PORT MUSKOGEE

SUCCESS FLOWS FROM MUSKOGEE

Project Manual for
QUALITY LIQUID FEED EXPANSION

5201 Three Forks Road
Fort Gibson, Oklahoma 74434

Project No. 153145

Rev. No. 0

Issued For Bid

November 2, 2023

BURNS McDONNELL

MAKING OUR CLIENTS SUCCESSFUL FOR MORE THAN 100 YEARS

PROJECT MANUAL

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SECTION 00 00 05 – PROJECT CERTIFICATION – CIVIL ENGINEER

Project Name Quality Liquid Feed Expansion
Date November 2nd, 2023

CERTIFICATION(S)

PROJECT CERTIFICATION – CIVIL ENGINEER

I hereby certify that these Drawings and/or Specifications have been prepared by me, or under my supervision.

_____ _____
By Date

Seth M. Gilliam, P.E. – OK License No. PE-30930

END OF SEALS PAGE

DOCUMENT 00 11 16 – INVITATION TO BID

Project Name: Quality Liquid Feed Expansion
Date: 11/02//2023

DESCRIPTION OF WORK OF THIS CONTRACT

You are invited to bid on a general contract. The Contract provides for the excavation of material to re-establish two existing dredge pond cells and the excavation and enlargement of a third existing cell.

BID INFORMATION

Bids will be received by The Port Muskogee Authority until 5:00 pm., local time, Friday, December 1st, 2023. Bids received after this time will not be accepted. Bids will be received at the following location:

Muskogee City County Port Authority
Three Forks Harbor
5201 Three Forks Road, Fort Gibson, OK, 74434.

Copies of the Bid Documents, including the drawings and specifications containing the information necessary for bidding, may be obtained for bidding purposes on the Port Muskogee website.

Bids will be received on a unit price basis.

Bidders shall be qualified to do business and licensed in accordance with all applicable laws of the state and local governments where the Project is located.

Bids received from Bidders who are not recorded by Owner as having received the Bid Documents will not be opened.

Prequalification of Bidders will not be required. The owner will evaluate Bidders in accordance with the Instructions to Bidders.

Bid security in the form of a certified or bank cashier's check or a Bid Bond in the amount of 5% of total Bid price shall accompany each Bid in accordance with the Instructions to Bidders.

Bids shall be in accordance with the Bid Documents.

The bids will be opened publicly and read aloud beginning at 2:00 P.M., on December 4th, at the Port Authority Office 5201 Three Forks Road, Fort Gibson, OK, 74434.

COMPLETION

Completion time shall be as follows:
The Work shall be Substantially Completed within ninety (90) calendar days after the date when the Contract Times commence to run as provided in the GENERAL CONDITIONS and completed and ready for final payment in accordance with the GENERAL CONDITIONS within one hundred and twenty (120) calendar days after the date when the Contract Times commence to run.

Areas to be Substantially Complete by date stated above include all work indicated in the Contract Documents.

OWNER'S RIGHT TO REJECT

The Owner reserves the right to reject any or all Bids and to waive irregularities therein, and all Bidders shall agree that such rejection shall be without liability on the part of the Owner for any damage or claim brought by any Bidder because of such rejections, nor shall the Bidders seek any recourse of any kind against the Owner because of such rejections. The filing of any Bid in response to this invitation shall constitute an agreement of the Bidder to these conditions.

OWNER

Muskogee City County Port Authority

By: Kimbra Scott

Title Port Director

END OF DOCUMENT 00 11 16

DOCUMENT 00 11 53 – BIDDER'S QUALIFICATION STATEMENT

Project Name: Quality Liquid Feed Expansion

SUBMITTED TO:

Muskogee City County Port Authority
Three Forks Harbor
5201 Three Forks Road, Fort Gibson, OK, 74434.

