereof shall be paid for as a separate line item of the bid proposal and contract, which includes potholing and survey verifications.]
3. Immediately notify the Owner's Representative and applicable utility company of any damages to existing utilities.
4. Promptly repair damaged utilities in accordance with requirements of Owner's Representative and applicable utility company at no additional cost to Owner.
5. Coordinate with Owner's Representative and applicable utility company for shutoff of or connection to active utilities. Do not interrupt existing utility services without approval in writing by Owner's Representative.

D. The use of explosives will only be permitted when traditional methods of excavation prove impossible and then only with the express written authorization of the Owner's Representative.

E. Dust Control

1. The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area.
2. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS

A. Flowable Fill and or Hot Sand

Flowable fill and or hot sand shall be used where shown and required on the Drawings; or as directed by the Resident Project Representative in those situations where necessary to plug gaps, abandoned manholes, abandoned pipes or fill voids under existing structures.

1. Scope

- a) All abandoned manholes shall be plugged with low strength concrete to 4" above

the top of pipe, the remainder of the manhole filled with sand, and the top of the manhole (including rims and lids) structure removed to 3 feet below finish grade and covered with 8" of concrete, then backfilled with soil.

- b) General – CLSM materials shall conform to the following sections and subsection of the ODOT 1999 Specification:

Portland Cement	701.02
FlyAsh	702
Fine Aggregate	701.05
Water	701.04
Air Entraining Agent (Opt)	701.03

- c) Mix Design – Use the sample mix proportions given in Table 1 as a guide to portioning the flowable fill. Adjust the mix design to account for difference in specific gravities and bleeding rate, and to comply with the testing requirements. Use the absolute volume method to design the mix.

Table 1 - Sample Flowable Fill Mix Design - Flowable Fill		
Ingredient	Pounds per Cubic Yard	(Kilograms per Cubic Meter)
Cement	20-50	12-30
Fly Ash	150-250	90-150
Sand (saturated-surface-dry condition)	2800-3000	1700-1800
Water	200-500	120-300

- d) Submit for approval the proposed mix design with trial batch testing data before use. Include the weight, specific gravity, material source and other material requirements for each ingredient, and the results of the flowability, unit weight, and strength tests from the trial batch. Use the methods described in Subsection 3. Previously used and successful mix designs may be submitted without retesting if the material sources have not changed.
- e) If bleed water does not appear on the surface immediately after the flowable fill levels off, replace 50 lb/C.Y. (30 kg/cubic meter) with approximately 60 lb/C.Y. (35 kg/cubic meter). The replacement rate depends upon the actual specific gravities of the fly ash and sand. Continue this process incrementally until the mixture bleeds freely.
- f) Sampling and Testing. Provide ample flowable fill for field-testing. The testing methods are as follows:
- Flow Test. Flow tests shall be conducted in accordance with ASTM D 6103, "Standard Test Method for Flow Consistency of Controlled Low Strength Material." To be acceptable, the diameter of the flowable fill spread must equal or exceed 8 inches (200mm).
 - Unit weight. Unit weight tests shall be conducted in accordance with ASTM D 6023, "Standard Test Method for Unit Weight, Yield, Cement

Content, and Air Content (Gravimetric) of Controlled Low Strength Material." A deviation of 5% in rejection of a flowable fill batch.

- iii. Strength Test. Compressive strength tests shall be conducted in accordance with ASTM D 4832, "Standard Test Method for Preparation and Testing of Controlled Low Strength Material." Strength shall be measured at 28 days. The Contractor may test flowable fill strength earlier than 28 days to confirm the material placed has reached the minimum required strength. Report all cylinder breaks. To be acceptable, the compressive strength must be more than 100 psi (700kPa) and less than 1200 psi (8000kPa). If 28 strengths exceed 1200 psi (8000kPa), adjust the mix design to reduce strength.

PART 3 - EXECUTION

3.1 PAVEMENT/STRUCTURE DEMOLITION

- A. Pavement demolition includes removal of Portland cement concrete surfacing, asphaltic concrete surfacing, curbs, gutters, sidewalks, and base courses.
- B. Joints between pavement that will remain and pavement that is being removed shall be sawed. Sawing shall be true to line. Depth of sawing shall be such that when removing the pavement, underbreakage or shattering of adjacent areas will not occur.
- C. Break pavement debris into pieces weighing not more than 150 lbs.
- D. Structure demolition may include partial demolition of existing drainage structures to permit tie-in of new storm drainage piping. Contractor shall take all precautions to minimize any damage to the existing structure to remain when creating the penetration opening.

3.2 FENCE AND POLE REMOVAL

- A. Fences, light poles, utility poles and pole-mounted fixtures to be removed are shown on Drawings.
- B. Fence Removal
 - 1. Care shall be taken in removal of material to prevent damage to posts, cable, fence, or fittings.
 - 2. Coil and tie cable or fence fabric tightly before storing. Tie fittings together in bundles or place in boxes.
- C. Light Pole, Utility Pole and Pole-Mounted Fixture Removal
 - 1. Poles and fixtures shall be removed undamaged, if possible.
 - 2. Remove poles in their entirety. Cut anchor bolts, protruding conduit, and similar appurtenances flush with the ground.

3.3 SALVAGED MATERIALS

- A. General: Remove carefully to avoid damages. Materials for reuse may be incorporated into new work as indicated.
 - 1. Except for items indicated to be retained as Owner's property, other removed and salvaged materials not indicated for reuse shall become Contractor's property and removed from site with further disposition by Contractor. Personnel benefit by Contractor's representatives of salvaged materials is not permitted.
- B. Store and protect items to be reused until they are installed. Store items which are not reused as directed by the Owner's Representative.

3.4 BACKFILL

- A. Backfill holes in accordance with specification sections governing materials indicated on Drawings. Where no material is indicated, backfill with approved borrow and compact to 90 percent Standard Proctor Density.
- B. Do not backfill with material from demolition unless approved by the Owner's Representative.
- C. Portions of the existing remaining West Bank Berm (in place) may be used for construction of the relocated and renovated West Bank Berm along the original (Pre-1977) alignment that aligns with the existing upstream and downstream berm that was not damaged by the approximately 1977 breach. Existing Rip-rap may be used for the toe dike, installed prior to backfill operations..

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove weekly from site accumulated debris, rubbish, and other materials resulting from demolition operations.
- B. Removal: Transport materials removed by demolition operations and legally dispose offsite.

3.6 CLEANUP

- A. Upon completion of demolition and after removal of all debris, leave site in clean condition satisfactory to Owner's Representative.
- B. Cleanup includes offsite disposal of all items and materials not required to be salvaged, including all debris and rubbish resulting from demolition operations.

END OF SECTION

SECTION 02223

UTILITY DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Demolition of underground utilities and other underground structures.
- B. Demolition may include removal and disposal of one or more of the following:
 - 1. Water Lines
 - 2. Sanitary Sewers
 - 3. Natural Gas Lines
 - 4. Electrical Conduits
 - 5. Storm Drain Lines
 - 6. Associated Appurtenances

1.2 SUBMITTALS

- A. Proposed schedule of operations, including coordination for shutoff, capping, and continuation of utility services as required.
- B. Provide a detailed sequence of demolition and removal work to ensure coordination with other work in progress and minimize disruption of Owner's operations.
- C. Video tape(s) of existing adjacent structures and site improvement.

1.3 JOB CONDITIONS

- A. Traffic
 - 1. Conduct demolition operations and removal of debris in a manner that will ensure minimum interference with roads, driveways, walks, and other adjacent occupied or used facilities.
 - 2. Do not close or obstruct existing roads, driveways, walks, and other adjacent occupied or used facilities without written permission from Owner's Representative.
- B. Protection of Existing Improvements
 - 1. Confine demolition activities to areas defined on drawings.
 - 2. Provide protection that will prevent damage to existing improvements and plantings indicated to remain in place on Owner's property and adjoining properties.
 - 3. Promptly repair damages caused to adjacent improvements by demolition operations.
 - 4. Preserve land areas outside the limits of demolition in their present condition.

C. Protection of Existing Utilities

1. Verify exact location of all existing utility lines shown or not shown on drawings.
2. Immediately notify the Owner's Representative and applicable utility company of any damages to existing utilities.
3. Promptly repair damaged utilities in accordance with the requirements of Owner's Representative and applicable utility company at no additional cost to Owner.
4. Coordinate with Owner's Representative and applicable utility company for shutoff of or connection to active utilities. Do not interrupt existing utility services without approval in writing by Owner's Representative.

D. Use of explosives will not be permitted.

E. Underground utilities to be demolished shall not be removed from service until new replacement utilities have been installed and tested. This requirement may be waived under the following conditions, subject to written approval of the Owner's Representative:

1. Temporary interruptions required for connection of new utilities to existing lines would be of short duration and be completed during a time when occupied buildings or facilities are not affected by the interruption.
2. Where temporary service or temporary utility lines have been provided by Owner or Contractor.
3. Where adequate storm water drainage has been provided by temporary ditches or pipes the existing storm drain may be demolished.

F. Dust Control

1. The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 UNDERGROUND UTILITY DEMOLITION

- A. Excavations and backfilling for removal of underground utilities shall be in accordance with the following:

1. Excavations under areas to receive pavements, driveways, curbs, gutters, steps, equipment slabs, building slabs-on-grade, and similar construction shall be backfilled with aggregate subbase backfill in accordance with applicable portions of Section 02316 - Trench Excavation and Backfill.
2. Excavation under grassed or landscaped areas shall be backfilled with select soil backfill in accordance with applicable portions of Section 02316 - Trench Excavation and Backfill.

3.2 UTILITY STRUCTURE DEMOLITION

- A. Remove frames, covers, grates, curb hoods, and cleanouts from the structure undamaged, if possible.
- B. Demolish and remove structures as follows:
 1. To full depth, if located within five (5) feet of new structures, equipment slabs, and similar construction.
 2. To a minimum depth of 36 inches below finished subgrade in areas where new pavements, driveways, curbs, gutters, steps, and similar construction are to be placed, unless greater depth is required for installation of new utility lines.
 3. To a minimum of 24 inches below finished grade in other areas unless greater depth is required for installation of new utility lines.
 4. Plug all influent and effluent lines, removing existing equipment, covers, grating, piping and appurtenances, cutting the structure to at least 3 feet below final grade, and filling with sand, or approved excess fill from adjacent construction. Prior to filling structures the bottoms shall be broken with jack hammer at various locations throughout the structure to facilitate drainage.
- C. Excavations for removal of structures and the remaining portions of the structure shall be backfilled in accordance with the following:
 1. Excavations under areas to receive pavements, driveways, curbs, gutters, steps, equipment slabs, building slabs-on-grade, and similar construction shall be backfilled with aggregate subbase backfill in accordance with applicable portions of Section 02316 - Trench Excavation and Backfill.
 2. Excavations under grassed or landscaped areas shall be backfilled with select soil backfill in accordance with applicable portions of Section 02316 - Trench Excavation and Backfill. After backfilling structures, the site shall be graded to drain

3.3 ADJUSTING EXISTING MANHOLES AND STRUCTURES

- A. Existing manholes and structures that do not conform to the new finished grade in either surfaced or unsurfaced areas shall be adjusted to new finished grade unless shown otherwise on drawings.

3.4 SALVAGED MATERIALS

- A. General: Remove carefully to avoid damages. Materials for reuse may not be incorporated into new work as indicated unless expressly authorized by the Owner's Representative.
 - 1. Except for items indicated to be retained as Owner's property, other removed and salvaged materials not indicated for reuse shall become Contractor's property and removed from site with further disposition by Contractor.
- B. The following items shall remain the property of Owner after removal:

None.
- C. Store and protect items to be reused until they are installed.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove weekly from site accumulated debris, rubbish, and other materials resulting from demolition operations.
- B. Removal: Transport materials removed by demolition operations and dispose offsite.

3.6 CLEANUP

- A. Upon completion of demolition and after removal of all debris, leave site in a clean condition satisfactory to Owner's Representative.
- B. Cleanup includes offsite disposal of all items and materials not required to be salvaged, including all debris and rubbish resulting from demolition operations.

END OF SECTION

SECTION 02226

STRUCTURE EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Unclassified excavation, backfilling, and compaction of backfill for structures, including Arkansas River embankments, i.e. West Bank Berm.

1.2 UNIT PRICES

- A. No separate payment will be made for labor, materials, equipment, maintenance, and disposables covered under this Section. Include cost in unit price or lump sum price for appropriate work.

1.3 SUBMITTALS

- A. Submit a work plan for excavation and backfill for each structure with complete written description which identifies details of the proposed method of construction and the sequence of operations for construction relative to excavation and backfill activities. The descriptions, with supporting illustrations, shall be sufficiently detailed to demonstrate to the Owner that the procedures meet the requirements of the Specifications and Drawings.
- B. Submit excavation safety system plan.
 - 1. The excavation safety system plan shall be in accordance with applicable OSHA requirements for all excavations that are regulated by OSHA and Section 112 - Safety.
- C. Submit a ground and surface water control plan, including the OKR-10 permit and SWP3.
- D. Submit backfill material sources and product quality information.
- E. Submit Project record documents showing location of utilities, as installed, referenced to survey benchmarks. Include location of utilities encountered or rerouted. Give horizontal dimensions, elevations, inverts and gradients.

1.4 REFERENCES

- A. ASTM D 558 - Test Methods for Moisture-Density Relations of Soil Cement Mixtures.
- B. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49-kg) Rammer and 12-in. (304.88-mm) Drop.
- C. ASTM D 1556 - Density of Soil in Place by the Sand-Cone Method.
- D. ASTM D 2487 - Classification of Soils for Engineering Purposes.
- E. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

- F. ASTM D 3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depths).
- G. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- H. Federal Regulations, 29CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

1.5 TESTS

- A. Testing and analysis of backfill materials for soil classification and compaction during construction will be performed by an independent laboratory selected by the Owner and paid by the Contractor with the designated allocation of funds in the Proposal. All testing and analysis shall be coordinated by the Resident Project Representative and the Contractor.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Perform excavation with equipment suitable for achieving the requirements of this Specification.
- B. Use equipment which will produce the degree of compaction specified. Backfill within 3 feet of walls shall be compacted with hand operated equipment. Do not use equipment weighing more than 10,000 pounds closer to walls than a horizontal distance equal to the depth of the fill at that time. Use hand operated power compaction equipment where use of heavier equipment is impractical or restricted due to weight limitations.

2.2 MATERIAL CLASSIFICATIONS

- A. The classification or product description for backfill applications shall be as shown on the Drawings and as specified.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Conduct an inspection to determine condition of existing structures and other permanent installations, specifically the existing West Bank Berm (area to be renovated, and area of existing West Bank Berm upstream and downstream of the area to be renovated); existing River Parks Trail, and West Bank Soccer Complex facilities.
- B. Set up necessary or River Parks Trail detours and barricades in preparation for excavation and backfill activities, if construction will affect traffic or public access to public trails or facilities. Maintain barricades and warning devices at all times for streets, trails, and intersections where work is in progress, or where affected by the Work, and is considered hazardous to traffic movements. If necessary the Contractor shall provide a flag person at construction entrance to coordinate with any public traffic, or public recreational vehicles or public walking.

- C. Perform work in accordance with OSHA standards. Provide an excavation safety system for all excavations over 5 feet deep.

3.2 PROTECTION

- A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within the grading limits.
- B. Protect and support above-grade and below-grade utilities which are to remain.
- C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities are indicated on the Drawings.
- D. Prevent erosion of excavations and backfill. Do not allow water to pond in excavations.
- E. Maintain excavation and backfill areas until start of subsequent work. Repair and recompact slides, washouts, settlements, or areas with loss of density at no additional cost to the Owner.
- F. If any work in an excavation or fill is temporarily suspended for more than 16 calendar days the requirements for protection against erosion under the Stormwater Prevention Pollution Plan (SWP3) and the OKR-10 Construction Permit will be implemented.

3.3 EXCAVATION/BACKFILL

- A. Perform excavation or backfill work so that the underground or above ground structure can be installed to depths and alignments shown on Drawings. Use caution during excavation and backfill work to avoid disturbing surrounding ground and existing facilities and improvements (upstream and downstream West Bank Berm, and River Parks Trail). Keep excavation to the absolute minimum necessary. The pay lines for excavation of any structure shall be the outside limit of the proposed structure. No additional payment will be made for excess excavation (Temporary Works) outside the designated pay lines, not authorized by Owner's Representative.
- B. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work. Notify Owner's Representative and obtain instructions before proceeding in such areas.
- C. Immediately notify the agency or company owning any line which is damaged, broken or disturbed. Obtain approval from Owner's Representative and agency for any repairs or relocations, either temporary or permanent.
- D. Avoid settlement of surrounding soil due to equipment operations, excavation procedures, vibration, dewatering, or other construction methods.
- E. Provide surface drainage during construction to protect work and to avoid nuisance to adjoining property. Where required, provide proper dewatering and piezometric pressure control during construction.

- F. Conduct hauling operations so that trucks and other vehicles do not create a dirt nuisance in streets. Verify that truck beds are sufficiently tight and loaded in such a manner that objectionable material will not spill onto streets. Promptly clear away any dirt, mud, or other materials that spill onto streets or are deposited onto streets by vehicle tires. The Contractor shall comply with all requirements of the SWP3 relating to a construction entrance, contained wash-down area, etc.
- G. Maintain permanent benchmarks, monumentation, and other reference points. Unless otherwise directed, replace those which are damaged or destroyed by the Work.
- H. Provide sheeting, shoring, and bracing where required to safely complete the Work, to prevent excavation from extending beyond limits indicated on Drawings, and to protect the Work and adjacent structures or improvements. Sheeting, shoring, and bracing used to protect workmen and the public shall conform to OSHA requirements.
- I. Prevent voids from forming outside of sheeting. Immediately fill voids with grout, concrete fill, cement stabilized sand, or other material approved by Owner's Representative.
- J. After completion of the structure, remove sheeting, shoring, and bracing unless Owner's Representative has approved in writing that such temporary structures may remain. Remove sheeting, shoring and bracing in such a manner as to maintain safety during backfilling operations and to prevent damage to the Work and adjacent structures or improvements.
- K. Immediately fill and compact voids left or caused by removal of sheeting with cement stabilized sand or material approved by the Owner's Representative.

3.4 HANDLING EXCAVATED MATERIALS

- A. Classify excavated materials. Place material which is suitable for use as backfill in orderly piles at a sufficient distance from excavation to prevent slides or cave-ins.
- B. Provide additional backfill material if adequate quantities of suitable material are not available from excavation and trenching operations at the site.
- C. All trenches shall be backfilled with pre-approved select material by the Resident Project Representative. Installation procedures for backfill, including lift heights, tamping/compaction procedures, etc., shall be described in a written document as a technical submittal prior to any backfill activity. Any backfill placed in violation of the approved installation procedure shall be removed and replaced, without question and at the cost of the Contractor.

3.5 DEWATERING

- A. Provide ground water control per the following.
 - 1. Maintain the ground water surface a minimum of two feet below the bottom of the foundation base of any excavation and structure.
 - 2. Maintain ground and surface water control until the structure is sufficiently complete to provide the required weight to resist hydrostatic uplift with a minimum safety factor of 1.2.

3.6 FOUNDATION EXCAVATION

- A. Notify Owner's Representative at least 48 hours prior to planned completion of foundation excavations. Do not place the foundation base until the excavation is accepted by the Owner's Representative.
- B. Excavate to elevations shown on Drawings, as needed to provide space for the foundation base, forming a level undisturbed surface, free of mud or soft material. Remove pockets of soft or otherwise unstable soils and replace with foundation backfill material or a material as directed by the Owner's Representative. Prior to placing material over it, re-compact the subgrade, scarifying as needed, to 95 percent of the maximum Standard Proctor Density according to ASTM D 698. If the specified level of compaction cannot be achieved, moisture condition the subgrade and re-compact until 95 percent is achieved, over-excavate to provide a minimum layer of 24 inches of foundation backfill material, or other means acceptable to the Owner's Representative.
- C. Fill unauthorized excessive excavation with foundation backfill material or other material as directed by the Owner's Representative.
- D. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in a satisfactory, undisturbed condition. Keep excavations free of standing water and completely free of water during concrete placement.
- E. Soils which become unsuitable due to inadequate dewatering or other causes, after initial excavation to the required subgrade, shall be removed and replaced with foundation backfill material, as directed by Owner's Representative, at no additional cost to the Owner.
- F. Place foundation base, or foundation backfill material where needed, over the subgrade on same day that excavation is completed to final grade. Where base of excavations are left open for longer periods, protect them with a seal slab or a soil-cement base.
- G. All crushed aggregate, and other free draining Class I materials, shall have a geotextile filter fabric separating it from native soils or select material backfill. The fabric shall overlap a minimum of 12 inches beyond where another material stops contact with the soil. The fabric shall be secured by means of a trench burial. A sketch of this procedure and the stitching of fabric are shown on two sketches at the end of this section.
- H. Crushed aggregate, and other Class I materials, shall be placed in uniform layers of 8-inch maximum thickness. Compaction shall be by means of at least two passes of a vibratory compactor.

3.7 FOUNDATION BASE

- A. After the subgrade is properly prepared, including the placement of foundation backfill where needed, the foundation base shall be placed. The foundation base shall consist of a 12-inch layer of crushed aggregate or soil-cement. Alternately, a 4-inch minimum seal slab may be placed. The foundation base shall extend a minimum of 12 inches beyond the edge of the structure foundation.
- B. Where the foundation base and foundation backfill are of the same material, both can be

placed in one operation.

3.8 BACKFILL

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- A. Complete select material backfill to surface of natural ground or to lines and grades shown on Drawings. Deposit backfill in uniform layers (not to exceed 24-inches) and compact each layer as specified.
- B. Do not place backfill against concrete walls or similar structures until laboratory test breaks indicate that the concrete has reached a minimum of 85 percent of the specified compressive strength. Where walls are supported by slabs or intermediate walls, do not begin backfill operations until the slab or intermediate walls have been placed and concrete has attained sufficient strength.
- C. Remove concrete forms before starting backfill and remove shoring and bracing as work progresses. (NOT APPLICABLE)
- D. Maintain fill material at no less than 1 percent below nor more than 3 percent above optimum moisture content. Place fill material in uniform 8-inch maximum loose layers. Compaction of fill shall be to at least 95 percent of the maximum Standard Proctor Density according to ASTM D 698 under paved areas. Compact to at least 90 percent maximum Standard Proctor Density around structures below unpaved areas.
- E. Where backfill is placed against a sloped excavation surface, run compaction equipment across the boundary of the cut slope and backfill to form a compacted slope surface for placement of the next layer of backfill.

3.9 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of Section 02320 – Compaction and Testing and the following:
 - 1. Tests will be performed initially on minimum of three different samples of each material type for plasticity characteristics, in accordance with ASTM D 4318, and for gradation characteristics, in accordance with Section 02532 - Aggregate Base Course. Additional classification tests will be performed whenever there is a noticeable change in material gradation or plasticity.
 - 2. In-place density tests of compacted subgrade and backfill will be performed according to ASTM D 1556, or ASTM D 2922 and ASTM D 3017, and at the following frequencies and conditions:
 - a. A minimum of one test for every 100 cubic yards of compacted backfill material.
 - b. A minimum three density tests for each full work shift.
 - c. Density tests will be performed in all placement areas.
 - d. The number of tests will be increased if inspection determines that soil types or moisture contents are not uniform or if compacting effort is variable and not considered sufficient to attain uniform density.
- B. At least three tests for moisture-density relationships will be initially performed for each type of backfill material in accordance with ASTM D 698. Additional moisture-density relationship tests will be performed whenever there is a noticeable change in material

gradation or plasticity.

- C. If tests indicate work does not meet specified compaction requirements, recondition, recompact, and retest at Contractor's expense.

3.10 DISPOSAL OF EXCESS MATERIAL

- A. Load, haul and deposit excavated material outside the limits of the project or as directed by the Owner's Representative.

END OF SECTION

SECTION 02230

SITE CLEARING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Site clearing in preparation for grading operations.

1.2 SUBMITTALS

- A. A pre-construction condition survey shall be made prior to the start of any onsite construction activities.
 - 1. The Owner's Representative and the Contractor shall make a joint condition survey that will be video recorded after which the Contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs, grassed areas, pavement, sidewalks, and other improvements immediately adjacent to the site of the work and adjacent to his assigned staging areas, storage areas, and access routes as applicable.
 - 2. Both the Owner and the Contractor, upon mutual agreement as to its accuracy and completeness, shall sign the report.
 - 3. A pre-construction topographic survey shall be performed by the Contractor's Professional Licensed Surveyor and an AutoCAD version drawing with 1 foot labeled contours shall be provided to the Engineer.

1.3 JOB CONDITIONS

- A. Protection shall be provided to prevent damage to existing improvements indicated to remain in place on the Owner's property and adjoining properties.
- B. Damaged improvements shall be restored to their original condition, as acceptable to parties having jurisdiction.
- C. Confine demolition activities to work areas defined on drawings.
- D. Provide protection that will prevent damage to existing improvements and plantings indicated to remain in place on Owner's and adjoining properties.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Sedimentation and Erosion Controls: Sedimentation and erosion controls shall be installed before clearing and grubbing operations are begun in accordance with the Stormwater Prevention Pollution Plan (SWP3) and the OKR-10 permit.
- B. Roads and Walks: Keep roads and walks free of dirt and debris at all times.
- C. Utility Lines: Protect existing utility lines that are indicated to remain from damage. Notify the utility company immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations.

3.2 CLEARING

- A. Limits of clearing shall be all areas within construction limit lines.
- B. Trees, saplings, shrubs, bushes, vines, and other organic matter designated on the drawings to be retained shall not be defaced, injured, destroyed, or cut.

3.3 GRUBBING

- A. Limits of grubbing shall coincide with the limits of clearing.
- B. Remove and dispose of roots larger than 3 inches in diameter, matted roots, and stumps from the areas to be grubbed. Excavate this material together with logs, organic and metallic debris, brush, and refuse and remove to the following depth below finished subgrade.
 - 1. Footings - 18 inches
 - 2. Walks - 12 inches
 - 3. Roads/Trails - 18 inches
 - 4. Parking areas - 12 inches
 - 5. Lawn areas - 12 inches
 - 6. In the case of footings, roads, walks, or other construction on fills, roots and stumps shall be removed to a depth of 18 inches below the original ground line.

3.4 DISPOSAL

- A. Burning of materials on the site shall not be permitted.
- B. Removal
 - 1. Material to be removed shall be taken from the site daily as it accumulates.
 - 2. Should the Contractor elect to continue to work beyond normal working hours, material to be removed shall not be allowed to accumulate for more than 48 hours.

END OF SECTION

SECTION 02276

LRD NO. 7 RIPAP

2

PART 1 - GENERAL

1.1 DESCRIPTION

The work under this Section consists of furnishing, transporting, stockpiling and placement of LRD No. 7 Riprap. The LRD No. 7 Riprap is to conform to the gradation curve provided at the end of this Specification to the "best fit" possible. The supplier will provide all labor, equipment, materials, and supervision for delivering the riprap of the type specified and at the location to be determined by the Contractor for the placement as shown on the Drawings.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Not Applicable

1.3 REFERENCES

A. U.S. Army Corps of Engineers

1. EM 1110-2-1601 Hydraulic Design of Flood Control Channels
2. ETL 1110-2-120 Additional Guidance for Riprap Channel Protection
3. U.S. Army Corps of Engineers Handbook for Concrete and Cement
 - a. CRD-C 107 Specific Gravity and Absorption of Coarse Aggregate
 - b. CRD-C 144 Resistance to Freezing and Thawing
 - c. CRD-C 145 Resistance to Abrasion of Large Size Coarse Aggregate

B. American Society of Testing and Materials (ASTM)

ASTM C 88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

1.4 SUBMITTALS

A. The Supplier shall submit the following tests within twenty-four (24) hours of performing tests, or if current documentation for the existing quarry is available, that data may be provided:

1. Specific Gravity and Adsorption

2. Soundness (Freezing and Thawing)
3. Resistance to Abrasion
4. Resistance to Disintegration by Saturated Solutions of Sodium Sulfate or Magnesium Sulfate
5. Gradation

B. The name and location of the approved quarry will be reviewed and accepted by the Engineer after the Contractor has determined if it can produce stone that complies with the requirements of this Specification. Suitable tests and service records will be used to determine the acceptability of the stone materials. The source shall be submitted to the Engineer with the proposal quotation.

1.5 PAYMENTS

Payment for Riprap will only be made at the unit price bid for each ton delivered (FOB Jobsite), stockpiled at the stockpile location area, and placed as shown on the Drawings. For purposes of payment it is assumed that the conversion from cubic yards to tons of riprap will be 1.5 unless otherwise noted below.

Supplier conversion: _____ Tons/CY (confirm by Supplier)

PART 2 - PRODUCTS

2.1 RIPRAP SOURCE

A. Rock for Riprap shall be obtained only from local quarries that have provided the specified documentation as listed in Part 1.

B. Approval of a source of stone material shall not be construed as approval of all materials from that source. Certain areas of an approved source or quarry may be rejected, at the Engineer's discretion, if those areas are determined to produce material which does not meet the quality or gradation criteria in this Specification.

2.2 QUALITY

A. Stone material furnished shall be highly durable stone. Gypsum, anhydride, chert, shale, and soft or weathered rock shall not be used. Neither breadth nor thickness of any piece of stone shall be less than one-third its length. Rocks shall be of angular shape.

B. Suitable tests and service records will be used to determine the acceptability of the stone materials. If such tests and records are not available to the satisfaction of the Engineer, as in the case of a newly operated source, the material shall be subjected to such tests as necessary to determine its acceptability for use in the work.

C. Tests to which stone may be subjected include specific gravity, absorption, freezing and thawing, abrasion, resistance to disintegration by saturated solutions of sodium sulfate and magnesium sulfate, gradation, and such other tests as may be considered necessary to demonstrate to the satisfaction of the Engineer that the materials are acceptable for use in the work. Tests and test values listed below are for job controls of stone and will be used to determine the acceptability of the stone being produced. The Contractor shall be responsible for all testing.

2.3 WEIGHT AND ABSORPTION

The minimum weight per solid cubic foot calculated from the bulk specific gravity (saturated surface-dry) of the sample determined in accordance with the procedure in CRD-C 107, shall be 160 pounds. The maximum absorption shall be 6 percent (6%). Tests shall be made on 1-1/2-inch to 2-1/2-inch aggregate.

2.4 SOUNDNESS (FREEZING AND THAWING)

The loss of weight of stone after 20 cycles of freezing and thawing with test specimen immersed in water shall be less than 15 percent (15%). Each cycle shall consist of 16 hours freezing at a temperature of 5 degrees F. and 8 hours thawing at a temperature of 100 degrees F. Test specimens shall be prepared in accordance with requirements of CRD-C 144.

2.5 RESISTANCE TO ABRASION

Stone shall be subjected to the Los Angeles Abrasion Test in accordance with CRD-C 145 and shall show a loss in weight of not more than 45 percent (45%) after 1000 revolutions.

2.6 RESISTANCE TO DISINTEGRATION BY SATURATED SOLUTIONS OF SODIUM SULFATE OR MAGNESIUM SULFATE.

Stone shall be subjected to the sodium/magnesium sulfate test in accordance with ASTM C 88, and shall show a loss in weight of not more than 15 percent (15%).

2.7 GRADATION

A. Riprap shall meet gradation requirements presented on the U. S. Army Corps of Engineers Little Rock District riprap gradation curves for the LRD No. 7 riprap. The Little Rock District's riprap gradation curve for LRD No. 7 riprap is presented at the end of this section.

B. Gradation tests shall be performed by the Contractor and submitted to the Engineer for review and acceptance. Any stone that does not meet the gradation requirements shall be removed from the stockpile area and not be paid for under this Contract. The Contractor shall prepare and submit for acceptance a test procedure and format proposed for reporting the results or shall use the following acceptable procedure:

1. Select a sample (generally a truckload at the work site or the quarry).
2. Weigh and record results individually for each piece weighing over the specified intermediate size.

3. Weigh, collectively or individually, all pieces weighing less than the specified intermediate size and record total weight of this size material.

4. Weigh all material passing the 1/2-inch square mesh sieve.

5. Calculate the cumulative percent passing, and plot size in pounds against the percent passing.

Stone shall be free of overburden spoil and shall be graded so as to produce a reasonably well graded mass of stone with the minimum practical percentage of voids. Stone carrying dirt and fines less than 1/2-inch in maximum cross-section, accumulated from interledge layers or from blasting or loading operations, will be accepted if such material does not exceed 8 percent by weight.

C. Gradation tests shall be performed by the Contractor at a frequency of not less than one (1) test for each 5,000 tons of material in place.

D. There are two criteria for the LRD No. 7 gradation:

%	<u>Lighter by Diameter (ft.)</u>	<u>Lighter by Weight (lbs.)</u>
100	3.92-3.6	9060-6000
50	3.0- 1.75	4000-800
15	2.1-0.83	1100-90

This means there is some rock that is smaller than 9 inches

PART 3 - EXECUTION

3.1 GENERAL

The Contractor shall provide and install the riprap at the locations shown the Drawings. If the Supplier or the hauler has any specific requirements other than what is shown on the Drawings, those issues or concerns or requirements are to be provided to the Engineer prior to submittal of a proposal quotation.

3.2 STOCKPILING OF MATERIAL

Access to a stockpile location prior to installation may be required to be coordinated with the River Parks Authority or its designated representative. All contact shall be through the Engineer or the Resident Project Representative.

3.3 BASE COMPACTION - STOCKPILE AREA

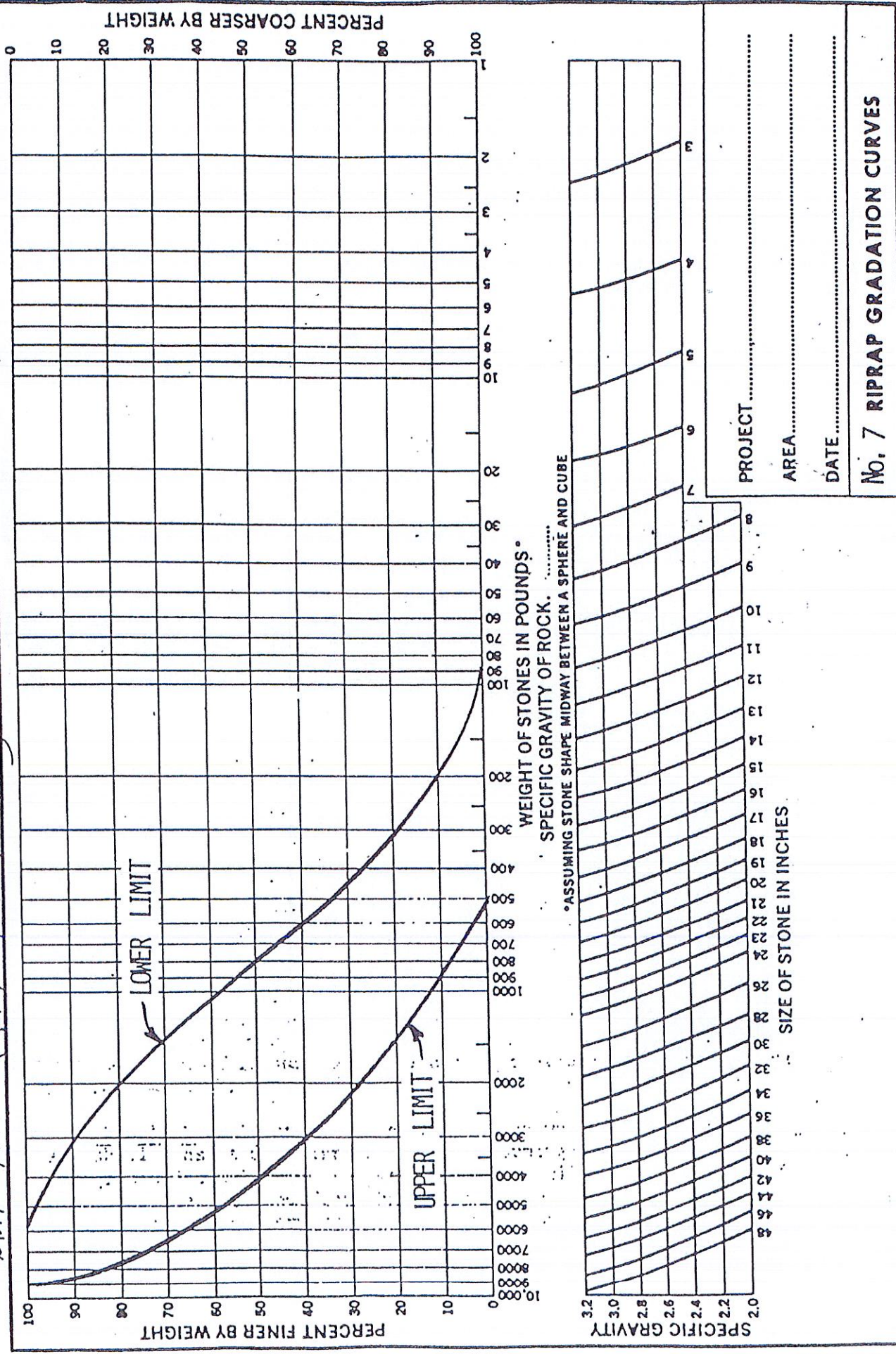
The Contractor will provide a stockpile area and access road as to be submitted prior to start of delivery and installation. The Contractor shall compact the access road and stockpile area base in accordance with Section 0350 - Dense Base Aggregate.

3.4 STONE PLACEMENT IN STOCKPILE AREA

Riprap shall be placed in the stockpile area by the Supplier, until the stockpile area is full. If the construction contractor is on-site and transporting the riprap to the placement area, the stockpile area will diminish as the Supplier is bringing loads of delivery. If the construction contractor is not on-site then the Supplier will cease delivery until such time as additional area is available in the stockpile area.

"END OF SECTION"

Max 9000 # (47") Min 90 # (10") 50% GREATER THAN 200 # (21")



SECTION 02310

SITE GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Materials, excavation, filling, backfilling, compacting, subgrade preparation, and other operations to grade the site to designed elevations and configuration.

1.2 SUBMITTALS

A. Blasting (NOT APPLICABLE)

1. Submit records of Owner's Representative's written approval to perform blasting operations before blasting operations are begun. A detailed Blasting Plan shall be prepared and submitted for review and acceptance by the Owner's Representative.
2. Submit records indicating compliance with regulating codes and safety requirements.

- B. Borrow Material - Submit test reports indicating conformance to specification of offsite soil proposed to be used as backfill, including as a minimum, sieve analysis, Atterberg Limits, and density tests.

- C. Submit test result certificates from supplier and/or manufacturer indicating that spot subgrade reinforcement material meets specifications noted.

1.3 STANDARD SPECIFICATIONS

- A. The following is a list of standard technical specifications with the accompanying abbreviations used in this specification:

1. American Association of State Highway and Transportation Officials Standard Specifications – AASHTO
2. Oklahoma Department of Transportation – ODOT.

Only Technical data referenced from ODOT standards is applicable to this Project. Payment conditions for ODOT referenced standards are not applicable.

1.4 QUALITY ASSURANCE

- A. Compaction shall be in accordance with Section 02320 – Compaction Control and Testing.
- B. The Owner's Representative shall be the final judge of suitability of all materials.
- C. Materials in question, pending test results, shall not be used in the work. The Contractor shall remove all materials that fail to comply with the requirements of the specifications, whether in stockpiles or in place.

- D. Fills, embankments, backfills, or subgrades, which do not comply with the specification requirements, shall be removed or recompacted until the requirements are satisfied.

1.5 PROTECTION

A. Protection of Existing Improvements

1. Protection shall be provided to prevent damage to existing improvements indicated to remain in place on the Owner's property and adjoining properties.
2. Damaged improvements shall be restored to their original condition, as acceptable to parties having jurisdiction.
3. Land areas outside the limits of work performed under this contract shall be preserved in their present condition. The Contractor shall confine construction activities to areas defined on the drawings.

B. Protection of Existing Utility Services:

1. The location and depths of existing utilities and yard piping shown on the plans are taken from the best available records provided by the Owner. Where visible, surface features such as exposed conduit, manholes, valve boxes, and transformers were field located and the location of underground utilities were approximated from these surface features. The Owner and the Owner's Representative do not warrant the locations of existing utilities and yard piping shown on the Drawings, nor the existence of other utilities not shown on the Drawings.
2. Verify exact location of all existing utility lines shown or not shown on the drawings prior to installation of proposed improvements.
3. Immediately notify the Owner's Representative and applicable utility company of any damages to existing utilities.
4. Promptly repair damaged utilities in accordance with requirements of Owner's Representative and applicable utility company at no additional cost to Owner.
5. Coordinate with Owner's Representative and applicable utility company for shutoff of or connection to active utilities. Do not interrupt existing utility services without approval in writing by Owner's Representative.

- C. Protection of Work Site: Barricades or other type protectors shall be provided to prevent unauthorized personnel from entering work sites.

1.6 JOB CONDITIONS

A. Classification of Excavation

1. No classification has been made to differentiate the various surface and subsurface conditions the Contractor may encounter during his performance under this contract.

2. It is the Contractor's responsibility to verify the site surface and subsurface conditions.
- B. Dewatering
1. Excavation and embankment work shall be performed in such manner that the area of the site and the area immediately surrounding the site will be continually and effectively drained by gravity or temporary pumps.
 2. Water shall not be permitted to accumulate in excavations or other areas of the site.
 3. The excavation shall be drained by methods that prevent the softening of subgrades and embankments.
- C. Blasting shall only be allowed when traditional methods of excavation prove impossible and then only with the express written authorization of the Owner's Representative. (NOT APPLICABLE)
- D. Explosives and Blasting (NOT APPLICABLE – NO BLASTING AT SITE IS PERMITTED)
1. Should the Contractor elect to use explosives to loosen rock or other material, the Contractor shall obtain the required permits and the written permission of the Owner's Representative before any blasting is done. However, the issuance of said permits, the granting of said permission, or any other act, requirement, or condition contained in these specifications, or any order, direction, or approval given by the Owner's Representative shall not be construed as requiring or directing the use of any explosives. Neither shall the issuance of any approval be construed as accepting liability for any injury or damage to persons or property resulting from such usage.
 2. The Contractor shall take necessary precautions as required by the laws of the State of Oklahoma relative to blasting and conduct the necessary operations in a manner that will not endanger persons or property.
 3. Only sufficient quantity of explosives necessary for the immediate day's work shall be stored on the site.
 4. Storage of caps, exploders, and explosives shall comply with applicable laws and regulations. Explosives shall be stored in fireproof magazines, located in areas approved by the Owner's Representative. Exploders shall be stored separately from the explosives.

PART 2 - PRODUCTS

2.1 SUITABLE MATERIALS

- A. Suitable materials for fill and backfill include those that are free of debris, roots, organic or frozen materials, and stones having a maximum dimension of 4 inches in the upper 6 inches of fill or 6 inches in the remainder of fill. Topsoil shall be used for construction of berms in fill areas.

- B. Unsuitable materials shall include those materials that are determined to be inadequate for providing a stable slope, fill, subgrade, or foundation for structures.
- C. Materials which contain excess moisture content will be classified as unsuitable unless they can be dried by manipulation, aeration, or blending with other materials and conform to the requirements for suitable materials.
- D. Expansive clay soils shall be classified as unsuitable unless treated or mixed in an approved manner.
- E. If there are inadequate supplies of suitable excavated materials onsite to allow the grading of the site as indicated on the drawings, the Contractor shall obtain suitable materials from another source at no additional cost to the Owner. Before obtaining materials from offsite, the Contractor shall submit a soil analysis of the materials to the Owner's Representative for approval. In the event that excess or unsuitable material must be wasted, the Contractor shall dispose of this material at a location off the site without additional cost to the Owner.

2.2 SPOT SUBGRADE REINFORCEMENT MATERIAL

- A. Spot subgrade reinforcement material shall consist of sound, tough, durable crushed stone or gravel with filler of broken stone chips or sand.
- B. Material shall meet the requirements of AASHTO M 147, Grading B with the following gradation:

<u>Sieve</u>	<u>Mass Percent Passing</u>
2-inch	100
1-inch	75-95
3/8-inch	40-75
No. 4	30-60
No. 10	20-45
No. 40	15-30
No. 200	5-20

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavation, regardless of material encountered, shall be performed to the lines and grades indicated on the Drawings, allowing for surfacing, base courses, and topsoil.
- B. Suitable excavated material shall be transported to, and placed in, fill areas within the limits of the work. Unsuitable material encountered within the limits of the work shall be excavated below the grade shown and replaced with suitable material as directed by the Owner's Representative.
- C. Waste Material
 - 1. Excavated material shall not be wasted without the authorization of the Owner's Representative.

2. Surplus excavated material and unsuitable material shall be disposed of by the Contractor offsite without additional cost to the Owner, only after written permission is obtained from the Owner.
 3. Material authorized to be wasted shall be disposed of in such manner as not to obstruct the flow characteristics of any stream, including any regulatory floodplain or to impair the efficiency or appearance of any structure.
- D. Excavated material shall not be deposited in a manner that may endanger a partly finished structure by direct pressure or by overloading banks contiguous to the operations or that may otherwise be detrimental to the completed work.
- E. Blasting shall only be allowed when traditional methods of excavation prove impossible and then only with the express written authorization of the Owner's Representative. (NOT APPLICABLE)
- F. Blasting (NOT APPLICABLE)
1. Operations involving the handling or use of explosives shall be conducted with every precaution by trained personnel under experienced supervision.
 2. The Contractor shall notify the Owner's Representative when ready to begin blasting work.
 3. Blasts shall not be fired until all persons in the vicinity have had ample notice and have reached a position out of danger.
 4. The amount of explosives shall be suitably restricted, and blasts shall be covered or confined.
 5. The Contractor shall be responsible for, and remedy, damage caused by blasting or by accidental explosions.

3.2 EXCAVATION OF DITCHES

- A. Ditches shall be cut accurately to the cross sections and grades indicated. Roots, stumps, rock and foreign matter in the sides and bottom of ditches shall be cut to conform to the slope, grade, and shape of the section shown.
- B. Care shall be taken not to excavate ditches below the grades indicated. Excessive ditch excavation shall be backfilled to grade with suitable, thoroughly compacted material.
- C. Ditches shall be maintained until final acceptance of the work. Ditches shall be sodden within 14 days after completion of grading. The cost of sod for ditches shall be included in the unit price for excavation.
- D. Excavated material shall not be deposited closer than 3 feet from the edges of the ditches.

3.3 BACKFILL ADJACENT TO STRUCTURES

- A. Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures.
- B. Slopes bounding or within areas to be backfilled shall be stepped or serrated to prevent sliding of the fill.
- C. During backfilling operations and in formation of embankments, equipment that will overload the structure when passing over and compacting these fills shall not be used.

3.4 PREPARATION OF GROUND SURFACE FOR FILL

- A. Areas upon which fills are to be placed shall be cleared and grubbed before the fill is started.
- B. Sloped ground surfaces steeper than one (1) vertical to four (4) horizontal on which fill is to be placed shall be plowed, stepped or benched, or broken up in such a manner that the fill material will bond with the existing surface.
- C. When surfaces on which fills are to be placed do not comply with the specified density requirements, the ground surface shall be broken up, pulverized, and compacted to the specified density.
- D. When surfaces on which fills are to be placed do not comply with the specified moisture content requirements, the ground shall be wetted, aerated, or dried to the specified moisture content.
- E. When the subgrade is part fill and part excavation, the excavated portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill.

3.5 FILL

- A. Fills and embankments shall be constructed at the locations and to the lines and grades indicated on the drawings, allowing for surfacing, base courses, and topsoil. Topsoil shall be used for the construction of berms.
- B. The material shall be placed in successive horizontal layers of 8 inches to 12 inches in loose depth for the full width of the cross section, and compacted.

3.6 COMPACTION

- A. Compaction densities and moisture contents are specified in Section 02320 – Compaction Control and Testing.
- B. Compaction shall be accomplished by sheep's-foot rollers, pneumatic-tired rollers, steel-wheeled rollers, power-driven hand tampers, or other approved equipment well suited to the soil being compacted. Material shall be aerated or moistened to maintain the required moisture content.

3.7 PAVEMENT SUBGRADE PREPARATION

A. Subgrade Preparation

1. After the subgrade has been shaped to line, grade, and cross section it shall be rolled with a power roller until compacted to the density specified in Section 02320 – Compaction Control and Testing. This operation shall include any reshaping, aeration, wetting, or drying required to obtain the specified moisture content.
2. All soft or otherwise unsuitable material shall be removed and replaced with suitable material or with spot subgrade reinforcement material as specified in paragraph 3.7-B - Spot Subgrade Reinforcement.
3. All boulders or ledge stone encountered in the excavation shall be removed or broken off to a depth of not less than 6 inches below the subgrade. The resulting area and all other low sections, holes, or depressions shall be brought to the required grade with suitable material or, with spot subgrade reinforcement material as specified in paragraph 3.7-B - Spot Subgrade Reinforcement.
4. Subgrade compaction shall be extended to include the shoulders.

B. Spot Subgrade Reinforcement

1. Unsuitable subgrade materials shall be removed, the bottom of the resulting excavation shaped uniformly and compacted firmly to the density specified for subgrade, and required provisions for adequate drainage made.
2. The subgrade reinforcement material shall be placed in the prepared excavation, in layers of not more than 5 inches, which shall be spread and rammed until level with the surrounding subgrade surface.
3. Voids shall be filled with finer selected material. The area shall then be rolled or tamped to the specified density. The filling and rolling or tamping shall be continued until the entire mass is thoroughly compacted to not less than the density of the adjacent areas.
4. The surface shall be finished to conform accurately to the grade and cross section shown on the drawings.