SUBMITTED BY:
Company _____
Name _____
Address _____
Principal Office _____
Corporation, partnership, individual, joint venture, other _____
Contractor license number, and state _____

EXPERIENCE STATEMENT

1. Bidder has been engaged as a General Contractor in construction for 10 years and has performed work of the nature and magnitude of this Contract for 5 years. Bidder has been in business under its present name for 10 years.
2. Bidder now has the following bonded projects under contract: (On a separate sheet, list project name, owner, engineer/architect, amount of contract, surety, and estimated completion date.)
3. Bidder has completed the following three contracts consisting of work similar to that proposed by this Contract: On a separate sheet, list project name, owner, engineer/architect, amount of contract, surety, and date of completion and percentage of the cost of the Work performed with Bidder's own forces.
4. Has Bidder ever failed to complete any project? If so, state when, where, and why.
5. Bidder normally performs the following work with his own forces:
   _____
   _____
   _____.
6. Construction experience of key individuals in the organization is as follows (continued on attached sheets if needed):
   _____
   _____
   _____.
7. In the event the Contract is awarded to Bidder, the required surety Bonds will be furnished by the following surety company and name and address of agent:
   _____
   _____
   _____.

FINANCIAL STATEMENT

Bidder possesses adequate financial resources as indicated by the following:

1. Assets and Liabilities: Attach a financial statement, audited if available, including Bidder's latest balance sheet and income statements showing the following items:
   a. Current assets (cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory, and prepaid expenses).
   b. Net fixed assets.
   c. Other assets.
   d. Current liabilities (accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries, and accrued payroll taxes).
   e. Other liabilities (capital, capital stock, authorized and outstanding shares par values, earned surplus, and retained earnings).
   f. Name of firm preparing financial statement and date thereof:

If financial statement is not for identical organization named herein, explain relationship and financial responsibility of the organization furnished.

2. Current Judgments: The following judgements are outstanding against Bidder:

	Judgment Creditors	Where Docketed and Date	Amount
a.	_____	_____	$_____
b.	_____	_____	$_____

Bidder hereby represents and warrants that all statements set forth herein are true and correct.

Date _____, 20__

(OFFICIAL SEAL)

Name of Organization:

_____

By _____

Title _____

(If Bidder is a partnership, the partnership name shall be signed, followed by the signature of at least one of the partners authorized to bind the partnership. If Bidder is a corporation, the corporate name shall be signed, followed by the signature of a duly-authorized officer and with the corporate seal affixed).

END OF DOCUMENT 00 11 53

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

ARTICLE 1 - INTRODUCTORY INFORMATION

1.01 DEFINED TERMS:

A. Terms used in these Instructions to Bidders, and which are defined in the GENERAL CONDITIONS, have the meanings assigned to them in the GENERAL CONDITIONS.

B. Bid Documents shall include the following:

1. Bidding Requirements:
    a. Invitation to Bid.
    b. Instructions to Bidders.
    c. Other information available.
    d. Bid Form.
    e. Bid Bond.
2. Contract Forms:
    a. Agreement.
    b. Performance and Payment Bonds.
    c. Certificates.
3. Contract Conditions:
    a. General Conditions.
    b. Supplementary Conditions.
    c. Labor-Related Regulations.
4. Specifications.
5. Drawings.
6. Addenda issued prior to receipt of Bids.

C. Certain additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

1. Bidder - one who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.
2. Issuing Office - the office from which the Bid Documents are to be issued and where the bidding procedures are to be administered.
3. Successful Bidder - the lowest, responsible, and responsive Bidder to whom Owner [on the basis of Owner's evaluation as hereinafter provided] makes an award.

1.02 COPIES OF BID DOCUMENTS:

A. Complete sets of the Bid Documents in the number and for the deposit sum (if any) stated in the Invitation to Bid, may be obtained from the Issuing Office.