3.8 FINISH GRADING

- A. Excavated and filled sections, and adjacent transition areas, shall be uniformly smooth graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The finish grade areas shall be free from rocks, debris, construction materials or any other foreign object that could impact future maintenance by the Owner. All areas shall be thoroughly inspected by the Resident Project Representative prior to acceptance of any finish grade areas. Payment for finished grading shall not exceed 70 percent until the inspection is approved.
- B. The surface of embankments or excavated areas for road construction or other areas to be

paved shall not vary more than 0.05-foot from the established grade and cross section.

- C. Other finished surfaces shall not vary more than 0.15-foot from the established grade and cross section and shall be free of depressed areas where water would pond.

END OF SECTION

SECTION 02316

TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This section describes the requirements and procedures for excavation and backfill related to underground conduits and piping.

1.2 SUBMITTALS

- A. Borrow Material - Submit test reports of analysis of off-site soil proposed to be used as backfill, including as a minimum, sieve analysis, Atterberg Limits and density tests.
- B. Bedding Material, - Submit certificates from supplier and/or manufacturer indicating bedding material meets specifications noted.
- C. Initial Backfill - Submit certificates from supplier and/or manufacturer indicating Initial Backfill meets specifications noted.
- D. Select Backfill - Submit certificates indicating Select Backfill meets specifications noted.
- E. Final Backfill - Submit certificates indicating Final Backfill meets specifications noted.

1.3 STANDARD SPECIFICATIONS

- A. The following is a list of standard specifications with the accompanying abbreviations used in this specification:
 - 1. American Association of State Highway and Transportation Officials Standard Specifications - AASHTO.
 - 2. American Society for Testing Materials Standard Specifications - ASTM.

1.4 QUALITY ASSURANCE

- A. Compaction shall be in accordance with Section 02320: Compaction.
- B. The Owner's Representative shall be the final judge of suitability of all materials.
- C. Materials in question, pending test results, shall not be used in the work. The Contractor shall remove all materials that fail to comply with requirements of the specifications, whether in stockpiles or in place.
- D. Pipe bedding or trench backfill, which does not comply with specification requirements, shall be removed or re-compacted until the requirements are satisfied.

1.5 PROTECTION

A. Protection of Existing Improvements:

1. Protection shall be provided to prevent damage to existing improvements indicated to remain in place on the Owner's property and adjoining properties.
2. Damaged improvements shall be restored to their original condition, as acceptable to parties having jurisdiction.
3. Land areas outside the limits of work shall be preserved in their present condition. The Contractor shall confine construction activities to areas defined for work on the Drawings.

B. Protection of Existing Utilities:

1. The Contractor shall verify all existing utility locations either shown or not shown on the Drawings.
2. The Contractor shall immediately notify the Owner's Representative and applicable utility company of any damages to existing utilities.
3. Repairs to damaged utilities shall be made in accordance with the requirements of the Owner's Representative and applicable utility company at no additional cost to the Owner.
4. The Contractor shall coordinate with the Owner's Representative and the applicable utility company for shutoff of or connection to active utilities. Existing utility services shall not be interrupted except as authorized in writing by the Owner's Representative.

C. Protection of Work Site: Barricades or other type protectors shall be provided to prevent unauthorized personnel from entering work sites.

1.6 JOB CONDITIONS

A. Classification of Excavation:

1. No classification has been made to differentiate the various surface and subsurface conditions the Contractor may encounter during his performance under this contract.
2. It is the Contractor's responsibility to verify the site surface and subsurface conditions.

B. Dewatering:

1. Trenching and backfilling shall be performed in such manner that gravity or temporary pumps will continually and effectively drain the trench and the area immediately surrounding the trench.
2. Water shall not be permitted to accumulate in trenches.

3. Trenches shall be drained by methods that prevent the softening of the pipe bedding.
4. Trenches shall be dry when the trench bottom is prepared.

C. Shoring:

1. Shoring, including sheet piling, shall be furnished and installed as necessary to protect workers, banks, adjacent paving, structures, and utilities.
2. Shoring, bracing, and sheeting shall be removed, as trenches are backfilled, in a manner to prevent caving.

D. Blasting will not be permitted.

PART 2 - PRODUCTS

- 2.1 PIPE MARKERS. Provide vinyl tape pipe markers over all new lines within 24-inches of top of pipe, conduits and yard pipe, specifically including new water lines, new raw water lines, new chemical feed lines, new sludge lines and new electrical conduit lines.

2.2 BEDDING MATERIAL

A. Bedding for Electrical Conduit:

1. In general, bedding for electrical conduits shall consist of natural sand having hard, strong, durable particles free from deleterious substances conforming to the following gradation requirements:

Sieve Designation	Mass Percent Passing
3/8 inch	100
No. 4	95-100
No. 8	70-100
No. 16	40-80
No. 30	20-65
No. 50	7-40
No. 100	2-20
No. 200	0-10

B. Pipe Embedment Material for Water, Sanitary Sewer, Storm Drainage, Air Utility and Process Piping (MAY NOT BE APPLICABLE)

1. In general, bedding shall be in conformance with the following requirements. Bedding for all rigid and flexible pipes shall be crushed rock meeting the requirement of either ASTM D-2321, Class 1A, or ASTM C-33, Number 57 or 67 and graduations shown below:

Nominal Sieve Size	Percent Passing		
	Class 1A	Number 57	Number 67
1 1/2"	100%	100%	-
1"	ASTM D-2321	95-100%	100%
3/4"	-	-	90-100%
1/2"	-	25-60%	-
3/8"	-	-	20-55%
Number 4	<10%	0-10%	0-10%
Number 8	-	0 to 5%	0 to 5%
Number 200	< 5%	-	-

2.3 BACKFILL MATERIAL

A. Backfill

1. Backfill is that portion of the total backfill down to but not including the pipe embedment material. All backfilling shall be done in such a manner as not to disturb or injure the pipe or structures of against which it is placed. Any pipe or structure injured or moved from its proper line or grade during backfilling operations shall be opened up and repaired then re-backfilled as herein specified.
2. In Paved areas backfill shall consist of ODOT aggregate base Type A, or approved substitute. ODOT Specification is used only for technical basis of gradation and materials. ODOT payment terms and conditions are not applicable to this Contract.
3. In unpaved areas, backfill shall consist of only material approved by the Engineer consisting of loose earth, free of clods, stones, organic matter, debris or other objectionable material.
4. Pipe bedding, unless and if not shown otherwise, shall be in accordance with ODOT Construction Standards or as and if shown in applicable Pipe Bedding Details.
5. Materials which contain excess moisture content will be classified as unsuitable unless they can be dried by manipulation, aeration, or blending with other materials and conform to the requirements for select soil backfill.
6. Expansive clay soils shall be classified as unsuitable unless treated or mixed in a manner that will make them satisfactory.

B. Final Backfill:

1. In general, Final Backfill may be excavated material containing no rocks, clods of dirt, or other foreign objects greater than 4- inches in diameter, subject to the approval of the Owner's Representative.
2. Final Backfill where pipe is installed in paved areas shall be crushed rock conforming to ODOT Type A aggregate base or approved substitute.
3. Final Backfill in unpaved areas shall be topsoil, of as good a quality as the original

topsoil, which is removed.

2.4 SELECTION OF BORROW MATERIAL

- A. If there are inadequate supplies of suitable excavated materials on site to allow proper backfilling of the trenches as indicated on the Drawings, the Contractor shall obtain suitable materials from another source at no additional cost to the Owner. Before obtaining materials from off site, the Contractor shall submit a soil analysis of the materials to the Owner's Representative for approval.

PART 3 - EXECUTION

3.1 TRENCH EXCAVATION

- A. Trench excavation, regardless of material encountered, shall be performed to the depths, lines, and grades indicated or as otherwise specified.
- B. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins.
- C. Excavated materials not required or suitable for backfill shall be removed and wasted as specified in Section 02310: Site Grading.
- D. Unless indicated otherwise, excavation shall be made by open cut, with a minimum amount of trench opened at one time as practical.
- E. Trench walls shall be vertical from the bottom of the trench to at least one foot above the top of the pipe. The remainder of the trench shall be excavated such that the walls are at a slope flat enough to prevent collapse of the trench. Shoring shall be installed if necessary to protect workers, banks, adjacent paving, structures, and utilities in accordance with applicable portions of Paragraph 1.6 (c): Shoring.
- F. Trench Width:
 - 1. Trenches shall be wide enough to allow for the proper laying of pipes and conduits. Unless otherwise indicated on the Drawings, the bottom of the trench shall conform to the following (Use horizontal span for arch pipe, elliptical pipe, or other odd-shaped conduits):

Size of Conduit (ID) Internal Diameter or Horizontal Span	Width of Trench Without Sheeting and Shoring	(Maximum) With Sheeting and Shoring
12 inch and smaller	24 inch	36 inch
15-21 inch Inc.	ID + 12 inch	ID + 24 inch
24-30 inch Inc.	ID + 18 inch	ID + 30 inch
33-54 inch Inc.	ID + 30 inch	ID + 42 inch
60 inch and Larger	ID + 42 inch	ID + 54 inch

2. Where only a small amount of sheeting and shoring is required, the maximum trench widths shall be the same as where no sheeting and shoring are required.
- G. Excavation for manholes, valves, and other appurtenances shall be sufficient to allow a minimum 12-inch clearance around the appurtenance.
- H. Wet or otherwise unstable materials encountered in the bottom of the trench shall be over-excavated to allow for construction of stable pipe bedding. The over-excavation shall be backfilled with coarse aggregate bedding or aggregate subbase backfill.
- I. Blasting shall not be allowed.

3.2 MINIMUM DEPTH OF BURY

- A. Unless indicated otherwise on the Drawings, trenches shall be excavated to a depth that will provide not less than the following cover over the top of the pipe or conduit from finished grade:
 1. Water Lines: 30 inches
 2. Roof Drains and Storm Drains: 2 feet
 3. Sanitary Sewers: 3 feet
 4. Electrical Conduits: 2 1/2 feet
 5. Force Mains: 3 feet
- B. In addition to the above requirements, trenches shall be excavated to a depth that will avoid interference with other utilities.

3.3 PIPE BEDDING AND TRENCH BACKFILL

- A. Installation
 1. Installation procedures shall be used for pipes and conduits under pavements, driveways, curbs, gutters, steps, equipment slabs, building slabs on grade, and similar use areas. Bedding installation for plastic pipe shall be in accordance with applicable portions of ASTM D-2774.
 2. Circular Pipes
 - a. Bedding: Bedding shall be placed on the bottom of the trench prior to the installation of the pipe. Bedding shall be used for polyethylene piping, concrete, and ductile iron pipe with exterior coating. Bedding shall also be used for electrical duct bank. The bedding shall have a minimum thickness of one-fourth the outside pipe diameter or six (6) inches, whichever is greater. Hand or mechanical tamping shall be used to compact the bedding. The surface of the bedding shall be brought to a uniform grade during compaction. Bell holes shall be excavated prior to pipe installation to allow for unobstructed assembly of the joint and to assure that the pipe is fully bedded for its entire length.
 - b. Pipe Embedment - Flexible Pipe (DIP, PVC, HDPE, FRP, etc.)
 - (i) After the pipe has been installed, embedment material shall be placed to extend up the sides of the pipe to a point six (6) inches above the top of the pipe. Each lift shall not exceed six (6) inches and shall be compacted by

hand. Mechanical tamping may be used except when installing plastic pipe or when the pipe manufacturer does not recommend use of mechanical tampers. Sufficient material shall be worked under the haunch of the pipe to provide adequate support. Precautions to prevent movement of the pipe during placing of the material under the pipe haunch shall be taken.

c. Pipe Embedment - Rigid Pipe (RCP, VCP)

- (i) After the pipe has been installed, embedment material shall be placed to extend up the sides of the pipe to a point equal to one half (1/2) the diameter of the pipe. Each lift shall not exceed six (6) inches and shall be compacted by hand. Mechanical tamping may be used except when the pipe manufacturer does not recommend use of mechanical tampers. Sufficient material shall be worked under the haunch of the pipe to provide adequate support. Precautions to prevent movement of the pipe during placing of the material under the pipe haunch shall be taken.

3. Backfill

- a. Backfill shall be placed from the top of the bedding or embedment material. Each lift shall not exceed six (6) inches and shall be compacted by hand. Mechanical tamping may be used except when installing plastic or fiberglass pipe or when the pipe manufacturer does not recommend use of mechanical tampers.
- b. Backfill shall be placed simultaneously on both sides of the pipe to prevent displacement.

4. Final Backfill

- a. Trenches shall not be backfilled until required pressure tests are performed in accordance with Section 02560: LEAKAGE TESTS.
- b. Final Backfill shall be placed in successive horizontal layers of 8 inches to 12 inches in loose depth for the full width of the trench and compacted.
- c. Rolling equipment shall not be used until a minimum of two feet of backfill material has been placed over the top of the pipe. If a hydro hammer is used to compact the backfill, a minimum of three feet of cover is required.

3.4 COMPACTION

- A. Backfill compaction densities and moisture contents are specified in Section 02320: Compaction Control and Testing.

END OF SECTION

SECTION 02320

COMPACTION CONTROL AND TESTING

PART 1 -GENERAL

1.1 SECTION INCLUDES

- A. Compaction control and testing of soils and base courses.

1.2 SUBMITTALS

- A. Laboratory Tests: Submit for information to the Owner's Representative the results of the tests indicating type of soil materials, characteristics, and other information specified. Testing shall be paid for out of the testing allowance provided in the Contract.
- B. Field Tests: Submit results of field moisture/density tests for review and approval. Testing shall be paid for out of the testing allowance provided in the Contract.

1.3 DEFINITIONS

A. Cohesionless Materials

- 1. Cohesionless materials shall be clean, free-draining, variously graded gravel and sands with little or no fines. The portion passing the No. 200 sieve shall be limited to 12% and shall have a plasticity index of 0.
- 2. Cohesionless materials shall be classified according to ASTM D 2487 as GW, GP, SW or SP.

B. Cohesive Materials

- 1. Cohesive materials shall be classified according to ASTM D 2487 as GM, GC, SM, SC, CL and CH.
- 2. Materials classified according to ASTM D 2487 as ML, OL, MH, OH and PT shall be unsatisfactory.

1.4 QUALITY ASSURANCE

A. Test Specifications

1. Laboratory Tests

- a. Moisture - density relations of soils (compaction test) - AASHTO T 99, Method C or D
- b. Liquid limit of soils - AASHTO T 89
- c. Plastic limit and plasticity index of soils - AASHTO T 90
- d. Particle size analysis of soils (gradation test) - AASHTO T 88

2. Field Tests

- a. Density of soil in-place by the rubber-balloon method - AASHTO T 205
 - b. Determination of moisture in soils by means of a calcium carbide gas pressure moisture tester - AASHTO T 217
 - c. Density of soil and soil aggregate in-place by nuclear methods - AASHTO T 238, Method B (direct transmission)
- B. Laboratory Tests Required – The Owner has right to increase / decrease testing in efforts to improve Project performance.
 - 1. The following tests shall be performed for each principal type of material or combination of materials encountered or utilized.
 - a. Compaction test
 - b. Liquid limit test
 - c. Plastic limit test (and determination of plasticity index)
 - d. Gradation test
 - 2. The tests listed above shall be performed on additional samples as directed by the Owner's Representative.
 - 3. Results of these tests shall be the basis of control for compaction.
- C. Field Tests Required – The Owner has right to increase / decrease testing in efforts to improve project performance.
 - 1. Structure Excavation, Filling and Backfilling
 - a. One (1) in-place density test and one (1) in-place moisture test per 600 square yards per lift, but no more than 10 tests per lift
 - b. One (1) in-place density test and one (1) in-place moisture test per 600 square yards per lift in subareas enclosed by interior grade beams or interior stem walls prior to placement of fill, but not less than one (1) per lift
 - c. In-place density and moisture tests within the structure (a) may be utilized as the in-place density and moisture tests indicated in (b) if they happen to coincide within the subarea.
 - 2. Trench Excavation and Backfilling
 - a. One (1) in-place density test and one (1) in-place moisture test per 100 linear feet of trench per lift under structures and paved areas
 - b. One (1) in-place density test and one (1) in-place moisture test per 300 linear feet of trench per lift under grassed or non-traffic areas
 - 3. Site Grading:
 - a. Excavation, filling and raw subgrade and base course preparation under paved areas: One (1) in-place density test and one (1) in-place moisture test per 2,000 square yards per lift.
 - b. Excavation, filling and raw subgrade preparation under grassed or non-traffic areas: One (1) in-place density test and one (1) in-place moisture test per 3,000 square yards per lift
 - c. Nuclear methods for determining in-place density may be used for only 80 percent of the required tests. The remaining tests shall be correlation check tests of the nuclear test results by use of the rubber-balloon method.

- d. Additional in-place moisture-density tests and relative density tests shall be performed as directed by the Owner's Representative.
- D. Samples for laboratory and field tests shall be taken at locations designated by the Owner's Representative.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 COMPACTION

- A. Each lift shall be compacted to not less than the percentage of maximum density specified below.

Percent Maximum Density

	<u>Cohesive Material</u>	<u>Cohesionless Material</u>
Fill embankment, backfill, and trench backfill		85 of relative density
Under equipment slabs, building slabs-on-grade and other structures:	100	
Under pavement, driveways, curbs, gutters, steps, and similar use areas (including adjacent shoulder areas):	95	
Under sidewalks and grassed or landscaped areas:	90	

B. Moisture Content

1. Each lift of fill, embankment, backfill and trench backfill under pavement, driveways, curbs, gutters, steps, sidewalks, grassed or landscaped areas, and similar use areas (including adjacent shoulder areas) shall be compacted at a moisture content one (1) percent below to four (4) percent above optimum moisture.
2. Each lift of fill, embankment, backfill and trench backfill under equipment slabs, building slabs-on-grade, and other structures shall be compacted at a moisture content one (1) to four (4) percent above optimum moisture.
3. Subgrades shall be compacted at a moisture content one (1) to four (4) percent above optimum moisture.

3.2 COMPACTION DEFICIENCIES

- A. The Owner's Representative shall be the final judge of suitability of all compaction and material that is used for fill or backfill.
- B. Apparent negligence or carelessness during any portion of the earthwork operations will require that additional tests be performed on that portion of the work.
- C. Fills, embankments, backfills, trench backfills, subgrades or base courses that do not meet the specification requirements shall be removed or recompact until the requirements are satisfied at no additional cost to the Owner. Additional testing required due to failure of test results shall be paid for by the Contractor. If backfill is rejected by the Owner's Representative, it shall be immediately removed and replaced with suitable material, without question.

END OF SECTION

SECTION 02532

AGGREGATE BASE COURSE

PART 1 - GENERAL

This Section describes the requirements for stabilized Aggregate Base Course for repair of Gravel Roads/River Parks Trails for the Project.

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

Section 02320 - Compaction Control and Testing

1.2 REFERENCES

A. Oklahoma Department of Transportation (ODOT) Standard Specifications for Highway Construction, dated 1988.

The Standard Specifications for Highway Construction - Section 303 shall be used except for the following modifications:

1. Delete the subsection titled "METHOD OF MEASUREMENT."
2. Delete the subsection titled "BASIS OF PAYMENT."
3. Delete references to preparation of subgrade; see Section 02320 -Compaction Control and Testing of these Specifications for preparation of subgrade requirements.
4. Delete compaction requirements; see Article 3.2 of this Specification for compaction requirements.

B. American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T 11 Standard Method of Amount of Material Finer than 75 μ m Sieve in Aggregate.

AASHTO T 27 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.

AASHTO T 89 Standard Method of Test for Determining the Liquid Limit of Soils.

AASHTO T 90 Standard Method for Determining the Plastic Limit and Plasticity Index of Soils

AASHTO T 96 Standard Method of Test for Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine.

1.3 SUBMITTALS

- A. Submittals shall be made in accordance with the Project Document Requirements.
- B. The following tests shall be conducted on the aggregate material with results submitted for acceptance at least thirty (30) calendar days prior to the start of work.
 - C. Los Angeles abrasion
 - D. Sieve analysis
 - E. Plastic limit and plasticity index
 - F. Liquid limit

1.4 PAYMENT

Payment for Aggregate Base Course will only be included in Item No. 179. Work items for payment under Aggregate Base Course shall include, but are not limited to:

- A. Aggregate Base Course;
- B. Crushed rock surfacing on Project site roads
- C. Other applications, such as turnouts and Parking Areas as shown on the Drawings.

PART 2 - PRODUCTS

2.1 GENERAL

Aggregate shall conform to ODOT Specifications Section 703, Type C.

2.2 GRADATION

Aggregate shall have a gradation which conforms to ODOT Specifications, Section 703 Type C as determined by AASHTO T 11 and AASHTO T 27.

2.3 PLASTICITY

Aggregate shall meet the requirements of ODOT Specifications, Section 703, Type C for maximum plasticity index as determined by AASHTO T 89 and AASHTO T 90.

2.4 RESISTANCE TO ABRASION

Material furnished shall have a percent wear by the Los Angeles Test not greater than 45 as determined by AASHTO T 96.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

Construction methods shall conform to ODOT Specifications Subsection 303.04.

3.2 COMPACTION

Refer to Section 02320 - Compaction Control and Testing of these Specifications.

3.3 TESTING

A. Refer to Section 02320 - Compaction control and Testing of these Specifications.

"END OF SECTION"

SECTION 02533

GRAVEL ROAD SURFACING

PART 1 GENERAL

The work shall consist of furnishing, transporting, and placing mineral aggregates for road surfacing.

PART 2 MATERIALS

Aggregate shall conform to the applicable requirements of ASTM D 1241 or, if so specified, shall be obtained from designated sources. The aggregate material shall be free from vegetable matter and other deleterious substances. After the Contractor has determined that the aggregate meets the specification and at least 20 days prior to delivery to the site, the Contractor shall notify the Owner's Representative in writing of the source of the material. Test data and other certification information for the aggregate shall be furnished 20 days prior to the use of the material.

BASE PREPARATION

The area to be surfaced shall be compacted as specified to the lines and grades shown on the Drawings. The Base Aggregate Course surface shall be inspected and approved by the Owner's Representative before any aggregate surfacing material is placed.

PLACEMENT

The aggregate shall be deposited, spread, processed, and compacted on the prepared subgrade to the required thickness as shown on the Drawings. In the event segregation occurs, the material shall be bladed until the various sizes of aggregate are uniformly and satisfactorily blended. After being spread, the material shall be watered, mixed, shaped to the required section, and compacted as specified in Section 6. The completed course shall be smooth, true to grade and cross-section, and free from ruts, humps, depressions, and irregularities.

PART 3 MEASUREMENT AND PAYMENT

For items of work, for which specific unit prices are established in the contract, the volume of aggregate will be measured to the nearest cubic yard within the neat lines shown on the Drawings. Payment for the quantity of aggregate will be made under Bid Items 8 and 9 as applicable including the Base Aggregate course, complete in place. Such payment will be full compensation for furnishing, delivery, placing and compacting the aggregate and Base Aggregate course, and for all other items necessary and incidental to the performance of the work.

Compensation for any item of work described in the Contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Paragraph 6 of this specification.

PART 4 ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

A. One -Lane Road

- (1) This item shall consist of furnishing, placing, treating with moisture and soil stabilization additives, shaping and compacting the gravel road surface coarse material for the One Lane Roads and the installation of the drainage ditches and low water crossings, as shown on the Drawings and staked in the field.

- (2) In Section 2, MATERIALS, the following shall also apply:

- (a) The surface course shall meet the requirement of ASTM D 1241 for Type I with Gradation C or any other gradation, which will grade within the followings limits:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3/4"	100
No. 4	38 - 65
No. 8	25 - 60
No. 30	10 - 40
No. 200	3 - 12

- (b) The gravel road surfacing shall meet the following requirements:

- [1] Percentage of Wear: When tested in accordance with ASTM C 131, the percentage of wear shall not exceed 40 percent after 500 revolutions.

- [2] Plasticity Index: When tested in accordance with ASTM D 4318, the plasticity index shall not be more than five (5).

- [3] Liquid Limit: When tested in accordance with ASTM D 4318, the liquid limit shall not be more than 25 percent.

- (3) The moisture content of the gravel mix material shall be maintained within the limits required to:

- (a) The moisture content of the fill matrix at the time of compaction shall be neither less than one (1) percent below optimum moisture content nor one (1) percent above optimum moisture content.

- (b) Meet mixing rates with the soil stabilizer and earth sealant additives as specified on Construction Specification 400, Soil Stabilizer Additives.

- (4) In Section 3, BASE PREPARATION, the following shall also apply: Roadbeds to be surfaced including the drainage ditches shall be scarified minimally to the top 3 inches of the road-bases and treated with soil stabilization additives mixed with water to within ± 1 % optimum moisture and compacted as necessary to provide density of roadbase matrix not less than 95% maximum Proctor density (ASTM-698).
- (5) In Section 4, PLACEMENT, the following shall also apply. The road gravel surface coarse material shall be compacted as necessary to provide density of road gravel surface coarse matrix not less than 95% maximum Proctor density (ASTM-698).
- (6) Section 5, MEASUREMENT AND PAYMENT, this section as stated will not apply. Payment for this work shall be measured to the nearest linear feet within the neat lines shown on the Drawings. Such payment shall be full compensation for furnishing, delivery, placing, treating, shaping and compacting the road Base Aggregate and Surface coarse work and the installation of drainage ditches, including the low water crossings and for all other items necessary and incidental to the performance of the work. Compensation for this item shall also included payment for the following Subsidiary Items: Clearing and Grubbing, Pollution Control, Traffic Control, Water for Construction, Soil Stabilization Additive, Earthfill, and Excavation.

B. Two -Lane Road (16-feet wide)

- (1) This item shall consist of furnishing, placing, treating with moisture and soil stabilization additives, shaping and compacting the gravel road surface coarse material for the Two Lane Roads (16-feet wide) and the installation of the drainage ditches, including the low water crossing, as shown on the Drawings and as staked on the field.

- (2) In Section 2, MATERIALS, the following shall also apply:

- (a) The surface course shall meet the requirement of ASTM D 1241 for Type I with Gradation C or any other gradation, which will grade within the followings limits:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3/4"	100
No. 4	38 - 65
No. 8	25 - 60
No. 30	10 - 40
No. 200	3 - 12

- (b) The gravel road surfacing shall meet the following requirements:

- [1] Percentage of Wear: When tested in accordance with ASTM C 131, the percentage of wear shall not exceed 40 percent after 500 revolutions.

- [2] Plasticity Index: When tested in accordance with ASTM D 4318, the plasticity index shall not be more than five (5).
- [3] Liquid Limit: When tested in accordance with ASTM D 4318, the liquid limit shall not be more than 25 percent. The moisture content of the gravel mix material shall be maintained within the limits required to:
 - (a) The moisture content of the fill matrix at the time of compaction shall be neither less than one (1) percent below optimum moisture content nor one (1) percent above optimum moisture content.
 - (b) Meet mixing rates with the soil stabilizer and earth sealant additives if Soil Stabilizer Additives are used.
- (4) In Section 3, BASE PREPARATION, the following shall also apply: Roadbeds to be surfaced including the drainage ditches shall be scarified minimally to the top 3 inches of the road bases and treated with soil stabilization additives mixed with water to within $\pm 1\%$ optimum moisture and compacted as necessary to provide density of roadbase matrix not less than 95% maximum Proctor density (ASTM-698).
- (5) In Section 4, PLACEMENT, the following shall also apply. The road gravel surface coarse material shall be compacted as necessary to provide density of the road gravel surface coarse matrix not less than 95% maximum Proctor density (ASTM-698).
- (6) Section 5, MEASUREMENT AND PAYMENT, this section as stated will not apply. Payment for this work shall be measured to the nearest linear feet within the neat lines shown on the Drawings. Such payment shall be full compensation for furnishing, delivery, placing, treating, shaping and compacting the road Base Aggregate and Surface coarse and the installation of drainage ditches and low water crossings, and for all other items necessary and incidental to the performance of the work. Compensation for this item shall also included payment for the following Subsidiary Items: Clearing and Grubbing, Pollution Control, Traffic Control, Water for Construction, Soil Stabilization Additive, Earthfill, and Excavation.

C. Parking and Spurs

- (1) This item shall consist of furnishing, placing, treating with moisture and soil stabilization additives, shaping and compacting the gravel surface coarse material for the parking lots and spurs as shown on the Drawings

(2) In Section 2, MATERIALS, the following shall also apply:

- (a) The gravel surface course shall be meet the requirement of ASTM D 1241 for Type I with the Gradation C or any other gradation which will grade within the followings limits:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
3/4"	100
No. 4	38 - 65
No. 8	25 - 60
No. 30	10 - 40
No. 200	3 - 12

(b) The gravel surface coarse shall meet the following requirements:

- [1] Percentage of Wear: When tested in accordance with ASTM C 131, the percentage of wear shall not exceed 40 percent after 500 revolutions.
- [2] Plasticity Index: When tested in accordance with ASTM D 4318, the plasticity index shall not be more than five (5).
- [3] Liquid Limit: When tested in accordance with ASTM D 4318, the liquid limit shall not be more than 25 percent.

(2) The moisture content of the gravel mix material shall be maintained within the limits required to:

- (a) The moisture content of the fill matrix at the time of compaction shall be neither less than one (1) percent below optimum moisture content nor one (1) percent above optimum moisture content.
- (b) Meet mixing rates with the soil stabilizer and earth sealant additives as specified on Construction Specification 400, Soil Stabilizer Additives.

(3) In Section 3, BASE PREPARATION, the following shall also apply: Parking and spurs bases to be surfaced shall be scarified minimally to the top 3 inches and treated with soil stabilization additives mixed with water to within ± 1 % of optimum moisture and compacted as necessary to provide density of parking and spur bases' matrix not less than 95% maximum Proctor density (ASTM-698).

(4) In Section 4, PLACEMENT, the following shall also apply. The parking and spurs' gravel surface coarse material shall be compacted as necessary to provide density of the gravel surface coarse matrix not less than 95% maximum Proctor density (ASTM-698).

- (5) Section 5, MEASUREMENT AND PAYMENT, shall not apply. Payment for this work shall be measured to the nearest square foot area within the neat lines shown on the Drawings. Such payment shall be full compensation for furnishing, delivery, placing and compacting the aggregate, and for all other items necessary and incidental to the performance of the work. Compensation for this item shall also included payment for the following Subsidiary Items: Clearing and Grubbing, Pollution Control, Traffic Control, Water for Construction, Soil Stabilization Additives, Structure Concrete, Earthfill and Excavation.

SECTION 02747

BITUMINOUS CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers the requirements for asphalt prime coat, tack coat, and asphalt concrete paving for River Parks Trails or Parking Lots.

1.2 SUBMITTALS

- A. Submit list of equipment proposed for use.

1.3 STANDARD SPECIFICATIONS

- A. Asphaltic concrete paving equipment, mixing, construction, and protection shall conform to the requirements of the enumerated sections of the Oklahoma Department of Transportation Standard Specifications for Highway Construction (ODOT Specifications), dated 1999.
- B. References to the "Department" in the ODOT Specifications shall be changed to refer to the "Owner's Representative".
- C. References to the "Materials Division" and "Materials Engineer" in the ODOT Specifications shall be changed to refer to "Testing Lab" and "Testing Engineer".
- D. Delete subsections titled "Method of Measurement" and "Basis of Payment".

PART 2 - PRODUCTS

2.1 PRIME COAT

- A. Prime coat shall conform to ODOT Specifications, Section 408.

2.2 TACK COAT

- A. Tack coat shall conform to ODOT Specifications, Section 407.

PART 3 - EXECUTION

3.1 EQUIPMENT

- A. Distributors shall conform to ODOT Specifications, subsection 401.03(a).
- B. Compactors shall conform to ODOT Specifications, subsection 401.03(b).
- C. Mixing Plants
 - 1. All plants shall conform to ODOT Specifications, subsection 411.03.

3.2 PREPARING MIXTURE

- A. Delivering and stockpiling of aggregates shall conform to ODOT Specifications, subsection 106.07.
- B. The bituminous material and aggregate shall be heated to the temperature specified in ODOT Specifications, subsection 708.03, and in a manner that will avoid local overheating and provide a continuous supply of the bituminous material to the mixer at a uniform temperature at all times.
- C. Drying and bin storage of aggregate shall conform to ODOT Specifications, paragraph 411.04(b).
- D. Mixing of materials shall conform to ODOT Specifications, subsections 411.04(c) and 411.04(d).

3.3 PRIME COAT

- A. Weather limitations shall be in accordance with ODOT Specifications, subsection 408.04(a).
- B. Preparation of surface shall conform to ODOT Specifications, subsection 408.04(b).
- C. Application of bituminous material shall conform to ODOT Specifications, subsection 408.04(d).
- D. Application temperature shall conform to ODOT Specifications, subsection 708.03.
- E. Application of blotter material shall conform to ODOT Specifications, subsection 408.04(e).

3.4 PLACING ASPHALT MIXTURE

- A. Weather limitations shall be in accordance with ODOT Specifications, subsection 411.04(g).
- B. Spreading and finishing shall conform to ODOT Specifications, subsection 411.04(h).
- C. Joints shall conform to ODOT Specifications, subsection 411.04(i).
- D. Compaction shall conform to ODOT Specifications, subsection 411.04(j) except as follows:
 - 1. Delete all references to unit prices.
- E. Surface tolerances shall conform to SSHC Subsection 401.04(a).
- F. Width and thickness shall conform to SSHC paragraph 411.04(k)2.
- G. Traffic shall not be permitted on the asphalt concrete pavement until it has received its final rolling.

3.5 TACK COAT

- A. Tack coat application shall conform to ODOT Specifications, subsection 407.04.
- B. Emulsified asphalt shall be applied by spraying at a temperature conforming to ODOT Specifications, subsection 708.03.

END OF SECTION

SECTION 02821

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Chain link fences and gates – Repair Only.

1.2 SUBMITTALS

- A. Manufacturer's technical data for fences and gates.
- B. Manufacturer's technical data for grounding.
- C. Manufacturer's technical data for gate operator, operator controls, and mounting.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe sizes indicated are commercial pipe sizes.
- B. Tube sizes indicated are nominal outside dimension.
- C. Roll-formed section sizes are the nominal outside dimensions.
- D. Finish for framework and appurtenances shall be as indicated below:
 - 1. Galvanized finishes shall have not less than the minimum weight of zinc per square foot, as indicated:
 - a. Pipe: ASTM A120 (1.8 oz. zinc per square foot)
 - b. Square tubing: ASTM A123 (2.0 oz. zinc per square foot)
 - c. Roll formed from sheet: ASTM A123 (2.0 oz. zinc per square foot)
 - d. Hardware and Accessories: ASTM A153

2.2 FABRIC

- A. Chain link fabric shall be as follows:
 - 1. One-piece fabric widths, for fence heights up to 12 feet.
 - 2. No. 9 gauge (0.148-inch) wires or match existing fence material.
 - 3. 2-inch mesh.
- B. Selvages
 - 1. Top selvages twisted and barbed and bottom selva ge knuckled for fabric over 60 inches high.

C. Finish

1. Galvanized finish with not less than 1.2 oz. zinc per square foot, complying with ASTM A92, Class 1.

2.3 POSTS, RAILS, AND BRACES

A. End, corner, and pull posts shall be of the minimum sizes and weights as follows, or to match existing fence that is damaged and is to be repaired:

1. 2.875-inch O.D. pipe weighing 5.79 lbs. per linear foot.

B. Line posts shall be of the minimum sizes and weights as follows. Posts shall be spaced at 10 feet o/c maximum, unless otherwise indicated.

1. 2.375-inch O.D. pipe weighing 3.65 lbs. per linear foot.

C. Gate posts for supporting single gate leaf, or one leaf of a double gate installation shall be as follows:

1. Up to 6 feet wide:

- a. 2.875-inch O.D. pipe weighing 5.79 lbs. per linear foot.

2. Over 6 feet and up to 13 feet wide:

- a. 4-inch O.D. pipe weighing 9.10 lbs. per linear foot.

3. Over 13 feet and up to 18 feet wide:

- a. 6.625-inch O.D. pipe weighing 18.97 lbs. per linear foot.

4. Over 18 feet:

- a. 8.625-inch O.D. pipe weighing 24.70 lbs. per linear foot.

D. Top rails shall be as follows, unless otherwise indicated:

1. 1.660-inch O.D. pipe weighing 2.27 lbs. per linear foot.

2. Rails shall be in manufacturer's longest lengths, with expansion type couplings, approximately 6 inches long, set at maximum of 100 feet lengths. Top rail shall be securely attached to each gate, corner, pull, and end post.

E. Post Brace Assembly: Bracing assemblies shall be installed at end and gate posts and at both sides of corner and pull posts with the horizontal brace located at mid-height of the fabric with 3/8-inch diameter rod and turnbuckle for diagonal truss.

F. Tension wire shall be galvanized 7-gauge coiled spring wire.

- G. Barbed wire supporting arms shall be pressed steel, wrought iron, or malleable iron, complete with provision for anchorage to posts and attaching 3 rows of barbed wire to each arm. Supporting arms may either be attached to posts or integral with post top weather cap. The barbed wire supports shall be as follows:
 - 1. Single 45 degree arm, one for each post where indicated.
- H. Barbed wire shall be 2-strand, 12-1/2 gauge wire with 14-gauge, 4-point barbs spaced at 5 inches o/c, coated as follows:
 - 1. Galvanized, complying with ASTM A121, Class 3.
- I. Post tops shall be pressed steel, wrought iron, or malleable iron, designed as a weathertight closure cap (for tubular posts). One cap shall be furnished for each post unless equal protection is afforded by combination post top cap and barbed wire supporting arm, where barbed wire is required. Caps shall have openings to permit passage of the top rail.
- J. Stretcher bars shall be one-piece lengths equal to full height of the fabric, with a minimum cross-section of 3/16-inch x 3/4-inch. One stretcher bar shall be installed at each gate and end post, and 2 at each corner and pull post, except where fabric is integrally woven into the post. Stretcher bar bands shall be steel, wrought iron, or malleable iron, spaced at not over 15 inches o/c to secure stretcher bars to end, corner, pull, and gate posts. Bands shall be 7/8-inch wide by 1/8-inch thick.

2.4 GATES

A. Swing Gate

- 1. Shape and size of gate frame, as currently installed for repair. Framing and bracing members, round or square, of steel alloy. Steel member finish, zinc-coated. Steel pipe frame 1.90-inch O.D., weighing 2.72 lbs. per linear foot, tubing frame 2 inches square, weighing 2.60 lbs. per linear foot.
- 2. Gate fabric, as specified for fencing. Barbed wire top on gate, as specified herein. Coating for steel latches, stops, hinges, keepers, and accessories galvanized. Gate latches fork type. Gate leaves shall have truss rods or intermediate braces. Attach gate fabric to gate frame in accordance with manufacturer's standards, except where welding will not be permitted. Arrange padlock latches to be accessible from both sides of gate, regardless of latching arrangement.

2.5 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Wire ties for tying fabric to line posts shall be 9-gauge wire spaced 12 inches o/c. For tying fabric to rails and braces, 9-gauge wire ties spaced 24 inches o/c shall be used. For tying fabric to tension wire, 11-gauge hog rings spaced 24 inches o/c shall be used. Finish of ties shall match fabric finish.
- B. Concrete shall conform to ASTM C94, using 3/4-inch maximum size aggregate, and having minimum compressive strength of 3,000 psi at 28 days.

- C. Grout shall be one part Portland cement to three parts clean, well-graded sand and a minimum amount of water to produce a workable mix.
- D. Padlocks will be furnished by Owner, padlock chains by Contractor.
- E. Grounding Conductors: Bare soft-drawn copper wire No. 4 AWG minimum unless otherwise indicated or specified.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Fencing and/or gate installation shall only be used in the event that an existing fence or gate is damaged either on River Parks Authority or private property.
- B. Excavation: Holes shall be of diameters and spacings shown. In firm, undisturbed, or compacted soil, footings shall be 10-inch in diameter for line posts and 1-foot - 4 inches for end posts, gate posts, and brace posts.
- C. Unless otherwise indicated, in firm, undisturbed soil hole depths shall be excavated to approximately 4 inches lower than the post bottom, with bottom of posts set not less than 36 inches below the surface. Excess soil from excavations shall be spread uniformly adjacent to the fence line or on adjacent areas of the site, as directed.
- D. When solid rock is encountered near the surface, rock shall be penetrated at least 12 inches for line posts and at least 18 inches for end, pull, corner, and gate posts. Hole shall be at least 1-inch greater diameter than the largest dimension of the post to be placed.
 - 1. If solid rock is below soil overburden, holes shall be the full depth required, except penetration into rock need not exceed the minimum depths specified above.
- E. Setting Posts:
 - 1. Loose and foreign materials shall be removed from sides and bottoms of holes. Soil shall be moistened prior to placing concrete.
 - 2. Posts shall be centered and aligned in holes 4 inches above bottom of excavation.
 - 3. Concrete shall be placed around posts in a continuous pour, and vibrated or tamped for consolidation. Each post shall be checked for vertical and top alignment, corrected to its proper position, and held in position during placement and finishing operations.
 - 4. Trowel finish tops of footings and slope or dome to direct water away from posts. Extend footings for gateposts to the underside of bottom hinge. Set keeps, stops, sleeves, and other accessories into concrete as required.
 - 5. Concrete surfaces shall be kept moist for at least 7 days after placement, or cured with membrane curing materials or other acceptable curing method.
 - 6. Grout for posts set into sleeved holes, concrete constructions, or rock excavations shall be Portland cement grout, sulphur, or other acceptable grouting material.

7. Concrete Strength: Allow concrete to cure a minimum of 72 hours before performing other work on posts.
- F. Top rails, where shown, shall run continuously through post caps or extension arms, bending to radius for curved runs.
- G. Center rails shall be installed where shown. They shall be installed in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.
- H. Brace gate, corner, end, and pull posts to nearest post with a horizontal brace used as a compression member, placed at least 12 inches below top of fence, and a diagonal truss rod and truss tightener used as a tension member. Install so posts are plumb when diagonal rod is under proper tension.
- I. Install top and bottom tension wires before installing chain-link fabric, and pull wires taut. Place top and bottom tension wires within 8 inches of respective fabric line.
- J. Approximately 2-inch clearance shall be left between finish grade and bottom selvage. Fabric shall be pulled taut and tied to posts, rails, and tension wires. Fabric shall be installed on security side of fence and anchored to framework so that fabric remains in tension after pulling force is released. Fabric shall be installed with the barbs up.
- K. Damaged coatings shall be repaired in the shop or during field erection by recoating with manufacturer's recommended repair compound, and applied in accordance with manufacturer's instructions.
- L. Stretcher bars shall be threaded through or clamped to fabric 4 feet o/c and secured to posts with metal bands spaced 15 inches o/c.
- M. Gates shall be installed plumb, level, and secure for full opening without interference. Ground-set items shall be installed in concrete for anchorage, as recommended by the fence manufacturer. Hardware shall be adjusted for smooth operation and lubricated where necessary. Install swing gates to swing through 90 degrees from closed to open. Install slide gates, weatherproof phones, and loop detector or sensor plate as shown. Install telephone communication and gate open-close control circuits as shown on drawings. Connect gate motor operators to fire alarm circuits so that, in the event of an alarm, the gate will open.
- N. Tie wires shall be U-shaped, conforming to the diameter of the pipe to which attached and shall clasp pipe and fabric firmly with ends twisted at least 2 full turns.
- O. Fasteners: Hardware for tension bands shall be installed so the nuts are on the inside of the fence. Ends of bolts shall be peened or threads scored to prevent removal of nuts.
- P. Install barbed wire on supporting arms above fence posts. Extend each end member of gate frames sufficiently above top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence. Pull each strand taught and securely fasten each strand to each supporting arm or extended member. Secure wires in accordance with fence manufacturer's recommendations.

- Q. Install supporting arms as recommended by manufacturer. In addition to manufacturer's standard connections, permanently secure supporting arms to posts. Studs driven by low-velocity powder-actuated tools may be used with steel, wrought iron, or malleable iron. Do not use studs driven by powder-actuated tools with gray iron or other material that will fracture.

3.2 GROUNDING

- A. Fences shall be grounded with a 10-foot long, 3/4-inch diameter, copper clad steel ground rod at each fixed gate post and at each corner post or at 500-foot intervals. Drive ground rod until the top is 12 inches below grade. Attach a No. 4 AWG copper conductor, by fusion weld (Cadweld) process, to the ground rods and extend underground to the immediate vicinity of fence post. Lace the conductor vertically into 12 inches of fence mesh and fasten by two anti-electrolysis type bronze clamps, one to bond wire to post (bare metal) and the other to bond wire to fence (bare metal).

END OF SECTION

SECTION 02891

TRAFFIC SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers the requirements for the selection and installation of traffic (vehicular or pedestrian) signs.
- B. Engineer and/or Resident Project Representative or Owner will determine location and details of signs during the Pre-Bid Meeting.

1.2 STANDARD SPECIFICATIONS

- A. Sign material and construction shall conform to the requirements of Section 850 - Signs, and 851 - Galvanized Steel Sign Posts of the Oklahoma Department of Transportation Standard Specifications for Highway Construction (ODOT Specifications), dated 1999.
- B. References to the "Department" in the ODOT Specifications shall be changed to refer to the "Owner's Representative".
- C. Delete subsections titled "Method of Measurement" and Basis of Payment."

PART 2 - PRODUCTS

2.1 CONCRETE

- A. Concrete for sign footings shall be normal weight concrete as specified in Section 03300 - Cast-in-Place Concrete.

2.2 SIGNPOSTS

- A. Signposts shall be galvanized steel pipe conforming to ODOT Specifications, Subsection 721.01.

2.3 SIGN PANELS

- A. Sign panels shall conform to ODOT Specifications, Subsection 719.01.

2.4 SHEETING

- A. Sheeting shall be non-reflective sheeting meeting the applicable requirements of ODOT Specifications, Subsection 719.04, except as follows.
 - 1. Delete the second sentence of paragraph 719.04(b) 2, "In addition, at least on setby the Department," entirely.
 - 2. Delete the third and fourth sentences of paragraph 719.04(b) 2, "Verification of color by comparisonby the Color Tolerance Charts," entirely.

2.5 SIGN COPY

- A. Sign copy shall be applied by the direct screening process conforming to ODOT Specifications, paragraph 719.05(a) 1.
- B. Sign copy material and application shall conform to ODOT Specifications, paragraph 719.05(a) 3.
- C. Tests shall conform to ODOT Specifications, paragraph 719.05(a) 5.

2.6 SIGN MOUNTING BRACKETS

- A. Sign mounting bracket materials shall conform to ODOT Specifications, Subsection 719.02(a).
- B. Sign mounting bracket fabrication shall conform to ODOT Specifications, Subsection 719.02(b).

2.7 FASTENERS

- A. Fasteners for aluminum signs shall conform to ODOT Specifications, Subsection 719.03.

PART 3 - EXECUTION

3.1 SIGNPOSTS

- A. Field cuts and galvanizing repair shall conform to ODOT Specifications, Subsection 851.04.
- B. Posts shall be set plumb and supported to prevent displacement until the concrete has hardened.

3.2 SIGNS

- A. Sign panels shall be cleaned as specified in ODOT Specifications, paragraph 850.04.a.
- B. Sheeting shall be applied to properly treated base panels with mechanical equipment as specified in ODOT Specifications, paragraph 850.04.b.1 Class 2. Adhesive-coated sheeting shall be pre-perforated.
- C. Splices in the sheeting shall not be allowed.
- D. Sign copy shall be applied to the sign following the application of the sheeting background.
- E. Signs shall be erected so the sign face is vertical.

END OF SECTION

SECTION 02900

PLANTING

PART 1- GENERAL

1.1 DESCRIPTION OF WORK

- A. This section covers the requirements for materials, and services required to repair any damage during construction activities and/or specified herein.

1.2 SUBMITTALS

- A. Certification: Submit certificates of inspection or manufacturer's certified analysis at testing compliance with specifications for the following:

- 1. Plant Materials

- B. Manufacturer's Literature: Submit manufacturer's literature on the following:

- 1. Antidesiccant
- 2. Tree Wrap
- 3. Steel Edging
- 4. Watering Requirements

- C. Planting Schedule: Submit planting schedule indicating scheduled planting dates for each type of work.

- D. Maintenance Instructions: Submit instructions and recommendations for the one year maintenance of landscape work.

1.3 QUALITY ASSURANCE

- A. General

- 1. Landscape Contractor: A firm specializing in all aspects of landscape work and capable of installing all planting work.
- 2. Ship landscape materials with certificates of inspection required by governing authorities.
- 3. Do not make substitutions. If specified material is not available, submit proposal for use of substitute material.

- B. Plant Materials

- 1. General

- a. Furnish plants conforming to varieties & sizes specified in the Oklahoma native plant list and true to botanical name as listed in Standardized Plant Names.
- b. Furnish healthy, vigorous, planting stock, free from disease, insects, defects or disfigurement.
- c. Provide plants grown under climatic conditions similar to project area.

C. Analysis and Standards:

- 1. Provide standard packaged products with manufacturer's certified analysis.
- 2. For other materials provide analysis in accordance with methods established by Association of Official Agricultural Chemists.

D. Observation: Owner's Representative reserves the right to examine plant materials either at the place of growth or at the Project site prior to planting, to assure compliance with specifications for name, variety, size, and quality. Such examination does not preclude right to reject materials at the Project site due to damage in transit. Owner's Representative shall have the option to select and tag any or all plants at the nursery prior to delivery to the Project site.

1.4 DELIVERY & STORAGE

A. Delivery

- 1. Notify Owner's Representative of plant material arrival on site to accommodate immediate examination.
- 2. Protect plant materials during transport and delivery to avoid damage.
- 3. Plants "trees spaded" from nursery are acceptable providing plant balls conform to specifications.