B. Complete sets of Bid Documents shall be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

C. Owner and Engineer in making copies of Bid Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

1.03 QUALIFICATION OF BIDDERS:

A. Prequalification statements are not required. Owner will, however, evaluate the Bidder's qualifications following the opening of Bids. Evaluation criteria considered will include, but not be limited to:

1. Financial responsibility.
2. Experience and performance records on similar work.

3. Ability to supply construction equipment and personnel to complete the Work within the Contract Time.
4. Evidence of Bidder to do business in the state where the Project is located, or covenant to obtain such qualifications prior to award of the Contract.

B. Bidders may be requested to submit financial statement subsequent to the Bid opening. Such statements shall be submitted to Owner within 3 days after being so requested.

C. Only those Bids will be considered which are submitted by Bidders who show satisfactory completion of work of type and size comparable to the Work required by these Bid Documents.
1. A list of comparable projects, including pertinent information and identification of the owners, shall be submitted with the Bid.
2. See ARTICLE 5 - AWARD OF CONTRACT herein for additional requirements after opening of Bids.

1.04 EXAMINATION OF CONTRACT DOCUMENTS AND SITE:

A. Before submitting a Bid, it is the responsibility of each Bidder:
1. To thoroughly examine the Contract Documents and other related data identified in the Bid Documents (including "technical data" referred to below).
2. To visit the Site to become familiar with and satisfy Bidder as to the general, local, and Site conditions that may in any manner affect cost, progress, and performance of the Work.
3. To consider federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, performance, and furnishing of the Work.
4. To study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data.
5. To promptly notify Engineer of all conflicts, errors, ambiguities, or discrepancies which Bidder has discovered in or between the Contract Documents and such other related documents.

B. Before submitting a Bid, each Bidder will be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance, and furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder, including safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents. This shall include local shipping facilities and availability of lands if applicable.

C. Access to the Site:
1. On request, Owner will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as each Bidder deems necessary for submission of its Bid. Bidder must fill all holes, clean up, and restore the Site to its former conditions upon completion of such explorations, investigations, tests, and studies.
2. The lands upon which the Work is to be performed, rights-of-way, and easements for access thereto and other lands designated for use by Bidder in performing the Work are identified in the Bid Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of Materials and Equipment to be incorporated in the Work are to be obtained and paid for by Bidder.

Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bid Documents.

D. The submission of a Bid will constitute an incontrovertible representation by the Bidder that it has complied with every requirement of this paragraph "Examination of Contract Documents and Site," and that the Bid Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

1.05 INTERPRETATIONS, MODIFICATIONS, AND ADDENDA:

A. Any Bidder who discovers ambiguities, inconsistencies, or errors or is in doubt as to the meaning or intent of any part of the Bid Documents shall promptly request Engineer to provide an interpretation. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bid Documents.

B. Addenda may also be issued to modify the Bid Documents as deemed advisable by Owner or Engineer.

C. Because of the time required to publish and deliver, no Addenda will be issued within the last 7 days before the date of opening Bids.

D. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

1.06 PREBID CONFERENCE:

A. See Section 00 11 16 Invitation to Bid for details.

ARTICLE 2 - BASIS OF BIDDING

2.01 SPECIFIED EQUIPMENT AND MATERIALS:

A. The Contract, if awarded, will be on the basis of Equipment and Materials specified or described in the Bid Documents, or those substitute or "or-equal" Equipment and Materials approved by Engineer and identified by Addendum. The Equipment and Materials described in the Bid Documents establish a standard of the required type, function, and quality to be met by any proposed substitute or "or-equal" item. No item of Equipment or Material will be considered by Engineer as a substitute or "or-equal" unless written request for approval has been submitted by Bidder and received by Engineer at least 10 days prior to receipt of Bids.

1. Such requests shall include the name of the Equipment or Material for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement by Bidder setting forth changes in other Equipment, Materials, or other portions of the Work including changes to the work of other contracts that incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed item is upon Bidder.

2. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

B. Electronic Equipment Compliance:

1. All equipment, devices, items, systems, software, hardware or firmware provided under this Contract shall be warranted as electronically compliant, meaning that they shall properly, appropriately, and consistently function and accurately process date and time

data (including without limitation: calculating, comparing, and sequencing). This warranty supersedes anything in the Specifications or other Contract Documents which might be construed inconsistently. This warranty is applicable whether the equipment, device, item, system, software, hardware, or firmware is specified with or without reference to a manufacturer's name, make, or model number.

2.02 INDIRECT COSTS:

A. Taxes:
   1. All applicable sales, use, compensating, or other taxes to be paid or withheld by Bidder, now imposed by any taxing authority, on Equipment and Materials to be incorporated in the Work, and on any or all other cost items entering into the Contract Price, shall be included in the Bid price.
   2. The Bidder shall include all such taxes except those on Equipment and Materials, if any, furnished by Owner or others (or exempted by the state), and Bidder shall furnish taxing authorities any information or reports pertaining thereto as required.
   3. The Owner is exempt from the state of Oklahoma sales and use taxes on Equipment and Materials to be incorporated in the Work. The Bidder shall not include in its Bid any sales, use, or similar taxes from which Owner is exempt.

B. The cost of all construction licenses, building and other permits, and governmental inspections required by public authorities for performing the Work, which are applicable at the time Bids are opened and which are not specified to be obtained by Owner, shall be included in the Bid price.

C. The cost of all royalties and license fees on Equipment and Materials to be furnished and incorporated in the Work shall be included in the Bid price.

D. Tests, inspections, and related activities called for throughout the Bid Documents are a responsibility of Bidder unless specified otherwise. The Bid shall include all costs arising from such responsibility.

E. The cost of all electrical, water, gas, telephone, sanitary, and similar facilities and services required by Bidder in performing the Work shall be included in the Bid price unless specified otherwise.

2.03 SUBCONTRACTORS:

A. No Bid shall be based upon aggregate of Subcontractors performing more than 60 % of the total Work.

B. The experience, past performance, and ability of each proposed Subcontractor will be considered in the evaluations of Bids. Any proposed Subcontractor so requested shall furnish experience statement prior to Notice of Award.

C. If any prospective Bidder is in doubt on the acceptability of any Subcontractor, Bidder may request from Engineer a tentative approval.

D. No Bidder shall be required to employ any Subcontractor, other person, or organization against whom Bidder has reasonable objection.

2.04 CONTRACT TIMES:

A. The number of days within which, or the dates by which, the Work is to achieve Substantial Completion and also final completion and be ready for final payment shall be set forth in the Bid Form and will be stated in the Agreement or incorporated therein by reference to the Bid Form.

B. Provisions for liquidated damages, if any, are as set forth in the Agreement.

ARTICLE 3 - BIDDING PROCEDURE

3.01 PREPARATION OF BID:

A. The Bid Form shall be filled out in detail in black ink and signed by the Bidder.
B. Bids by partnerships shall be executed in the partnership name and signed by a partner authorized to bind the partnership whose title shall appear under his signature, and the official address of the partnership shall be shown below the signature.
C. Bids by corporations shall be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign), and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
D. Names of all persons signing shall be printed below their signatures.
E. A power of attorney shall accompany the signature of anyone not otherwise authorized to bind the Bidder.
F. The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
G. The address to which communications regarding the Bids are to be directed shall be shown.

3.02 METHOD OF BIDDING:

A. Bids will be received on a Unit Price basis as set forth in the Bid Form.
B. Firm Bids are required.
C. Schedule of Unit Prices:
    1. Bidder shall complete the “Schedule of Unit Prices” included in the Bid and shall accept all fixed Unit Prices listed therein.
    2. The total Bid Price will be determined as the sum of the products of the bid quantity of each item and the Unit Price set forth in the “Schedule of Unit Prices.” The final Contract Price shall be subject to adjustment and according to final measured, used, or delivered quantities, and the Unit Prices set forth in the “Schedule of Unit Prices” will apply to such final quantities except that if quantities vary more than 30% above or below bid quantities, Unit Prices shall be subject to change-by-Change Order.