B. Storage:

- 1. Place mulch in dry storage area, away from contaminants.
- 2. Deliver packaged materials in original unopened containers showing weight, analysis, and name of manufacturer, in conformance with state law.
- 3. Protect materials from deterioration during delivery and while stored on site.

1.5 JOB CONDITIONS

A. Contractor shall assume responsibility for locating all site utility systems, including existing irrigation, and perform work in a manner which will avoid damage. Hand excavate, as required.

- B. Proceed with and complete landscape installation as rapidly as portions of site become available, working within seasonal limitations.
- C. When unforeseen conditions detrimental to plant growth are encountered notify Owner's Representative before planting.

PART 2 - PRODUCTS

2.1 PLANT MATERIALS

- A. Plant List: The Contractor shall furnish and plant all plants shown on the Drawings, as specified, and in quantities listed on the plant materials list. If discrepancies exist between the count of plant materials as shown on Drawings, and as listed on the plant materials list, the actual count on Drawings shall be considered correct.
- B. All plants shall conform to the species, variety, condition, and sizes specified in the plant materials list. Substitutions shall be allowed only where alternate plant materials are specified on drawings, or as approved by the Owner's Representative.
- C. Quality and Size:
 - 1. Plants shall have a growth habit that is normal for the species and shall be sound, healthy, vigorous, well-branched and well-formed, with healthy root systems, and be free from disease, sunscald, windburn, abrasion, harmful insects or insect eggs.
 - 2. Trees shall be symmetrically developed on all sides with reasonably straight trunks or stems (unless otherwise specified), and be free from objectionable disfigurements, bad crotches, or scars.
 - 3. Plants shall be equal to or exceed the measurements specified in the plant list, which are minimum acceptable sizes. They shall be measured before pruning, with branches in normal position. Requirements for measurements, branching, and quality of plants in the plant list generally follow the code of standards currently recommended by the American Association of Nurserymen, Inc., in the American Standard for Nursery Stock. Plants of the same variety used in a group or in close proximity shall be of uniform size.
 - 4. Plants larger than specified in the plant list may be used if approved by the Owner's Representative, but use of such plants shall not increase the contract price. If use of larger plants is approved, the root shall be increased in proportion to the size of the plant (in accordance with ANSI Z60.1).
 - 5. Container grown plants shall have sufficient root growth to hold the soil intact when removed from containers, but shall not be root bound. They shall have been grown in containers for a period of not less than 6 months and for no more than two years with the exception of larger container grown trees or specimen plants in 20 gallon or larger containers.
 - 6. Provide ground cover plants in flats or removable containers.

7. Ground cover shall be established and well-rooted, and shall have sufficient roots to hold the soil intact after removal from the pot without being "pot-bound". Plants shall have runners meeting the minimum requirements for number and length as listed in ANSI Z60.1.
8. Plant materials shall conform to the requirements and recommendations of ANSI Z60.1. All plants shall have been grown or acclimatized under climatic conditions similar to those in the locality of the project.
9. Plants shall be dug and prepared for shipment in a manner that will not cause damage to future development after planting.
10. Rootballs of plant materials are to be free of weeds including but not limited to briars, bindweed, poison ivy, nutgrass and dallis grass.
11. Quality and Size of Plants: Conform to the Grading Code of Nursery Stock, No. 1 grade.
12. Comply with federal and state laws requiring inspection for plant diseases and infestations. Inspection certificates required by law shall accompany each shipment of plants, and delivery certificates to the Owner's Representative. Before installing plants delivered from outside the country in which planted, obtain clearance from the County Agricultural Commissioner as required by law.

D. Storage:

1. Plants not installed on the day of arrival at the project site shall be stored and protected as follows:
 - a. All plants stored on the project shall be protected from drying at all times by covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar materials. All plants shall be watered as necessary until planting.
 - b. Plants shall be stored in areas designated or approved by the Owner's Representative.

E. Handling:

1. Care shall be taken to avoid damaging plants being moved to the project site. Plants shall not be lifted by the trunk or stem, and shall not be dropped. During transportation to the site, plants shall be properly covered to prevent drying out. Damaged plants will be rejected and shall be removed from the site immediately.

2.2 MATERIALS (OTHER THAN PLANTS)

A. Topsoil:

1. Topsoil on site and imported topsoil shall conform with Section: TOPSOIL.

B. Soil Conditioners:

1. Peat moss shall be fresh water 'sphagnum' peat moss conforming to Federal Specification Q-P-166. Peat shall be evenly moist at the time of mixing and shall be delivered to the site in unopened original containers.
2. Sand: Sand shall consist of having hard, durable particles free from deleterious substances.
3. Composted Manure: Provide a well rotted (three-year-old minimum) unleached stable or cattle manure free from sawdust, shavings, refuse, and harmful chemicals.
4. Gypsum: U.S. Grade, fine gypsum.

C. Fertilizer:

1. Commercial fertilizer shall be delivered to the site in unopened original containers, each bearing the manufacturer's guaranteed analysis.
 - a. Trees:
 - (1) Agriform 10-20-10 tablets as manufactured by Agriform International Chemicals, Inc.
 - b. Shrubs and Groundcover:
 - (1) Granular slow release fertilizer containing a minimum percentage by weight by 10 nitrogen, 20 phosphoric acid, and 10 potash.
 - (2) Bonemeal containing 4% nitrogen and 20% phosphoric acid.

D. Mulch:

1. Mulch shall be shredded cypress bark; free of any toxic materials.

E. Tree Wrap:

1. Trees shall be wrapped as indicated with Kraft tree wrap (or approved equal), not less than 4" wide with 50% overlap. Trunks shall be wrapped to the lowest branches.

F. Guying and Staking Materials:

1. Stakes, Guys, and Chafing Guard:
 - a. Provide as indicated on planting details.

G. Steel Edging:

1. Provide commercial steel edging 1/8 inch in thickness and 5-1/2 inches in depth.
2. Provide stakes as required by manufacturer.

- H. Antidesiccant: Emulsion-type, firm forming agent designed to permit transpiration but retard moisture loss.
- I. Water: Water shall be suitable for irrigation and free from ingredients harmful to plant life. The Contractor will furnish required hoses and watering equipment.

PART 3 - EXECUTION

3.1 PLANTING SEASONS

- A. Planting may be done whenever the weather and soil conditions are favorable or as otherwise authorized by the Owner's Representative.

3.2 LAYOUT

- A. Plant material locations shall be shown on planting plan.
- B. Prior to plant installation, lay out edges of planting beds and locate each major plant for review by the Owner's Representative.

3.3 EXCAVATION

- A. Prior to excavation of planting beds and pits, all areas shall conform to the grades and slopes as shown on the drawings, and the location of any underground utilities and irrigation system shall be verified by the Contractor. Damage to utilities or irrigation system shall be immediately repaired at Contractor's expense.
- B. Rock and other debris shall be removed to a depth necessary to permit proper planting.
- C. Plant pits shall be excavated with vertical sides and shall meet the minimum dimensions shown on planting details.
- D. Excess soil and other excavated materials shall be removed from the project site, or as directed by the Owner's Representative.

3.4 BED PREPARATION

- A. Bed areas shall be cultivated to a depth of 12", removing all grass, weeds, roots, rocks, and other debris.
- B. Following cultivation, peat moss, sand and composted manure shall be tilled into the soil as follows:
 - 1. 3 parts topsoil and backfill.
 - 2. 1 part sand.
 - 3. 1/2 part composted manure.
 - 4. 1/2 part peat moss.

- C. Prior to planting, water all areas thoroughly to produce weed growth. Apply "Roundup" herbicide to kill all growth and proceed with installation after period recommended by herbicide manufacturer.

3.5 SETTING PLANTS

A. Trees:

1. Place Agriform tablets in bottom of pit, according to manufacturer's instructions at the rate of one 21 gram tablet for each 1/2" of caliper.
2. Trees shall be set plumb and with the full side of the plant facing the front of the bed.
3. Soil shall be placed to secure the plant in position to approximately one half the depth of the ball. The backfill shall be watered to settle the soil and eliminate air pockets. Excess tying materials shall be removed or folded back. No packing materials shall protrude above soil level after planting is completed.
4. Trees shall be staked, guyed, wrapped, and mulched as indicated on planting details.

B. Shrubs and Groundcover:

1. Container grown stock shall be removed from containers in such a way as to prevent damage to plant or roots.
2. Shrubs shall be uniformly spaced as indicated, plumb, with the full side facing the front of the bed.
3. After establishment of finished grade around plants, all bed areas shall be topdressed with 10-20-10 fertilizer at the rate of 2 lbs. per 100 sq. ft.
4. All bed areas shall have a mulch spread to a uniform thickness of 3".

- C. Plants shall be set at the same depth at which they were grown, after settling.

3.6 WATERING

- A. All plant materials shall be watered until soil is saturated following planting.

3.7 PRUNING AND REPAIR

- A. Trees and shrubs shall be pruned and injuries repaired in the following manner:

1. The amount of pruning shall be limited to the minimum necessary to remove dead, diseased, damaged, or conflicting branches.
2. All cuts shall be flush with adjacent trunks or branches, leaving no stubs.

3. The typical growth habit of each plant shall be retained as much as possible.
4. All cuts larger than 3/4 inch diameter shall be trimmed back to healthy tissue, smoothed so as not to retain water and painted with tree wound dressing. Use waterproof, adhesive, and elastic paint; antiseptic, free from kerosene, coal tar, creosote, or any other material injurious to the tree. Do not bind plant with wire or rope which might damage the bark or break branches.
5. All pruned materials shall be removed from project site.

3.8 RESTORATION AND CLEAN-UP

- A. Excess and waste material shall be removed daily. When planting has been completed in an area, clear area of all debris and containers.

3.9 PROTECTION OF PLANT MATERIALS

- A. Following planting operations, place warning signs and barriers as necessary to protect planting against damage of any kind.
- B. Repair damage resulting from erosion, gulleys, washouts or other causes by filling with topsoil, tamping, refertilizing and resetting plants at the Contractor's expense.

3.10 MAINTENANCE DURING INSTALLATION

- A. Maintenance operations shall begin immediately after each plant is installed and shall continue as required until final acceptance. Plants shall be kept in a healthy, growing condition by watering, pruning, spraying, weeding, and any other necessary operations. Planting beds shall be kept free of weeds, grass, and other undesired vegetation. Keep all walks and paved areas clean. The site is to be kept clear of debris resulting from landscape work or maintenance.
- B. Contractor shall be responsible for repair or replacement of any damaged structures, plants, etc. in which damage resulted from planting operations.

3.11 EXAMINATION AND SUBSTANTIAL COMPLETION

- A. Owner's Representative shall inspect all work for substantial completion upon written request by the Contractor seven days in advance.
- B. Upon completion of all repairs or replacements requested at the time of inspection, the Owner's Representative shall certify in writing the substantial completion.

3.12 GUARANTEE PERIOD

- A. All plant materials shall be guaranteed for replacement for a period of 180 days, beginning on the date of substantial completion.
- B. Replacements:

1. Any plant required under this contract that is dead or not showing satisfactory growth, as determined by the Owner's Representative shall be promptly removed from the site and replaced by the Contractor. All replacements shall be of the same size and variety as originally specified, unless otherwise directed.
2. The Contractor will not be responsible for theft or damage to plants by vehicles or vandalism following substantial completion.

3.13 MAINTENANCE DURING GUARANTEE PERIOD

- A. The Contractor will be responsible for all maintenance of plant materials up to the date of substantial completion, and for a 180 day maintenance and guarantee period beginning on the date of substantial completion. During this 180 day period, the Contractor is responsible for:
 1. Water plants as necessary to maintain adequate supply of moisture in root zone.
 2. Water at a rate which allows soil to absorb water.
 3. Prune plants as required to remove dead branches.
 4. Mulch plants to keep a depth of 3".
 5. In planting beds, remove grass and weeds on a weekly basis.
 6. Spray plants with approved insecticides and fungicides as required and directed by Owner's Representative.
 7. Inspect and perform maintenance on a weekly basis.

3.14 FINAL INSPECTION AND FINAL ACCEPTANCE

- A. At the end of the maintenance and guarantee period, inspection of plants will be made by the Owner's Representative upon written request by Contractor seven days in advance. The Contractor will be notified in writing of the Final Acceptance, or of work required. The Contractor will be responsible for all maintenance until Final Acceptance is granted. Beginning on the date Final Acceptance is given to the Contractor, the Owner will be responsible for maintenance of all plant materials.
- B. Any plant, as required under this contract, that is dead, not true to name or size as specified, or not in satisfactory growth, as determined by the Owner's Representative shall be removed from site and replaced as originally specified without cost to the Owner.

END OF SECTION

SECTION 02901

LANDSCAPE WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements for materials, equipment, tools, transportation, and services required for complete repair of existing plant materials and related landscape items. Any damage to existing plant materials shall be replaced with the same plant material.

1.2 REFERENCES

- A. The following publications of the issues listed below form a part of this specification to the extent referenced to:
 - 1. American National Standards Institute (ANSI) Publications: Z60.1 Nursery Stock
 - 2. American Association of Nurserymen, Inc.: American Standard for Nursery Stock.

1.3 DEFINITIONS

- A. RPR: Resident Project Representative.

1.4 SUBMITTALS

- A. Certification: Submit certificates of inspection for the following:
 - 1. Plant materials.
- B. Manufacturer's Literature: Submit manufacturer's literature on the following:
 - 1. Antidesiccant.
 - 2. Tree Wrap.
 - 3. Watering Requirements.
- C. Planting Schedule: Submit planting schedule indicating scheduled planting dates for each type of work.
- D. Maintenance Instructions: Submit instructions and recommendations for one (1) year maintenance of landscape work.

1.5 JOB CONDITIONS

- A. Proceed with, and complete, landscape repair as rapidly as site becomes available.

PART 2 - PRODUCTS

2.1 PLANT MATERIALS

- A. Plant list: Furnish and plant all plants shown on the drawings, as specified, and in quantities listed on the plant materials list. If discrepancies exist between the count of plant materials as shown on drawings, and as listed on the plant materials list, the actual count on drawings shall be considered correct.
- B. All plants shall conform to the species, variety, condition, and sizes specified in the plant materials list. Substitutions shall be allowed only where alternate plant materials are specified on drawings, or with consent from RPR.
- C. Quality and Size:
 - 1. Plants shall have a growth habit that is normal for the species and shall be sound, healthy, vigorous, well-branched and well-formed, with healthy root systems, and be free from disease, sunscald, windburn, abrasion, harmful insects, or insect eggs.
 - 2. Trees shall be well formed and free from objectionable disfigurements, defects, or scars.
 - 3. Plants shall be equal to or exceed the measurements specified in the plant list, which are minimum acceptable sizes. They shall be measured before pruning, with branches in normal position. Requirements for measurements, branching, and quality of plants in the plant list generally follow the code of standards currently recommended by the American Association of Nurserymen, Inc., in the American Standard for Nursery Stock. Plants of the same variety used in a group or in close proximity shall be of uniform size.
 - a. Plants larger than specified in the plant list may be used if approved by the RPR, but use of such plants shall not increase the contract price.
 - b. If use of larger plants is approved, the root shall be increased in proportion to the size of the plant (in accordance with ANSI Z60.1).
 - 4. Balled and Burlapped Plants: Plants designated B&B in the plant list shall be balled and burlapped, with ball sizes and ratios conforming to ANSI Z60.1. They shall be dug with firm, natural balls of soil of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Balls shall be firmly wrapped with burlap or similar materials capable of rotting, and bound with twine cord or wire mesh.
 - 5. Container grown plants shall have sufficient root growth to hold the soil intact when removed from containers, but shall not be root bound. They shall have been grown in containers for a period of no less than 6 months and no more than 2 years. Container grown plants will be accepted as substitutes for B&B, provided all other requirements are met.
 - 6. Ground cover shall be established and well-rooted, and shall have sufficient roots to hold the soil intact after removal from the pot without being "pot-bound." Plants shall have runners meeting the minimum requirements for number and length as listed in ANSI Z60.1.
 - 7. Plant materials shall conform to the requirements and recommendations of ANSI Z60.1. All plants shall have been grown or acclimatized under climatic conditions similar to

those in the locality of the Project.

8. Plants shall be dug and prepared for shipment in a manner that will not cause damage to future development after planting.

9. Plants shall be planted the same day as arrival on Project site.

D. Handling:

1. Care shall be taken to avoid damaging plants being moved to the Project site. B&B plants shall be handled carefully, using a suitable method, to avoid a cracked, broken, loose, or "mushroomed" root ball. Plants shall not be lifted by the trunk or stem, and shall not be dropped. During transportation to the site, plants shall be properly covered to prevent freezing or drying out. Damaged plants will be rejected and shall be removed from the site immediately.

2.2 MATERIALS - OTHER THAN PLANTS

A. Topsoil: Natural, friable, fertile loam, representative of productive soils in the vicinity, and shall be free of subsoil, brush, weeds, litter, roots, stumps, extraneous or toxic substances harmful to plant growth, and rocks, clods, or objects larger than 3/4 inches in any dimension. The pH range shall be 6.5 to 8.5. The presence of Bermuda grass, Johnson grass, nut grass, bindweed, or dallis grass shall cause the soil to be rejected and removed from the site.

B. Peat Moss: Canadian 'sphagnum' peat moss consisting of partially decomposed plant residues containing a negligible amount of woody or mineral material. Peat shall be evenly moist at the time of mixing and shall be delivered to the site in unopened original containers.

C. Sand: Coarse in texture, clean, and free of toxic materials.

D. Fertilizer:

1. Commercial fertilizer shall be delivered to the site in unopened original containers; each bearing the manufacturer's guaranteed analysis.

2. Trees: Agriform 10-20-10 tablets manufactured by Agriform International Chemicals, Inc. or approved equal.

3. Shrubs and Groundcover: Granular fertilizer containing a minimum percentage by weight by 10 nitrogen, 20 phosphoric acid, and 10 potash.

E. Mulch:

1. Mulch shall be shredded Cypress Bark 1/4-inch to 3/4-inch diameter and free of toxic materials.

2. Bone meal containing 4 percent nitrogen and 20 percent phosphoric acid.

F. Water: Utilize domestic water supply from Owner's property at no cost to Contractor.

Furnish required hoses and watering equipment.

2.3 SOURCE QUALITY CONTROL

- A. RPR reserves the right to inspect plant materials either at the place of growth, or at the site prior to planting, to assume compliance with specifications for name, variety, size, and quality.
- B. Such inspection does not preclude right to reject materials at the Project site due to damage in transit.
- C. The RPR shall have the option to select and tag any or all plants at the nursery prior to delivery to the job site.

PART 3 - EXECUTION

3.1 PLANTING SEASONS

- A. Planting may be done whenever the weather and soil conditions are favorable or as otherwise authorized by RPR.

3.2 LAYOUT

- A. Plant materials and site furnishing locations shall be as shown on the drawings.

3.3 BED PREPARATION

- A. Eliminate all weeds in existing bed areas with "Round Up" herbicide (or approved equal) as needed, applied according to manufacturer's directions.
- B. Existing bed areas shall be cultivated to a depth of 3 inches, removing all grass, weeds, roots, rocks, and other debris.

3.4 SETTING PLANTS

- A. Trees:
 - 1. Place Agriform tablets in bottom of pit according to manufacturer's instructions at the rate of one 21-gram tablet for each 1/2-inch of caliper.
 - 2. Trees shall be set plumb and with the full side of the plant facing the front of the bed.
 - 3. Soil mix shall be placed to secure the plant in position to approximately one half the depth of the ball. The backfill shall be tamped and watered to settle the soil mix and eliminate air pockets. Excess burlap and tying materials shall be removed or folded back. No burlap or other wrapping materials shall protrude above soil level after planting is completed.
 - 4. Trees shall be mulched as indicated on planting details.

B. Shrubs and Groundcover:

1. Container grown stock shall be removed from containers in such a way as to prevent damage to plant or roots.
2. Shrubs shall be uniformly spaced as indicated, plumb, with the full side facing the outside of planter.
3. After establishment of finished grade around plants, all bed areas and planters shall be top-dressed with 10-20-10 or 8-8-25 fertilizer at the rate of 2 lbs. per 100 square feet.
4. All planters and bed areas shall have mulch of shredded cypress bark spread to a uniform thickness of 3 inches.

C. Plants shall be set at the same depth at which they were grown, after settling.

3.5 WATERING

- A. All plant materials shall be watered until soil is saturated following planting.

3.6 PRUNING AND REPAIR

- A. Trees and shrubs shall be pruned and injuries repaired in the following manner:

1. On B&B and container materials the amount of pruning shall be limited to the minimum necessary to remove dead, diseased, damaged, or conflicting branches. B&B pruning shall be done in a manner that will preserve the natural shape and form of the species. Topping or shearing is unacceptable.
2. All cuts shall be made to the natural growth collar at the base of the branch where it emerges from an adjacent trunk or branch. No stubs shall be left beyond the growth collar.
3. The typical growth habit of each plant shall be retained as much as possible.
4. All cuts larger than 3/4-inch diameter shall be trimmed back to healthy tissue, smoothed so as not to retain water, and painted with tree wound dressing.
5. All pruned materials shall be removed from Project site.

3.7 RESTORATION AND CLEANUP

- A. Excess and waste materials shall be removed daily.
- B. All materials brought to site shall be installed on the day of arrival.
- C. All debris and containers shall be removed.

3.8 MAINTENANCE DURING INSTALLATION

- A. Maintenance operations shall begin immediately after each plant is installed and shall continue as required until final acceptance. Plants shall be kept in a healthy, growing condition by watering, pruning, spraying, weeding, and any other necessary operations. Planting beds shall be kept free of weeds, grass, and other undesired vegetation.
- B. Contractor shall be responsible for repair or replacement of any damaged structures, plants, etc., in which damage resulted from planting operations.

3.9 INSPECTION AND PROVISIONAL ACCEPTANCE

- A. RPR shall inspect all work for provisional acceptance upon written request by the Contractor ten (10) days in advance.
- B. Upon completion of all repairs or replacements requested at the time of inspection, the Owner shall certify, in writing, the provisional acceptance.

3.10 GUARANTEE PERIOD

- A. Trees, shrubs, and groundcover shall be guaranteed for a period of 180 days beginning on the date of the substantial completion.
- B. Replacements:
 - 1. Any plant required under this contract that is dead or not showing satisfactory growth, as determined by RPR, shall be promptly removed from the site and replaced by the Contractor. All replacements shall be of the same size and variety as originally specified, unless otherwise directed.
 - 2. The Contractor will not be responsible for theft or damage to plants by vehicles or vandalism following substantial completion.

3.11 FINAL INSPECTION AND FINAL ACCEPTANCE

- A. At the end of the guarantee period, inspection of plants will be made by the RPR upon written request by Contractor with ten (10) days notice. The Contractor will be notified, in writing, of the Final Acceptance or of work required.
- B. Any plant, as required under this contract, that is dead, not true to name or size as specified, or not in satisfactory growth, as determined by RPR shall be removed from site and replaced as originally specified.

END OF SECTION

SECTION 02911

TOPSOIL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers the requirements for topsoil selection and application.

1.2 SUBMITTALS

- A. Laboratory Tests: Submit written results of laboratory tests of imported topsoil for review by the Owner's Representative.
- B. Submit record information regarding imported topsoil as follows:
 - 1. Specific locations of property from which the topsoil is to be stripped.
 - 2. Name and address of present Owner of property.
 - 3. Approximate amount of available topsoil.
 - 4. Depth to which topsoil is to be stripped.

1.3 QUALITY ASSURANCE

- A. The Owner's Representative shall be the final judge of suitability of topsoil. On site topsoil may be stripped at locations of construction and stockpiled on site to be reused throughout the plant. Where additional topsoil is required to be imported, the KPWA may request testing of topsoil for suitability.
- B. Testing for Imported Topsoil
 - 1. Imported topsoil shall be tested for organic material content, percent of silt, sand, clay, and other foreign materials such as rocks, roots, and vegetation.
 - 2. Additional imported topsoil testing shall be performed by an agricultural testing laboratory to determine soil pH, phosphate, and potash content. A report indicating amount and type of soil amendments necessary to bring soil to level specified shall be furnished to the Owner's Representative.
 - 3. Laboratory tests shall be submitted to the Owner's Representative for review.
- C. Imported Topsoil Test Specification: Imported topsoil complying with the following specifications shall be provided:
 - 1. Composition (by volume):
 - a. Organic material - minimum of 2%.
 - b. Silt - minimum of 15%.
 - c. Sand - 15 to 50%.
 - d. Clay - 15 to 35%.
 - e. Foreign Materials - maximum of 1.0%.

2. Soil pH shall range from 6.0 to 7.5.

1.4 PROTECTION

- A. Protection of personal, existing, and new improvements shall be in accordance with applicable requirements of Section 02310 - Site Grading.

PART 2 - PRODUCTS

2.1 SUITABLE TOPSOIL

- A. On site topsoil may be stripped at locations of construction and stockpiled on site to be reused throughout the plant. Where additional topsoil is required to be imported, the KPWA may request testing of topsoil for suitability.
- B. Suitable topsoil includes selectively excavated material that is representative of soils in a vicinity that produce heavy growths of crops, grass, or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances, or any material that might be harmful to plant growth or be a hindrance to grading, planting, or maintenance operations.
- C. Topsoil shall not contain more than five (5) percent by volume of stones, stumps, or other objects larger than 1 inch in any dimension.
- D. Topsoil Source: Stockpiled topsoil from the project site may be used, provided it meets the criteria described above.
 1. If sufficient topsoil is not available from the area on site to be cleared or the material on site is not suitable, the Contractor shall obtain suitable topsoil from off site at no additional cost to the Owner and in accordance with Part 1 1.3.C: Imported Topsoil Test Specification.
- E. Following approval of the sample, provide a 1/2 cubic yard sample and store at the site of work for comparison with subsequent loads of imported topsoil. Protect the comparison sample by a cover until the furnishing of all soil has been completed and accepted. Should the imported topsoil submittal lack certain requirements which can be added to the imported topsoil, the Owner's Representative will consider a request by the Contractor to amend the imported topsoil as recommended by the Soils Analyst at the Contractor's expense.
- F. Transport imported topsoil directly from the source to final position unless approved by Owner's Representative to be placed in stockpiles. If amendments are required, mix in an approved manner prior to placing on site. If stockpiling is approved, the locations and amount of the stockpiles will be designated by Owner's Representative.

PART 3 - EXECUTION

3.1 CONSERVATION OF TOPSOIL

- A. Topsoil shall be stripped from areas to be excavated and areas where fill will be placed immediately before grading operations in that area begin.
- A. Topsoil shall be stockpiled as directed by the Owner's Representative for future placement in the work.
- B. Sufficient topsoil shall be conserved to cover to a depth of four (4) inches all areas to be disturbed except areas to be paved or similarly surfaced.

3.2 TOPSOIL PLACING

- A. Prior to placing topsoil, vegetation on the areas receiving the topsoil shall be removed and the ground surface cleared of all other materials that would hinder proper grading, tillage, or subsequent maintenance operations.
- B. Previously constructed grades shall be repaired if necessary so that the areas receiving the topsoil shall conform to the lines and grades indicated on the Drawings.
- C. Areas receiving the topsoil shall be thoroughly scarified/ripped to a depth of at least six (6) inches, unless, by reason of drought, excessive moisture, or other factors, satisfactory results are not likely to be obtained. Subsoil clods shall not be larger than six (6) inches in diameter.
- D. Topsoil shall be uniformly distributed and evenly spread to a minimum thickness of four (4) inches. Spreading shall be performed in such a manner that planting can proceed with little additional soil preparation or tillage.
- E. The finished surface shall not vary more than 0.10 feet from the established grade and cross section and shall be free of depressed areas where water would pond.
- F. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or the proposed planting.

END OF SECTION

SECTION 02917
SOIL PREPARATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section covers the requirements for soil preparation including the requirements for:
 - 1. Soil Amendments
 - 2. Fertilizers
 - 3. Soil Conditioners
 - 4. Planting Soil Mixtures

1.2 SUBMITTALS

- A. Certification: Submit certificates of inspection or manufacturer's certified analysis attesting compliance with specifications for the following:
 - 1. Fertilizers
 - 2. Lime
 - 3. Peat

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02911 - Topsoil
- B. Section 02900 - Planting
- C. Section 02923 - Seeding

1.4 QUALITY ASSURANCE

- A. General
 - 1. Ship materials with certificates of inspection required by governing authorities.
 - 2. References to ANSI Standards or Federal Standards are the latest editions of these Standards.
- B. Analysis and Standards
 - 1. Provide standard packaged products with manufacturer's certified analysis.
 - 2. For other materials provide analysis in accordance with methods established by Association of Official Agricultural Chemists.

1.5 JOB CONDITIONS

- A. Proceed with landscape work as portions of the Project site become available, coordinating with other contractors. Any subsequent damage to final graded areas and Topsoil or Sod/Seeded areas by the Contractor or any subcontractors, suppliers or manufacturers shall be remediated by the Contractor at its expense.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials in original unopened containers.
- B. Protect materials from deterioration during delivery and while stored on site.
- C. Store in areas designated by Owner's Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Section 02911 - Topsoil.
- B. Soil Amendments:
 - 1. Provide, as the Agricultural Soil Test dictates or as shown on the drawings, the following:
 - a. Lime: Furnish raw ground limestone containing not less than 90% total calcium carbonates, 98% passing a 20-mesh sieve and 50% passing a 100-mesh sieve.
 - b. Aluminum Sulfate
 - c. Bonemeal: Furnish commercial, raw, finely ground containing 4% nitrogen and 20% phosphoric acid.
 - d. Gypsum: Furnish U.S. Grade Fine Gypsum.
 - e. Superphosphate: Soluble mixture of treated minerals; 20% available phosphoric acid.
- C. Fertilizers:
 - 1. Provide, as the Agricultural Soil Test dictates or as shown on the drawings, the following:
 - a. Phosphate and Potash: Provide a standard commercial product containing not less than 20% phosphoric acid and 20% potash, having a formula of 0-20-20.
 - b. Commercial Mixed Fertilizer: Provide a commercial fertilizer uniform in composition and a free flowing material.

- c. Urea: Provide for type (75% nitrogen from Urea-form) having an analysis of 30% nitrogen, 0% phosphorous, and 0% potash.
- d. Provide fertilizer containing the following percentages by weight for lawn areas.
 - 1) 5% Nitrogen
 - 2) 10% Phosphoric Acid
 - 3) 5% Potash

D. Soil Conditioners:

- 1. Peat: Provide a natural product of peat moss from a fresh-water site, conforming to Federal Specification Q-P-166.
- 2. Sand: Provide sand, clean and free of toxic materials.

PART 3 - EXECUTION

3.1 SOIL PREPARATION

A. Lawn Areas

- 1. Undisturbed Topsoil:
 - a. Prior to loosening topsoil, remove undesired vegetation and clear ground surface of all other materials that would hinder proper grading or tillage.
 - b. Loosen topsoil of lawn areas to a minimum depth of 6 inches.
 - c. Remove any deleterious material, clogs, clumps, rocks, etc, that are uncovered.
 - d. Make necessary soil amendments as indicated by soil tests. Work into topsoil thoroughly.
 - e. Make first application of fertilizer as indicated by soil test.
 - f. Thoroughly and evenly incorporate fertilizer with soil to a depth of 6 inches.
 - g. Remove high areas and fill in depressions; till soil to a homogenous mixture of the fine texture. Meet finished grades.
 - h. Limit fine grading to areas which can be promptly planted.
- 2. Replaced or New Topsoil
 - a. Prior to replacing topsoil, scarify subsoil to a minimum depth of 3 inches.
 - b. Spread topsoil to a minimum depth of 4 inches.
 - c. Remove deleterious materials, clogs, clumps, rocks, etc.

- d. Make necessary soil amendments as indicated by soil tests. Work into topsoil thoroughly.
- e. Make first application of fertilizer as indicated by soil test.
- f. Thoroughly and evenly incorporate fertilizer with soil to a depth of 6 inches.
- g. Grade lawn areas to a smooth, even surface with loose uniform texture.
- h. Limit fine grading to areas to be promptly planted.

B. Planting Beds:

1. Undisturbed Topsoil:

- a. Remove undesired vegetation and clear ground surface of deleterious material.
- b. Loosen bed to a depth of 8 inches.
- c. Remove all deleterious material, clogs, clumps, rocks, etc.
- d. Mix in soil amendments and fertilizers as indicated by soil test. Work thoroughly into soil.
- e. Mix in any soil conditioners as dictated by soil test.
- f. Grade to a smooth even surface with loose, uniform texture.

2. Replaced or Imported Topsoil

- a. Loosen subgrade to a minimum depth of 6 inches.
- b. Remove deleterious materials, clogs, clumps, rocks, etc.
- c. Spread topsoil to a minimum depth of 6 inches.
- d. Mix in soil amendments and fertilizes as indicated by soil test. Work thoroughly into soil.
- e. Mix in any soil conditioners as indicated by soil test.
- f. Grade to a smooth even surface with loose, uniform texture.

C. Planting Mixtures

1. Tree and Shrub Backfill:

- a. Prepare a mix as dictated by the soil test or as shown on the drawings.
- b. Place soil mix according to Section 02900 - Planting.

2. Moveable Planters:

- a. Prepare soil mix as dictated by the soil test or as shown on the Drawings.
- b. Place soil mix according to the Drawings.

END OF SECTION

SECTION 02923

SEEDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Seeding establishment and maintenance of new grassed areas.

1.2 STANDARD SPECIFICATIONS

- A. Seeding materials and construction shall conform to the requirements of Section 232 - Seeding, of the Oklahoma Department of Transportation Standard Specifications for Highway Construction (ODOT Specifications), dated 1999.
- B. References to the "Department" in the ODOT Specifications shall be changed to refer to the "Owner's Representative".
- C. Delete subsections titled "Method of Measurement" and "Basis of Payment".

1.3 SUBMITTALS

- A. Certification of Landscape Work
 - 1. Certificates of inspection and manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials shall be submitted.
 - 2. A seed vendor's certified statement shall be submitted for each seed mixture required, stating botanical and common name, percentages or purity, germination, and weed seed percentages for each seed species.
- B. Planting Schedule, Landscape Work: The Contractor shall submit his proposed planting schedule showing scheduled dates for each type of planting in each area of the Project site that was disturbed during construction.
- C. Maintenance Instructions, Landscape Work: Instructions shall be submitted recommending procedures for the maintenance of seeding work for one (1) full year. These instructions are provided as a guideline only to assist the Owner in establishing a maintenance program.

1.4 QUALITY ASSURANCE

A. General

- 1. Landscape Contractor: A single firm specializing in all aspects of landscape work and has a minimum of five (5) years of experience in performing seeding as specified.
- 2. Landscape materials shall be shipped with certificates of inspection as required by governmental authorities.

3. Do not make substitutions for specified materials.

B. Analysis and Standards:

1. Standard products shall be packed with manufacturer's certified analysis.
2. For other materials, an analysis shall be performed by a recognized laboratory in accordance with methods established, wherever applicable or as further specified.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Packaged materials shall be delivered in containers showing the weight, analysis, and name of manufacturer. Materials shall be protected from deterioration during delivery and while stored at the site.

1.6 JOB CONDITIONS

- A. Seeding shall not be performed until finish grading and structures in or adjacent to areas to be planted have been installed and approved.
- B. Work within seasonal limitations for various seed species.
- C. When detrimental conditions are encountered, notify Owner's Representative before proceeding.

1.7 PROTECTION OF SEEDED AREAS

- A. Seeded areas shall be protected from damage, disturbance, or construction activity after planting operations are complete.
- B. Damage resulting from construction activities, erosion, gulleys, tire ruts, washouts, or other causes shall be repaired by filling with topsoil, tamping, re-fertilizing, and re-seeding by the Contractor at his expense, if such damage occurs prior to acceptance of the Project.

1.8 PLANTING SEASON

- A. Planting season requirements shall conform to ODOT Specifications, Subsection 230.04(e).

PART 2 - PRODUCTS

2.1 SEED MATERIALS

- A. Seed materials shall conform to ODOT Specifications, Subsection 735.04.

2.2 TOPSOIL

- A. Refer to Section 02911 - Topsoil for topsoil requirements.

2.3 FERTILIZERS

- A. Commercial fertilizer shall conform to ODOT Specifications, Subsection 735.07.

2.4 MULCH

- A. Mulching materials shall conform to ODOT Specifications, Subsection 735.05.

2.5 WATER

- A. Contractor shall provide suitable quality water to establish and maintain a healthy stand of grass.

2.6 TEMPORARY IRRIGATION SYSTEM

- A. The Contractor will provide a temporary irrigation system to establish a healthy stand of grass. The temporary irrigation system will be onsite until acceptance of the Project. Failure by the Contractor to properly irrigate the newly seeded areas will result in the Contractor completely remediating areas that are not accepted by the Owner's Representative.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Construction methods shall conform to ODOT Specifications, Subsection 232.04.

3.2 SOIL PREPARATION

- A. Seedbed preparation shall conform to ODOT Specifications, Subsection 232.04(a).

3.3 PLANTING METHODS

- A. Planting methods shall conform to ODOT Specifications, Subsection 232.04(b).

3.4 MULCHING

- A. Mulching shall conform to ODOT Specifications, Subsection 233.04.

3.5 WATERING

- A. Watering shall conform to ODOT Specifications, Subsection 232.04(d).

3.6 ESTABLISHMENT OF TURF AND MAINTENANCE

- A. Repair and maintenance shall conform to ODOT Specifications, Subsection 232.04(f).

3.7 MOWING

- A. Mow lawns as soon as there is enough top growth to cut with mower set at specified height of 2 inches. Repeat mowing as required to maintain specified height. Removing no more than 40 percent of the leaf area. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Collect clippings during mowing and

remove them from the site. The Contractor is responsible for mowing all disturbed and seeded areas until such time as the Contract is completed.

- B. Any areas that establish cattails shall be treated and all evasive species shall be removed including all tubular root systems.
- C. Mowing shall conform to ODOT Specifications, Subsection 241.04.

3.8 FINAL ACCEPTANCE

- A. The Contractor shall care for the seeded areas after its installation until the acceptance of the entire project and has established an even, thick, vigorous strand of grass with no bare spots in seeded areas larger than 2-inch diameter.
- B. Final review for acceptance shall be made at the conclusion of the planting establishment period. On such date, all project improvements and all corrective work shall have been completed. If all project improvements and corrective work are not completed, then the turf establishment shall continue, at no additional cost to the Owner, until all work has been completed. This condition will be waived by the Owner's Representative under such circumstances wherein the Owner's Representative has granted an extension of time to permit the completion of a particular portion of the work beyond the time of completion set forth in the agreement.
- C. Written notice requesting review shall be submitted at least 10 days before the anticipated date.
- D. Prior to being considered ready for review, the Contractor shall have done a final weeding and lawn shall be neatly mowed and edged, and the job cleared of all debris and presented in a neat, orderly fashion.

3.9 GUARANTEE

- A. Guarantee all turf, native plants, and wildflowers to be in a healthy thriving condition until the end of the maintenance period or until the grasses are fully established. The Contractor shall replace, without cost to the Owner, all seeded areas not acceptable. The Owner will assume all maintenance responsibility upon the date final approval is given to the Contractor.

END OF SECTION

SECTION 02925

SODDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements for sod establishment and maintenance of new turf areas.
- B. Sod shall be placed in areas designated on the Drawings once all construction activity is complete and no further activity is anticipated.

1.2 STANDARD SPECIFICATIONS

- A. Sodding materials and construction shall conform to the requirements of Section 230 - Sodding and Sprigging of the Oklahoma Department of Transportation Standard Specifications for Highway Construction (ODOT Specifications), dated 1999.
- B. References to the "Department" in the ODOT Specifications shall be changed to refer to the "Owner's Representative".
- C. Delete subsections titled "Method of Measurement" and "Basis of Payment".
- D. Delete portions of ODOT Specifications that refer to "Sprigging".

1.3 SUBMITTALS

- A. Certification of Landscape Work
 - 1. Certificates of inspection and manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials.
 - 2. A copy of the purchase order invoice shall be submitted for each type of sod. The invoice shall define sod types and quantities.
- C. Planting Schedule, Landscape Work: The Contractor shall submit his proposed planting schedule showing scheduled dates for each area of the site.
- D. Maintenance Instructions, Landscape Work: Instructions shall be submitted recommending procedures for the maintenance of sod work for one (1) full year or until sod has fully established. These instructions are provided as a guideline only to assist the Owner in establishing a maintenance program.

1.4 QUALITY ASSURANCE

- A. General:
 - 1. Landscape Contractor: Firm specializing in all aspects of landscape work and has a minimum of five (5) years of experience in performing sodding work.

2. Ship landscape materials with certificates of inspection as required by governmental authorities.

B. Analysis and Standards:

1. Standard products shall be packed with manufacturer's certified analysis. For other materials, an analysis shall be performed by a recognized laboratory, whenever applicable or as further specified.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Packaged materials shall be delivered in containers showing the weight, analysis, and name of manufacturer. Materials shall be protected from deterioration during delivery, and while stored at the site.
- B. Sod shall be installed within 24 hours from time of stripping.

1.6 JOB CONDITIONS

- A. Sodding shall not be performed until the irrigation system, finish grading, underground utilities, storm drainage structure, surfacing, and structures in or adjacent to areas to be planted have been installed, tested, inspected, and approved.
- B. Work within seasonal limitations for various sod species.

1.7 PROTECTION OF SODDED AREAS

- A. Protect sodded areas from damage, disturbance, or construction activity after planting operations are complete.
- B. Damage resulting from construction activities, erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, tamping, re-fertilizing, and re-sodding by the Contractor at his expense, if such damage occurs prior to acceptance of the project.

1.8 PLANTING SEASON

- A. Planting season requirements shall conform to ODOT Specifications, Subsection 230.04(e).

PART 2 - PRODUCTS

2.1 SOD

- A. Sod shall conform to ODOT Specifications, Subsection 735.02.

2.2 TOPSOIL

- A. Refer to Section 02911 - Topsoil for topsoil requirements.

2.3 FERTILIZERS

- A. Commercial fertilizer shall conform to ODOT Specifications, Subsection 735.07.

2.4 WATER

- A. Contractor shall provide suitable quality water to establish and maintain a healthy stand of turf.

2.5 TEMPORARY IRRIGATION SYSTEM

- A. The Contractor will provide a temporary irrigation system to establish a healthy stand of turf. The temporary irrigation system will be onsite until acceptance of the project.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Construction methods shall conform to ODOT Specifications, Subsection 230.04.

3.2 WATERING

- A. Watering shall conform to ODOT Specifications, Subsection 230.04(f).

3.3 ESTABLISHMENT OF TURF AND MAINTENANCE

- A. Repair and maintenance shall conform to ODOT Specifications, Subsection 730.04(h).

- B. Mowing

1. Mowing shall conform to ODOT Specifications, Subsection 240.04.
2. Mow lawns as soon as there is enough top growth to cut with mower set at specified height of 2 inches. Repeat mowing as required to maintain specified height. Removing no more than 40 percent of the leaf area. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Collect clippings during mowing and remove them from the site.

3.4 FINAL ACCEPTANCE

- A. The Contractor shall care for the sodded areas after its installation until the acceptance of the entire Project and has established an even, thick, vigorous strand of grass free of bare spots, weeds, open joints, and surface irregularities.
- B. Final review for acceptance shall be made at the conclusion of the planting establishment period. On such date, all project improvements and all corrective work shall have been completed. If all project improvements and corrective work are not completed, then the turf establishment shall continue, at no additional cost to the Owner, until all work has been completed. This condition will be waived by the Owner's Representative under such circumstances wherein the Owner's Representative has granted an extension of time to permit the completion of a particular portion of the work beyond the time of completion set forth in the agreement.

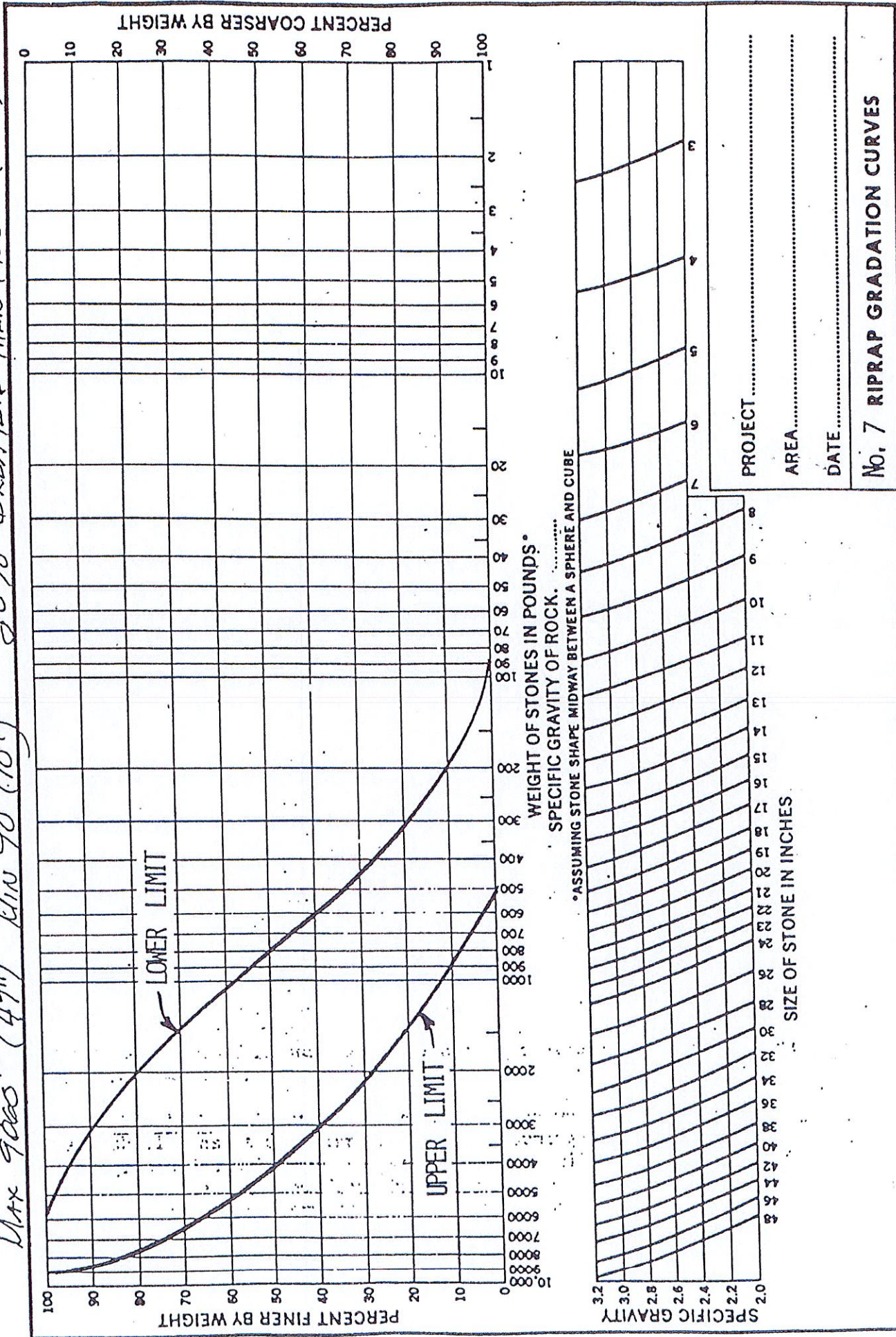
- C. Written notice requesting review shall be submitted at least 10 days before the anticipated date.
- D. Prior to being considered ready for review, the Contractor shall have done a final weeding and lawn shall be neatly mowed and edged, and the job cleared of all debris and presented in a neat, orderly fashion.

3.5 GUARANTEE

- A. Guarantee all turf to be in a healthy thriving condition until the end of the maintenance period or if replaced during warranty period until the replacement sod has established. Contractor shall replace, without cost to the Owner, all sodded areas not acceptable. The Owner will assume all maintenance responsibility upon the date final approval is given to the Contractor.

END OF SECTION

Max 9000 # (47") Min 90 # (10") 50% GREATER THAN 800 # (21")



WEST BANK REMEDIATION PROJECT
TECHNICAL SPECIFICATIONS

DIVISION 3 - LIST OF SECTIONS

Section 03300 - Cast in Place Concrete

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete, including formwork, reinforcing steel, mix design, placement procedures, and finishes.
- B. Related Sections:
 - 1. Section 02750 – Portland Cement Concrete Pavement Mixes
 - 2. Section 02751 – Portland Cement Concrete Pavement
 - 3. Section 02772 – Cement Concrete Curbs and Gutters

1.2 REFERENCES

- A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards except where more stringent requirements are shown or specified:
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings.
 - 2. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - 3. ACI 311 - Guide for Concrete Inspection.
 - 4. ACI 315 - Details and Detailing of Concrete Reinforcement.
 - 5. ACI 318 - Building Code Requirements for Reinforced Concrete.
 - 6. ACI 347 - Guide to Formwork for Concrete.
 - 7. ACI 350R - Environmental Engineering, Concrete Structures.
 - 8. ACI 350.1R - Testing Reinforced Concrete Structures for Watertightness.
 - 9. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.
 - 10. Concrete Reinforcing Steel Institute (CRSI) - Placing Reinforcing Bars.
 - 11. ASTM A615 - Specifications for Deformed / Plain Billet-Steel Bars for Conc Reinf.
 - 12. ASTM A706 - Standard Specs for Low-Alloy Deformed Bars for Concrete Reinf.
 - 13. American Welding Society, AWS D1.4 - Structural Welding Code – Reinf. Steel.

1.3 SUBMITTALS

- A. Product Data: Manufacturers' product data with applications and installation instructions for proprietary materials and items, including forming accessories, reinforcement, admixtures, curing compounds, underlayment compounds, bonding agents, form release agents, patching compounds, waterstops, joint systems, chemical floor hardener, dry-shake finish materials, and others as requested by the Owner's Representative.
- B. Shop Drawings:
 - 1. Design of formwork for structural stability and efficiency is Contractor's responsibility.
 - 2. Shop Drawing for Reinforcement: Shop drawings for reinforcement with details for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315

- Details and Detailing of Concrete Reinforcement and ACI SP 66 - ACI Detailing Manual latest editions, showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

C. Samples, Concrete Work: Samples of material as requested by Owner's Representative, including names, sources, and descriptions, as follows:

1. Normal weight aggregates
2. Waterstops
3. Expansion joint material including dowels and sleeve
4. Vapor retarder or barrier

D. Quality Control Submittals:

1. Test Reports: Laboratory test reports for concrete materials and mix design tests.
2. Certificates: Material certificates in lieu of materials laboratory test reports when permitted by Owner's Representative.
 - a. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds specified requirements.
 - b. Provide certification from admixture manufacturers that chloride is not contained in the admixtures.
3. Minutes of pre-installation conference.

1.4 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. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. ACI 347 - Guide to Formwork for Concrete.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 318 - Building Code Requirements for Reinforced Concrete.
4. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

D. Concrete Testing Service: Engage a testing laboratory acceptable to Owner's Representative and qualified according to ASTM C 1077 and ASTM E 329 for testing indicated to perform material evaluation tests and to design concrete mixes.

1. Materials and installed work may require testing and retesting at any time during progress of work.
2. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
3. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
4. 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.

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

F. Pre-Installation Conference: Conduct conference at project site to comply with requirements of Section 01300 – Administrative Requirements and the following:

1. At least 35 days prior to submittal of design mixes conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations.
2. Review requirements for submittals, status of coordinating work, and availability of materials.
3. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications.
4. Request that representatives of each entity directly concerned with cast-in-place concrete attend conference, including, but not limited to, the following:
 - a. Contractor's superintendent.
 - b. Laboratory responsible for concrete design mixes.
 - c. Laboratory responsible for field quality control.
 - d. Ready-mix concrete producer.
 - e. Concrete subcontractor.
 - f. Primary admixture manufacturers.
 - g. Engineer or Owner's Representatives.

G. Qualifications for Welding Work:

1. Qualify welding processes and welding operators in accordance with the AWS Standard Qualification Procedure. Employ welding supervisor or Senior Welder experienced in the welding of reinforcing bar or associated tasks where required.

2. Contractor shall ensure welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months. If re-certification of welders is required, retesting will be the Contractor's responsibility.
 - H. Supervision. Employ a subcontractor, superintendent, lead foreman, or lead concrete supervisor, in charge of concrete works and on-site during all concrete operations with adequate experience-- on projects of equal complexity-- in the preparation of forms, reinforcing bars, placement, finishing and curing of concrete.
 - I. Workmanship: The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as required by the specifications.
- 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING
- A. Deliver reinforcement to the project site bundled, tagged, and marked.
 1. Use weatherproof tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.
 2. Deliver reinforcement clean and free from loose mill and rust scale, dirt, and other coatings.
 - B. Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt, excessive rust, and grease.
 - C. Store materials to permit easy access for inspection and identification.
 - D. Exercise care to prevent damage to steel reinforcement during delivery and storage.
 - E. Cement: Store cement in watertight buildings, bins, or silos.
 - F. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
 - G. Aggregate:
 1. Stockpile aggregate in a manner to prevent contamination with other materials or with other sizes of aggregate. To ensure this condition, conduct tests for determining conformance to requirements at the point of batching.
 2. Allow sand to drain until it has reached a uniform content before it is used.
 - H. Admixtures:
 1. Store admixtures in a manner to prevent contamination.
 2. Protect admixtures from extreme temperatures, which would adversely affect their characteristics.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use plywood complying with U.S. Product Standard PS-1 - B-B (Concrete Form) Plywood, Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent compounds with a maximum of 350 mg per 1 volatile organic compounds (VOC) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces requiring bond or adhesion, or impede the wetting of surfaces to be cured with water or curing compound. Release agents shall be used in strict accordance with manufacturer's recommendations.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal.
 - 1. Provide units that will leave no metal closer than 1-1/2 inches to exposed surface.
 - 2. Provide ties that, when removed, will leave holes not larger than 1-inch diameter in concrete surface.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.
- B. Reinforcing Bars: ASTM A 706. Welding of reinforcing other than specified is prohibited.
- C. Steel Wire: ASTM A82, plain, cold-drawn steel.
- D. Welded Wire Fabric:
 - 1. ASTM A185 welded steel wire fabric.
 - 2. Furnish in flat sheet not rolls.
- E. Welded Deformed Steel Wire Fabric: ASTM A497.
- F. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar-type supports complying with CRSI specifications. Do not use wood, brick, or other unacceptable materials.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
- G. Tie Wire: 16-gauge minimum and in sufficient quantity to hold reinforcement accurately in place during concrete placement operations.

2.3 CONCRETE MATERIALS

All structural concrete specified and to be used on this project shall have a minimum compressive strength of 4,000 psi, unless noted otherwise on the Drawings..

- A. Portland Cement: ASTM C150, Type I or Type II.
1. Use one brand of cement throughout project unless otherwise acceptable to Owner's Representative.
 2. Type III cement may be used in lieu of Type I at the Contractor's option, when approved in writing by the Owner's Representative.
- B. Fly Ash: ASTM C618, Type C or Type F. (Do not use fly ash in concrete that will be exposed to view or slabs-on-grade.)
- C. Normal Weight Aggregates: ASTM C33 and as herein specified. Provide aggregates from a single source for exposed concrete.
1. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
 2. Local aggregates not complying with ASTM C33 but which have shown by special tests or actual service to produce concrete of adequate strength and durability may be used when acceptable to Owner's Representative.
 3. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre, which can cause stains on exposed concrete surfaces.
- D. Water: Clean, fresh, and potable.
- E. Flowable Fill. Minimum compressive strength of 100 psi, of a mix routinely provided by local concrete materials suppliers and successfully used by the KPWA on projects for use in excavations and line plugging.
- F. Admixtures: Provide admixtures produced by established reputable manufacturers and use in compliance with the manufacturer's printed directions. Do not use admixtures which have not been incorporated and tested in the accepted mixes, unless otherwise authorized in writing by the Owner's Representative.

1. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.
2. Water-Reducing Admixture: ASTM C494, Type A.
3. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C494, Type F or Type G.
4. Water-Reducing, Accelerating Admixture: ASTM C494, Type E.
5. Water-Reducing, Retarding Admixture: ASTM C494, Type D.

2.4 RELATED MATERIALS

- A. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch thick (26-gauge) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336-inch thick (22-gauge) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- C. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
 1. Waterstops: PVC by Greanstreak, Inc. or equal.
- D. Sand Cushion: Clean, manufactured, or natural sand.
- E. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested in accordance with ASTM E154, as follows:
 1. Polyethylene sheet not less than 8 mils thick.
- F. Liquid Membrane-Forming Curing Compound: Liquid-type, membrane-forming curing, compound complying with ASTM C309, Type I, Class A. Moisture loss not more than 0.055 gr. per sq. cm. when applied at 200 sq. ft. per gal.
- G. Bonding Compound: Polyvinyl acetate or acrylic base.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. Polyvinyl Acetate (Interior Only):
 - b. Acrylic or Styrene Butadiene:

2.5 PROPORTIONING AND DESIGNING OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Owner's Representative for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
- B. Fly Ash: Fly ash may be used to reduce cement content. Not more than 25% of cementitious material shall be fly ash. Submit mix design and test reports verifying compliance.
- C. Submit written reports to Owner's Representative of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until Owner's Representative has reviewed proposed mix designs. Reports submitted to the Owner's Representative shall contain the following data:
 - 1. Complete identification of aggregate source of supply.
 - 2. Tests of aggregates for compliance with specified requirements.
 - 3. Scale weight of each aggregate.
 - 4. Absorbed water in each aggregate.
 - 5. Brand, type, and composition of cement.
 - 6. Brand, type, and amount of each admixture.
 - 7. Amounts of water used in trial mixes.
 - 8. Proportions of each material per cu. yd.
 - 9. Gross weight and yield per cu. yd. of trial mixtures.
 - 10. Measured slump.
 - 11. Measured air content.
 - 12. Compressive strength developed at 7 days and 28 days from not less than 3 test cylinders cast for each 7 and 28-day test, and for each design mix.
- D. Normal Weight Concrete: Design mixes to provide normal weight concrete with the following properties:
 - 1. 4000-psi, 28-day compressive strength; W/C ratio, 0.42 maximum; 1 1/2" maximum aggregate size.
 - 2. 3000-psi, 28-day compressive strength; W/C ratio, 0.58 maximum; 1 1/2" maximum aggregate size.
- E. Slump Limits: Proportion and design mixes for normal weight concrete to result in concrete slump at point of placement as follows:
 - 1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
 - 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
 - 3. Concrete containing HRWR admixture (Superplasticizer): Not more than 8 inches after addition of HRWR to site-verified 2 to -3-inch slump concrete.
 - 4. Other concrete: Not less than 1-inch and not more than 5 inches.

- F. Laboratory Trial Batches: When laboratory trial batches are used to select concrete proportions, prepare test specimens in accordance with ASTM C192 and conduct strength tests in accordance with ASTM C39.
1. For concrete other than lightweight concrete, establish a curve showing relationship between water-cement ratio (or cement content) and compressive strength, with at least 3 points representing batches which produce strengths above and below that required. Use not less than 3 specimens tested at 28 days or an earlier age when acceptable to the Owner's Representative, to establish each point on the curve. The maximum allowable water-cement ratio for the concrete for the structure shall be as determined from these curves and shall correspond to an average compressive strength 15 percent greater than the specified strength.
- G. Field Experience Method: When field experience methods are used to select concrete proportions, establish proportions as specified in ACI 301.
1. Strength data for establishing standard deviation will be considered suitable if the concrete production facility has certified records consisting of at least 30 consecutive tests in one group or the statistical average for 2 groups totaling 30 or more tests, representing similar materials and project conditions.
 2. Standard Deviation: If standard deviation exceeds 600 psi, or if no suitable records available, select proportions to produce an average strength of at least 1200 psi greater than the required compressive strength of concrete.
 3. After sufficient experience and test data become available from the job, using ACI 214 methods of evaluation, the standard deviation may be reduced when the probable frequency of tests more than 500 psi below required compressive strength will not exceed 1 in 100, and that the probable frequency of an average of 3 consecutive tests below required compressive strength will not exceed 1 in 100.
- H. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to the Owner and as accepted by the Owner's Representative. Laboratory test data for revised mix design and strength results must be submitted to, and accepted by, the Owner's Representative before using in the work.

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (Superplasticizer) in concrete as required for placement and workability.
- B. Use nonchloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
- C. Use air-entraining admixture in all concrete except trowel finished interior floor slabs. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within following limits:

1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 6 percent moderate exposure.
 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure or to receive a surface hardener; 2 percent to 4 percent air.
- D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

- A. General: Concrete may be mixed at batch plants or it may be transit-mixed as specified herein. Batch plants must comply with the requirements of ACI 304, with sufficient capacity to produce concrete of the qualities specified and in quantities required to meet the construction schedule. All plant facilities are subject to testing laboratory inspection and acceptance of the Owner's Representative. Maintain equipment in proper operating condition, with drums cleaned before charging each batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing, or holding dry-mixed materials too long in the mixer before the addition of water and admixtures.
- B. Jobsite Mixing: Concrete mixed at site should conform to the following:
1. General: Mix concrete in a batch mixer conforming to requirements of the mixer manufacturer's Bureau of the Associated General Contractors of America. Mixer shall bear the manufacturer's rating plate indicating rated capacity and recommended revolutions per minute. Operate mixer in accordance with these recommendations. Use only mixers that are equipped with a suitable charging hopper, water storage tank, water measuring device, and are capable of thoroughly mixing the concrete into a uniform mass within the specified mixing time and of discharging the mix without segregation.
 2. Admixtures: When approved for use, dispense liquid admixtures by means of an automatic dispenser or similar metering device. Weigh or measure by volume powdered admixtures, as recommended by the manufacturer. Accurately measure all admixtures to within plus or minus 5 percent. Provide suitable agitating equipment to ensure uniform distribution of ingredients.
 3. Mixing: Charge batch into the mixer so that some water will enter in advance of the cement and aggregates. Allow water to flow into the mixer until the end of the first 25 percent of the specified mixing time. Provide controls to ensure that the batch cannot be discharged until the specified mixing time has elapsed. Provide controls to insure that no additional water may be added during mixing. Discharge the entire batch before recharging.
 4. Mixing Time: Mix each batch of 1 cubic yard or less for not less than 1-1/2 minutes, and not more than 5 minutes after all ingredients are in the mixer before any part of the batch is released. For mixes of capacity larger than 1 cubic yard, increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cubic yard or fraction thereof. Do not exceed 30 minutes total elapsed time between

intermingling of damp aggregates and cement to the discharge of the complete mix into forms.

5. Maintenance: Keep mixer clean. Replace mixer pick-up and throw-over blades when they have lost 10 percent of their original depth.
6. Identification: Provide a batch ticket for each batch discharged and used in the work, indicating the project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. Ready-Mix Concrete:

1. Comply with the requirements of ASTM C94, and as herein specified. Proposed changes in mixing procedures must be accepted by the Owner's Representative before implementation. Plant equipment and facilities should conform to National Ready-Mix Concrete Association "Checklist for Certification of Ready-Mixed Concrete Production Facilities."
2. When the air temperature is 90°F or greater, the maximum mixing and delivery time shall be reduced to 60 minutes. When the air temperature is between 85°F and 90°F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes. Additional reductions in mixing and delivery time may be required when weather or other conditions exist that contribute to rapid setting of concrete. When a truck mixer is used for the complete mixing of the concrete, begin the mixing operation within 30 minutes after the cement has been intermingled with the aggregates.
3. Furnish duplicate delivery tickets with each load of concrete delivered to the site, one for the Owner's Representative and one for the Contractor. In addition to the requirements of ASTM C94, provide the following information on delivery tickets:
 - a. Project Information
 - b. Date
 - c. Type and brand of cement
 - d. Cement content per cu. yd. of concrete
 - e. Maximum size of aggregate
 - f. Total water content expressed as water-to-cement ratio
 - g. Amount of water added at jobsite

- D. Retempering: Mix concrete only in quantities for immediate use. Discard concrete which has set; do not retemper. Adding water to the mix at the jobsite will not be permitted unless prior approval is obtained from the Owner's Representative.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarders or barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical and lateral, static and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.
1. Provide Class A tolerance for concrete surface exposed to view.
 2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
- D. Provide temporary openings for clean-outs and inspection where interior area of formwork is inaccessible before concrete placement. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations, consistent with project requirements.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Form intersecting planes to provide true, clean-cut corners, with edge grain of plywood not exposed as form for concrete.
- H. Wood forms for wall openings shall be constructed to facilitate loosening, if necessary, to counteract swelling of the forms.
- I. Wedges used for final adjustment of the forms prior to concrete placement shall be fastened in position after the final check.
- J. Formwork shall be so anchored to shores or other supporting surfaces or members that upward or lateral movement of any part of the formwork system during concrete placement will be prevented.
- K. Runways for moving equipment shall be provided with struts or legs and shall be supported directly on the formwork or structural members without resting on the reinforcing steel.

- L. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing before concrete placement as required to prevent mortar leaks and maintain proper alignment.
- M. Corner Treatment:
 - 1. Exposed corners shall be chamfered except as otherwise shown.
 - 2. Form chamfers with 3/4-inch x 3/4-inch strips, unless otherwise shown, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer strips at changes in direction.
 - 3. Unexposed corners may be formed either square or chamfered.
- N. Place corrugated metal forms with ribs perpendicular to supports and with plug welds to each support using curved welding washers. Provide at least 2 inches for end laps occurring over supports, and lap sides at least one full corrugation. Damaged areas of zinc coatings shall have welding flux, spatter, and slag removed, then shall be touched up with high zinc dust content repair paint.

3.3 FORMS FOR EXPOSED CONCRETE

- A. Unless otherwise indicated, construct formwork for exposed concrete from materials capable of providing continuous, straight, as-cast surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes.
- C. Do not use metal cover plates for patching holes or defects in forms.
- D. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.
- E. Use extra studs, walers, and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material which will produce bow.
- F. Assemble forms to be readily removed without damage to exposed concrete surfaces.
- G. Form molded shapes, recesses, and projections with smooth-finish materials, and install in forms with sealed joints to prevent displacement.

3.4 FALSEWORK

- A. Erect falsework and support, brace, and maintain it to safely support vertical, lateral, and asymmetrical loads applied until such loads can be supported by in-place concrete structures. Construct falsework so that adjustments can be made for take-up and settlement.

- B. Provide wedges, jacks, or camber strips to facilitate vertical adjustments. Carefully inspect falsework and formwork during and after concrete placement operations to determine abnormal deflection or signs of failure; make necessary adjustments to produce work of required dimensions.

3.5 PREPARING FORM SURFACES

- A. Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before reinforcement is placed. Form coating shall not leave stain on concrete or otherwise prevent the concrete surface from subsequently being painted.
 - 1. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed.
 - 2. Apply in compliance with manufacturer's instructions.

3.6 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of the items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support screed strips using strike-off templates or compacting type screeds.

3.7 VAPOR RETARDER OR BARRIER INSTALLATION

- A. General: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions. Following leveling and tamping of granular base for slabs on grade, place vapor retarder or barrier sheeting with longest dimension parallel with direction of pour.
- B. All vapor barrier seams and penetrations shall be sealed with the manufacturer's recommended adhesive or pressure-sensitive tape, and all seams shall be lapped a minimum of 6 inches.
- C. After placement of vapor retarder or barrier, cover with sand cushion and compact to depth as shown on drawings.
- D. **The Contractor shall assure, as part of his Quality Control review, that prior to any concrete placements being made, the vapor barriers are properly installed beneath the slabs. Failure to install vapor barriers will result in removal and replacement of concrete placement at Contractor's expense.**

3.8 PLACING REINFORCEMENT

- A. Fabrication:

1. General: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI "Manual of Standard Practice." In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.
2. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted in the work:
 - a. Bar lengths, depths, and bends exceeding specified fabrication tolerances.
 - b. Bend or kinks not indicated on drawings or final shop drawings.
 - c. Bars with reduced cross section due to excessive rusting or other cause.

B. Placing Reinforcement:

1. General: Comply with the specified codes and standards and Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and support and as herein specified.
2. Clean reinforcement to remove loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
3. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
4. Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operation.
5. Place reinforcement to obtain at least the minimum coverage for concrete protection per ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gauge wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
6. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with 16-gauge wire. Do not make end laps midway between support beams or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps.
7. Provide sufficient numbers of supports and of strength to carry reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
8. Splices: Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying. Comply with requirements of ACI 318 for minimum lap of spliced bars. In the absence of splice locations shown on the drawings, splice top bars at midspan and bottom bars at supports.
9. Weld splices in bars larger than No. 11, or where No. 11 bars are spliced to larger size bars, and elsewhere as shown. Use full penetration butt welds by the electric-arc

method unless otherwise shown. Use only welders who have passed the AWS standard qualification tests within the previous year. Weld splices to develop 125 percent of the specified yield strength of the bars, or of the smaller bar in transition splices. Clean bars of oil, grease, dirt, and other foreign substances and flame-dry before welding. Preheat bars before welding. Stagger splices in adjacent bars. Prepare ends of bars in compliance with AWS D1.4.

10. Mechanical butt splicing, using exothermic welding processes and high-strength steel sleeves that develop the same values of strength, may be used in lieu of electric-arc welding, at Contractor's option. Comply with manufacturer's directions for preparation of bars and installation procedures.
11. Comply with the requirements of AWS D1.4 for field welding. Prior to field welding, determine the weldability of reinforcing bars by a laboratory chemical analysis of steel. Only steel conforming to the chemical requirements specified in AWS D1.4 may be welded.
12. Notify Owner's Representative a minimum of 24 hours prior to beginning any welding or mechanical splicing.

3.9 PREPARATION FOR CONCRETE PLACEMENT

- A. Preplacement Inspection: Before placing concrete, coordinate, inspect, and complete the formwork installation, reinforcing steel, preformed joint fillers, vapor barriers, water stops, and items to be embedded or cast-in. Notify other crafts involved in ample time to permit the installation of their work. Cooperate with other trades in setting such work as required. All embedded items shall be secure in position before concrete is placed.
- B. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used. Where coating is used, apply with a brush or spray covering the form evenly without excess drip. Do not use form oil which causes softening or permanent staining of the concrete.
- C. Bearing stratum at bottom of foundation systems is subject to testing for soil bearing value by the testing laboratory, as directed by the Owner's Representative. Place concrete immediately after approval of foundation excavations. Excavate and backfill as necessary to complete the concrete work. Place concrete on subgrades that are well compacted to level and true grade. Before concrete is poured in areas between slabs on grade previously poured, recheck compaction of subgrade and, if necessary, recompact to avoid settlement of slabs at joints. Seal extremely porous subgrades in a manner approved by the Owner's Representative. Remove all ice, debris, and excess water from subgrades. After completion of the concrete work, backfill all excavations in accordance with Section 02315 – Structure Excavation and Fill.
- D. The installation of anchors, inserts, and sleeves for electrical, mechanical, plumbing, heating, ventilating, and air-conditioning work is subject to the inspection and approval of the supervisors of the particular trades involved. Finish void in sleeves and inserts temporarily with readily removable material.
- E. Notify Owner's Representative 24 hours before placing concrete.

3.10 CONCRETE PLACEMENT

- A. Place concrete in compliance with the practices and recommendations of ACI 304 and as specified herein. Do not place any concrete until the Owner's Representative has reviewed the results of the design mix 28-day test breaks and approval is given to proceed.
- B. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.
- C. Screed concrete, which is to receive other construction to the proper level to avoid excessive shimming or grouting.
- D. Do not use concrete which becomes nonplastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the project site and dispose of in an acceptable location.
- E. Concrete Conveying:
 - 1. Handle concrete from the mixer to the place of final deposit as rapidly as practicable and in a manner which will assure that the specified quality of the concrete is obtained.
 - 2. Equipment: Provide conveying equipment of proper size and design to ensure a continuous flow of concrete at the delivery end. Conveying equipment will be subject to the Owner Representative's approval. Conform to the following:
 - a. Truck mixers, agitators, and nonagitating units and their manner of operation shall conform to the applicable requirements of ASTM C94.
 - b. Belt Conveyors: Provide belt conveyors and discharge apparatus of a type which will not cause segregation. Discharge long runs into a hopper.
 - c. Chutes: Provide metal or metal-lined chutes. Install to a slope not flatter than 1 to 3 nor steeper than 1 to 2. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used, provided they discharge into a hopper.
 - d. Runways: Provide runways, or other means for wheeled equipment, to convey concrete to placement points. Do not support runways on reinforcement, nor wheel equipment over reinforcement.

- e. Pumps: Do not pump concrete without the Owner Representative's approval. Any change in concrete mix necessitated by pumping must be approved by Owner's Representative prior to placing concrete by this method.

F. Placing Concrete In Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
2. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
3. Consolidate concrete, including floor slabs on grade, by internal concrete vibrators supplemented by hand-spading, rodding, or tamping so that the concrete is thoroughly worked around reinforcement and embedded items and into the corners of forms. Consolidate each layer of concrete with previously placed layers in a manner that will eliminate all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Place vibrators 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 set. Internal vibrators shall produce a minimum frequency of 7,000 impulses per minute when submerged in concrete. Do not use vibrators to transport concrete. Insert and withdraw vibrators at uniformly spaced points not farther apart than the visible effectiveness of the machine. Duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrating equipment shall at all times be adequate in number of units and power to properly consolidate all concrete. Spare units shall be on hand as necessary to ensure such adequacy.
4. Formed Elements: Use internal vibrators, not form vibrators. When a surface mortar is to be the basis of the finish, work coarse aggregate back from the forms with a suitable tool to bring a full surface of mortar against the form.
5. Supported Elements: Use internal vibrators in elevated beams, girders, and brackets and along construction joints. Consolidate elevated slabs with vibrating bridge screeds, roller pipe screeds, or other means approved by the Owner's Representative. Tamp slabs to force aggregates away from surface and screed level to comply with ACI 347. After screeding, do not manipulate concrete prior to commencing finishing operation.
6. Do not drop concrete freely where reinforcing bars will cause segregation, nor drop freely more than 6 feet. Use tremies in length increments of 6 feet.

G. Special Placing Requirement for Slabs on Grade:

1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
2. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items, and into corners.

3. Bring slab surfaces to the correct level with a straight-edge and strike off. Use bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.
4. Maintain reinforcing steel in the proper position continuously during concrete placement operations.
5. **The Contractor shall have a sufficient number of qualified personnel available at all times while concrete is being placed, to ensure proper placing, finishing, and curing. The Contractor shall have qualified personnel for installation of forming for concrete placements with only acceptable deviations.**

H. Bonding:

1. Roughen surfaces of set concrete at all joints, except where bonding is obtained by use of a concrete bonding agent, and clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly and to not leave laitance, loose particles of aggregate, or damaged concrete at the surface.
2. Prepare for bonding of fresh concrete to new concrete that has set but is not fully cured, as follows:
 - a. At joints between footings and walls and between walls and beams or slabs they support, and elsewhere unless otherwise specified herein, dampen, but do not saturate, the roughened and cleaned surface of set concrete immediately before placing fresh concrete.
 - b. At joints in exposed work; at vertical joints in walls; at joints in girders, beams, supported slabs, and other structural members; and at joints designed to contain liquids; dampen, but do not saturate, the roughened and cleaned surface of set concrete and apply either a liberal coating of neat cement grout or a commercial bonding agent.
 - c. Use neat cement grout consisting of equal parts Portland cement and fine aggregate by weight and not more than 6 gallons of water per sack of cement. Apply with a stiff broom or brush to a minimum thickness of 1/16-inch. Deposit fresh concrete before cement grout has attained its initial set.
 - d. Apply commercial bonding agent to cleaned concrete surfaces in accordance with the printed instructions of the bonding material manufacturer.
3. Prepare for bonding of fresh concrete to fully cured hardened concrete or existing concrete by using an epoxy-resin bonding agent as follows:
 - a. Handle and store epoxy-resin adhesive binder in compliance with the manufacturer's printed instructions, including safety precautions.
 - b. Mix the epoxy-resin adhesive binder in the proportions recommended by the manufacturer, carefully following directions for safety of personnel.

- c. Before depositing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy-resin grout not less than 1/16-inch thick. Place fresh concrete while the epoxy-resin material is still tacky, without removing the in-place grout coat, and as directed by the epoxy-resin manufacturer.

I. Cold Weather Placing:

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 and as herein specified.
2. When the air temperature has fallen to, or is expected to fall, below 40°F, provide adequate means to maintain the temperature in the area where concrete is being placed at either 70°F for 3 days or 50°F for 5 days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Keep protection in place and intact at least 24 hours after artificial heat is discontinued. Avoid rapid dry-out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
3. When air temperature has fallen, or is expected to fall, below 40°F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50°F and not more than 80°F at point of placement.
4. Do not use frozen materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost, snow, and ice before placing concrete.
5. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
6. Use set-control admixtures when required and accepted in mix designs.

J. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
2. Temperature of concrete at time of placing shall not exceed 90°F. Contractor shall maintain an accurate reading thermometer at the jobsite to check temperature of concrete. Concrete shall be rejected before placing if temperature of concrete exceeds 90°F.
3. Special precautions to protect fresh concrete before and during finishing shall be mandatory when the rate of evaporation of surface moisture from concrete exceeds 0.2 pounds per square foot per hour. Rate of evaporation shall be determined in accordance with ACI 305. Special precautions shall include the following:

- a. Good planning and close coordination between supplier and jobsite shall be maintained to ensure prompt placement of concrete upon arrival at jobsite.
- b. Cool ingredients before mixing to reduce concrete temperature at time of placement. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option
- c. Erect windbreaks to reduce wind velocity over the concrete.
- d. Erect sunshades to reduce concrete surface temperatures.
- e. Cover reinforcing steel with water-soaked burlap so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- f. Fog spray subgrade, reinforcing steel, and forms.
- g. Utilize fogging to cool and moisten surrounding air. Fog nozzles, specially designed for concrete fogging, which produce a fog blanket shall be used. Common garden hose nozzles or other nozzles which produce an excessive washing spray shall not be allowed.
- h. Provide temporary covering such as wet burlap, plastic membrane, curing paper, or other suitable means.
- i. Use set control admixtures when required and accepted in mix design.

3.11 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Owner's Representative.
 - 1. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings unless shown otherwise on the drawings. Bulkheads designed and accepted for this purpose may be used for slabs.
 - 2. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements at contraction joints.
 - 3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- B. Joints in Slabs-on-Grade:
 - 1. Construction joints in slabs-on-grade shall not be spaced at more than 40 feet, unless approved by the Owner's Representative.

2. Contraction Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8-inch wide by 1/4 of slab depth or inserts 1/4-inch wide by 1/4 of slab depth, unless otherwise indicated. Joints in curbs shall coincide with floor joints.
 - a. If joint pattern not shown, provide construction or contraction joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
 3. Isolation Joints: Where indicated, joints between interior slabs-on-grade and vertical surfaces, unless otherwise shown, shall be of 1/4-inch premolded expansion material extending full slab depth. The perimeters of slabs at the joints shall be free of fins, rough edges, spalling, or other unsightly appearance.
 4. At joints in concrete slabs to be exposed, joints where filler is completely covered by base and shoe mold, and at other joints indicated to receive joint sealant, premolded expansion-joint filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed, and oiled wood strip temporarily secured to the top of the expansion joint filler to form a groove not less than 3/4-inch deep. The wood strip shall be removed after the concrete has set. The groove, when surface dry, shall be cleaned of foreign matter, loose particles, and concrete protrusions, then filled approximately flush with joint sealant so as to be slightly concave after drying. Edges of exposed concrete slabs along expansion joints shall be neatly finished with a slightly rounded edging tool.
 5. Concrete shall be placed in an alternating pattern terminating at construction joints to provide panels of size indicated. Forms shall remain in place for at least 12 hours after concrete placement. Where indicated, isolation joints shall be provided in slabs on grade at columns on separate footing for full slab depth and shall be constructed so that corners of isolation joints will meet at contraction joints.
 6. Concrete joints, where sawed or formed, shall be filled with joint sealant except where floor covering is required.
 7. Joint fillers and sealant material are specified in Section 07920 – Joint Sealants.
- C. Construction Joints Other Than Slabs-on-Grade: The unit of operation shall not exceed 40 feet maximum unless prior approval is obtained from Owner's Representative. Concrete shall be placed continuously so that the unit will be monolithic in construction. Fresh concrete may be placed against adjoining units provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and locations to least impair strength and appearance of the structure. Construction joints, if required, shall be located near the midpoint of spans for slabs, beams, or girders unless a beam intersects a girder at the center, in which case the joints in the girder shall be offset a distance equal to twice the width of the beam with provision for transfer of shear and other forces through the construction joint by use of reinforcement as approved. Joints in columns or piers shall be made at the underside of the deepest beam or girder framing thereto. Concrete for columns, walls, or piers shall be in place at least 2 hours before concreting beams, girders, or slabs thereon. Beams, girders, brackets, and haunches shall be considered as part of the floor system and shall be placed monolithically therewith. No horizontal joints shall be made in footings. Vertical construction joints in wall footings shall be reduced to a

minimum. Placement of concrete shall be at such rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Girders, beams, and slabs shall be placed in one operation. In walls having door and window openings, individual lifts shall terminate at top and bottom of opening. Other lifts shall terminate at such levels as are indicated or as to conform to structural requirements or architectural details, or both, as directed.

- D. Waterstops: Provide waterstops in construction joints of the configuration and at locations as shown on the drawings. Install waterstops to form a continuous diaphragm in each joint. Make provisions to support and protect waterstops during the progress of the work. Field fabricate joints in waterstops in accordance with manufacturer's printed instructions. Protect waterstop material from damage where it protrudes from any point.

3.12 FINISHING FORMED SURFACES

A. Rough Form Finish:

1. Provide as-cast rough form finish to formed concrete surfaces that are to be concealed in the finished work or by other construction, unless otherwise indicated.
2. Standard rough form finish shall be the concrete surface having the texture imparted by the form facing material used, with tie holes and defective areas repaired and patched, and all fins and other projections exceeding 1/4-inch in height rubbed down or chipped off.

B. Smooth Form Finish:

1. Provide smooth form finish to formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, veneer plaster, painting, or other similar system.
2. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
3. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Grout-Cleaned Finish:

1. Provide grout-cleaned finish to all concrete surfaces retaining water that have received smooth form finish treatment. These surfaces are inside walls of filters, clarifiers, rapid mix vaults and splitter boxes.
2. Combine one part Portland cement to 1-1/2 parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to consistency of thick paint. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

3. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
 - D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across the adjacent unformed surfaces, unless otherwise shown.
- 3.13 MONOLITHIC SLAB FINISHES
- A. Float Finish:
 1. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and as otherwise indicated.
 2. After screeding, consolidating, and leveling concrete slabs, do not work the surface further until ready for floating. Begin floating, using float blades or flat shoes only, when the surface water has disappeared or when the concrete has stiffened sufficiently to permit the operation of a power-driven float, or both. Consolidate the surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F/F 18 - F/L 15 measured according to ASTM E1155. Cut down high spots and fill all low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth, granular texture.
 - B. Trowel Finish:
 1. Apply trowel finish to monolithic slab surfaces that are to be exposed to view, unless otherwise shown or specified, and slab surfaces that are to be covered with resilient flooring, thin-set ceramic or quarry tile, paint, or other thin-film finish coating systems. Tops of concrete curbs shall receive steel trowel finish.
 2. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface. Consolidate the concrete surface by the final hand troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F/F 20 - F/L 17. Grind smooth surface defects that would telegraph through applied floor covering system.
 - C. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow by slightly scarifying surface with a fine broom.
 - D. Nonslip Broom Finish:
 1. Apply a nonslip broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

2. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use fiber-bristle broom, unless otherwise directed. Coordinate the required final finish with the Owner's Representative before application.

E. Heavy-Duty Wear-Resistant Finish:

1. Provide heavy-duty wear-resistant finish to monolithic slab surfaces where shown on the drawings or in schedules. Premix aggregates with Portland cement and required dispersing agents, and deliver to the site in moisture-resistant, sealed bags.
2. Apply premixed material at the manufacturer's recommended rate to provide not less than 1.0 lbs. of material per sq. ft. of floor surface.
3. Immediately following the first floating operation, uniformly distribute over the concrete surface approximately 2/3 of the specified weight of the blended dry shake materials and embed with power floating. After floating the first shake application, uniformly distribute the remaining portion of blended dry shake material at right angles to the first application and embed by power floating. Comply with manufacturer's application instructions.
4. After completion of broadcasting and floating, apply trowel finish as herein specified.

3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and 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 to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.15 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material.

Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

2. Start initial curing as soon as free water has disappeared from the concrete surface after placing and finishing.
3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least 7 days and in accordance with ACI procedures except high-early-strength concrete shall be cured for at least 3 days. Avoid rapid drying at the end of the final curing period.

B. Curing Methods:

1. Perform curing of concrete of moist curing, by moisture-retaining cover curing, by curing and sealing compound, or by combinations thereof, as herein specified.
 - a. For curing, use only water that is free of impurities, which could etch or discolor exposed, natural concrete surfaces.
 - b. Care shall be taken to ensure that no damage is done to fresh concrete during application of curing method. The Contractor shall protect other construction areas from excess water.
2. Provide moist curing by any of the following methods:
 - a. Keep the surface of the concrete continuously wet by covering with water.
 - b. Use continuous water-fog spray.
 - c. Cover concrete surface with the specified absorptive cover, thoroughly saturate cover with water, and keep the absorptive cover continuously wet. Place absorptive cover so as to provide coverage of the concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
3. Provide moisture-retaining cover curing as follows:
 - a. Cover the concrete surfaces with the specified moisture-retaining cover for curing concrete, placed in the widest practicable width, with sides and ends lapped at least 3 inches, and sealed by waterproof tape or adhesive.
 - b. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
4. Provide curing and sealing compound to slabs, walks, and curbs as follows:
 - a. Apply the specified curing and sealing compound to damp concrete surfaces as soon as finishing operations are complete (within 2 hours or as soon as the water film disappears). Apply uniformly in continuous operation by power spray-equipment or rollers in accordance with the manufacturer's directions. Recoat areas which are subjected to heavy rainfall within 3 hours after initial

application. Maintain the continuity of the coating, and repair damage to the coat during the entire curing period.

- b. Do not use membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to the Owner's Representative. The Contractor shall obtain from the curing compound manufacturer a written guarantee that its compound will not be detrimental to bonding of flooring adhesive or surface materials. This guarantee shall be submitted to the Owner's Representative at the time request is made for use of membrane curing compounds.
- c. Do not use curing compounds on surfaces to which additional concrete or cementitious finishing materials are to be applied. Such areas shall be cured by moist curing method.

C. Curing Formed Surfaces:

- 1. Cure formed concrete surfaces, including the undersides of girders, beams, supported slabs, and other similar surfaces, by moist curing with the forms in place for the full curing period or until forms are removed. If forms are removed prior to specified curing period, continue curing by one of the methods specified above, as applicable.
- 2. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun, shall be minimized by keeping the forms wet until they can be safely removed.

D. Curing Unformed Surfaces:

- 1. Initially cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by moist curing, whenever possible.
- 2. Final cure unformed surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

E. Temperature of Concrete During Curing:

- 1. When the atmospheric temperature is 40°F and below, maintain the concrete temperature between 50 and 70°F continuously throughout the curing period. When necessary, make arrangements before concrete placing for heating, covering, insulating, or housing as required to maintain the specified temperature and moisture conditions continuously for the concrete curing period. Do not use combustion the first 24 hours of curing without taking precautions to prevent exposure of the concrete to exhaust gases. Provide cold weather protection complying with the requirements of ACI 306.
- 2. When the atmospheric temperature is 80°F and above, or during other climatic conditions which will cause too rapid drying of the concrete, make arrangements

before the start of concrete placing for the installation of windbreaks or shading, and for fog spraying, wet sprinkling, or moisture-retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protection complying with the requirements of ACI 305.

3. Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete, which exceed 5°F in any one-hour and 50°F in any 24-hour period.

F. Protection from Mechanical Injury:

1. During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations. Do not allow any traffic, except for curing purposes, on the concrete surfaces until the concrete has attained 60 percent of its 28-day strength.

3.16 REMOVAL OF FORMS

- A. General: Formwork not supporting concrete such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided that curing and protection operations are maintained.
- B. Formwork supporting weight of concrete such as beam soffits, joists, slabs, and other structural elements may not be removed in less than 14 days and not until concrete has attained design minimum 28-day compressive strength. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of the concrete location or members under the least favorable conditions prevailing for any portion of the concrete.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.17 REUSE OF FORMS

- A. 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. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to the Owner's Representative.

3.18 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas:

1. Defective areas are those that affect the appearance or the structural integrity or durability of the structural elements. Cosmetic repairs will be required for defects that affect the appearance; structural repairs will be required for defects that affect structural integrity or durability.
2. Cosmetic repairs: Repair and patch defective areas with cement mortar immediately after removal of forms, as acceptable to the Owner's Representative. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
3. Structural repairs: Use epoxy-based products, either gravity fed, mortar or pressure injected, where or as otherwise directed by Owner's Representative.
4. Before patching is performed, the Owner's Representative shall be notified and provided sufficient time to observe extent of repairs required.
5. Cut out honeycomb, rock pockets, voids over 1/4-inch in any direction, and holes left by the rods or bolts, down to solid concrete but, in no case, to a depth of less than 1-inch. Where defective concrete extends to the depth of reinforcing steel, or where reinforcing steel is exposed during concrete chipping, concrete shall be removed to a minimum depth of 3/4-inch clear beyond depth of reinforcing steel. Saw-cut perimeter or area to be patched to provide edges cut perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with the specified bonding agent. Proceed with patching operations before bonding compound has dried.
6. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, the patching mortar will match the color of the surrounding concrete. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.
7. Fill holes extending through concrete by means of a plunger-type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure complete filling.

B. Repair of Formed Surfaces:

1. Repair exposed-to-view formed concrete surfaces, where possible, that contain defects which adversely affect the appearance of the finish. Remove and replace the concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Owner's Representative. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stain and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar, or precast cement cone plugs secured in place with bonding agent.
2. Repair concealed formed concrete surfaces, where possible, that contain defects that adversely affect the durability of the concrete. If defects cannot be repaired, remove and replace the concrete having defective surfaces. Surface defects, as such,

include cracks in excess of 0.01" wide, cracks of any width through nonreinforced sections, honeycomb, rock pockets, holes left by tie rods and bolts, and spalls except minor breakage at corner.

C. Repair of Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface tolerances specified for each surface and finish. Correct low and high areas as herein specified.
2. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, by using a template having the required slope. Correct high and low areas as herein specified.
3. Repair finished unformed surfaces that contain defects which adversely affect the durability of the concrete. Surface defects, as such, including crazing, cracks in excess of 0.01-inch wide, or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
4. Correct high areas in unformed surfaces by grinding after the concrete has cured at least 14 days.
5. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out the low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to the Owner's Representative.
6. Repair defective areas, except random cracks and single holes not exceeding 1-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and exposed reinforcing steel with at least 3/4-inch clearance all around. Dampen all concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of the same material to provide concrete of the same type or class as the original adjacent concrete. Place, compact, and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
7. Repair isolated random cracks and single holes not over 1-inch in diameter by the dry-pack method. Groove the top of cracks, and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen all cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.
8. Perform structural repairs with prior approval of Owner's Representative for method and procedure, using specified epoxy products.
9. Repair methods not specified above may be used, subject to the acceptance of the Owner's Representative.

3.19 FIELD QUALITY CONTROL AND TESTING

- A. Comply with requirements of Section 01451 – Testing Laboratory Services for the field testing of concrete as herein specified.
- B. Concrete shall meet or exceed the properties for concrete as defined in the mix design criteria and as herein specified. Failure of the concrete to meet any of these requirements shall be considered grounds for rejection of the concrete or the portion of the work performed with it.
- C. Formed Concrete Dimensional Tolerances:
 - 1. Formed concrete having any dimension smaller than required, and outside the specified tolerance limits, will be considered deficient in strength and will be rejected if the appearance or function of the structure is adversely affected.
 - 2. Formed concrete having any dimension greater than required will be rejected if the appearance or function of the structure is adversely affected, or if the larger dimensions interfere with other construction. Repair or remove and replace rejected concrete as required to meet the construction conditions. When permitted, accomplish the removal of excessive material in a manner to maintain the strength of the section without affecting function and appearance.
- D. Strength of Concrete Structures: The strength of the concrete structure in-place will be considered potentially deficient if it fails to comply with any of the requirements which control the strength of structure, including the following conditions:
 - 1. Failure to meet compressive strength test requirements.
 - 2. Concrete which differs from the required dimensions or location in such a manner to reduce strength.
 - 3. Concrete subjected to damaging mechanical disturbances particularly load stresses, heavy shock, and excessive vibration.
 - 4. Poor workmanship and quality control likely to result in deficient strength.

3.20 TESTS, INSPECTIONS, AND METHODS REQUIRED FOR LABORATORY TESTING

- A. Tests for Concrete Materials:
 - 1. For normal weight concrete, test aggregates by method of sampling and testing of ASTM C33.
 - 2. For Portland cement, submit certificate of material's properties and compliance with requirements of ASTM C150.
 - 3. Submit written reports to the Owner's Representative for each material sampled and tested, prior to start of work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material's manufacturer and brand name for manufactured

materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.

4. Certificates of material's properties and compliance with specified requirements may be submitted in lieu of testing, when acceptable to the Owner's Representative. Certificates of compliance must be signed by the materials producer and the Contractor.

3.21 TESTS, INSPECTIONS, AND METHODS REQUIRED FOR FIELD TESTING

- A. The testing laboratory shall take samples and conduct tests to evaluate concrete.
- B. Failure to detect defective work or materials will not, in any way, prevent rejection later when such defects are discovered, nor will it be construed as obligating the Owner to make final acceptance.
- C. Sampling and testing for field quality control during the placement of concrete shall be as follows:
 1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 2. Slump: ASTM C143; one test at point of discharge for each set of compressive strength test; additional tests when change of concrete consistency is observed.
 3. Air Content: For normal weight concrete ASTM C231, pressure method; for lightweight or normal weight concrete ASTM C173, volumetric method; one for every strength test and whatever the indication of change requires.
 4. Compression Test Specimens: ASTM C31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed.
 - a. Cast and store cylinders for laboratory-cured test specimens and field-cured specimens as specified in ASTM C31.
 - b. Four cylinders shall be delivered to the laboratory about 24 hours after being molded and shall be moist-cured under laboratory conditions.
 - c. The other two cylinders shall be kept on or near the work and shall receive the same protection from the elements and the same curing treatment as is given that portion of the work from which the sample was taken. Footing cylinders shall be treated as if taken from the superstructure.
 5. Concrete Temperature: Test hourly when air temperature is 40°F and below, and when 80°F and above, and each time a set of compression test specimens is made.
 6. Compressive Strength Tests:
 - a. Make at least one compressive strength test in accordance with ASTM C39 for each 50 cu. yds., or fraction thereof, of each mix design placed in any one day or for each 5,000 sq. ft. of surface area placed or as directed.

- b. Each test will consist of six specimens.
 - c. Two specimens, one laboratory-cured and one field-cured, shall be tested in 7 days for information.
 - d. Three specimens, two laboratory-cured and one field-cured, shall be tested at 28 days for strength evaluation;
 - e. One specimen shall be retained in reserve for later testing if required.
 - f. When the strength of the field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
7. Reports of compressive strength tests shall be reported in writing to the Owner's Representative and shall contain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day and 28-day tests, slump and air content.

3.22 ADDITIONAL TESTS

- A. The testing agency will make additional tests of in-place concrete when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Owner's Representative. The testing agency shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C42, or other acceptable nondestructive testing methods, as directed. The Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified to exist.

3.23 EVALUATION OF QUALITY CONTROL TESTS

- A. Do not use concrete delivered to the final point of placement which has slump or total air content outside the specified values.
- B. The strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutive 28-day compressive strength test results equal or exceed the specified compressive strength of the type or class of concrete and no individual strength test result falls below the specified compressive strength by no more than 500 psi. In all cases where the average strength of the laboratory control cylinders shown by these tests for any portion of the structure falls below the minimum ultimate compressive strengths, the Owner's Representative shall have the right to order a change in mix or in water content for the remaining portion of the structure.
- C. Strength tests of specimens cured under field conditions shall be required by the Owner's Representative to check the adequacy of curing and protecting of the concrete placed.

Specimens shall be molded by the field quality control laboratory at the same time and from the same samples as the laboratory cured specimens.

1. Provide improved means and procedures for protecting concrete when the 28-day compressive strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders.
 2. When laboratory-cured cylinder strengths are appreciably higher than the minimum required compressive strength, field-cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.
- D. If individual tests of laboratory-cured specimens produce strengths more than 500 psi below the required minimum compressive strength, or if tests of field-cured cylinders indicate deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question may be required.
- E. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to additional testing as herein specified.

3.24 TESTING CONCRETE STRUCTURES FOR WATERTIGHTNESS

A. General

1. The Contractor shall test the following structures for watertightness in accordance with ACI350.1R.
 - Parking Lot Stormwater Detention Facility
2. The method of testing shall exclude any factors that affect the water surface elevation during the test but are not due to leakage. The method of preparing for the test shall eliminate the loss of water from the structure due to items or elements that are not considered part of the actual structural containment. Tests shall not be scheduled when a major change in the average daily temperature is predicted. All test readings shall be witnessed by the Owner's Representative.

B. Test Preparation

1. Backfill shall not be present around the structure prior to the test. If present, groundwater shall be artificially lowered to below the floor elevation. Inspection access points shall be open to all piping, channels, and conduits that leave the structure, including any under-drain outlets. When the structure is structurally complete and of sufficient strength, and after all outlets have been securely sealed, the structure shall be filled with test water. During filling, the outlets shall be monitored for watertightness, the under-drain outlet monitored for any increase in flow, and the structure, especially the concrete joints, shall be monitored for any visible leakage from the structure. If any visible leakage from the structure or increase in flow from the under-drain system is observed, the condition shall be

corrected prior to the start of the test measurements. No allowance shall be made in the test measurements for uncorrected point source leakage. When the test preparations are acceptable to the Owner's Representative, the structure shall be kept full of water for a minimum of 3 days prior to starting the test.

C. Test Measurements

1. The location of the water surface shall be measured at four (4) points 90 degrees apart, at the start of the test. The water temperature shall be recorded at 5-foot intervals of depth. A partially filled, calibrated, open container for evaporation measurement shall be positioned in the structure and the water level in the container recorded. The measurements shall be recorded at 24-hour intervals at the same time each day. The structure exterior shall be inspected daily for indications of leakage. The test duration shall be a minimum of 3 days.
2. At the end of the test period, the location of the water surface shall be recorded at the location of the original measurements. The water temperature and the water surface in the evaporation measurement device shall also be recorded. The leakage rate from the tank shall be computed, corrected for evaporation as applicable, and if necessary, temperature. If the leakage rate is in excess of 0.1 percent of the water volume in 24 hours, then the structure shall be deemed to have failed the test. The structure shall also be considered to have failed the test if water is observed flowing from the structure (other than from the under-drain system) or if moisture, other than from precipitation or condensation, can be transferred to a dry hand from the exterior surfaces.
3. Any structure failing the test shall be repaired and retested at the Contractor's expense. The repair work may include de-watering the structure and inspecting the interior for defects that caused leakage.

END OF SECTION