3.03 BID SECURITY:

A. Each Bid shall be accompanied by Bid security, payable to Owner, of the amount stipulated in the Invitation to Bid.
B. The required security shall be in the form of a certified or bank cashier's check or a Bid Bond on the form prescribed by the AIA, Document A310, or on similar form attached.
C. Bid Bond shall be executed by a surety meeting the requirements set forth for "Surety Bonds" in the GENERAL CONDITIONS.
D. Bid security of the Successful Bidder will be retained until Bidder has executed the Agreement and furnished the required surety Bonds as set forth in the GENERAL CONDITIONS, whereupon Bid security will be returned. If the Successful Bidder fails to execute the Agreement and furnish the surety Bonds within 15 days after the date of Notice of Award, Owner may annul the Notice of Award, and the Bid security of that Bidder will be forfeited to Owner.
E. The Bid security of any Bidder whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 10 days after the Effective Date of the Agreement and the required surety Bonds furnished, or the 61st day after the Bid opening. Bid security of other Bidders will be returned within 10 days of the Bid opening.

3.04 SUBMISSION OF BID:

A. Bids shall be submitted at the time and place designated in the Invitation to Bid.

B. Bid Documents with accompanying Bid security and other required information shall be enclosed in an opaque sealed envelope marked with the following:
   1. Project name.
   2. Name and address of Bidder.

C. If the Bid is sent by mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "Sealed Bid Enclosed" on the face thereof.

3.05 MODIFICATION OR WITHDRAWAL OF BIDS:

A. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

B. If, within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

ARTICLE 4 - OPENING OF BIDS

4.01 OPENING OF BIDS:

A. Bids will be opened and unless obviously nonresponsive read aloud publicly at the place where Bids are to be submitted. An abstract of the amounts of the base Bids will be made available to Bidders after the opening of Bids.

B. All Bids shall remain open for a period of 60 days after Bids are opened, but Owner may, in its sole discretion, release any Bid and return the Bid security at any time prior to that date.

ARTICLE 5 - AWARD OF CONTRACT

5.01 OWNER'S RIGHT TO REJECT BIDS:

A. Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Owner also reserves the right to waive all informalities not involving price, times, or changes in the Work and to negotiate Contract terms with the Successful Bidder. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

B. All Bidders must agree that such rejection shall be without liability on the part of the Owner nor shall the Bidders seek any recourse of any kind against the Owner because of such rejections. The filing of any Bid shall constitute an agreement of the Bidder to these conditions.

5.02 EVALUATION OF BIDS:

A. In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted. Owner may also consider the operating costs, maintenance requirements, performance data, and guarantees of Equipment and Materials proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

C. Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

D. Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

E. Within 3 days after Bids are opened the apparent Successful Bidder, and any other Bidder so requested, shall submit a list of all Subcontractors the Bidder expects to use in the Work. The use of Subcontractors listed by Bidder and accepted by Owner prior to the Notice of Award will be required in the performance of the Work.

F. The award of the Contract, if it is awarded, will be to the lowest, responsive, responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interest of Project and Owner.

5.03 NOTICE OF AWARD:

A. After considering the basis of award and evaluation of Bids, if the Contract is to be awarded, Owner shall within 30 days after the date of opening Bids notify the Successful Bidder of acceptance of his Bid.

ARTICLE 6 - SIGNING OF AGREEMENT

6.01 6.01 When Owner gives Notice of Award to Successful Bidder, Owner will issue the required number of unbound, unsigned counterparts of the Agreement and other Contract Documents to Successful Bidder.

6.02 6.02 Within 15 days thereafter, Successful Bidder shall sign all copies of the Agreement leaving the dates blank, insert the properly executed Bonds, power of attorney documents, and other required documents in the appropriate places, and deliver all copies to Owner.

6.03 Within 10 days thereafter, Owner will execute all copies of the Agreement and insert the Date of Contract in the Agreement, Bonds, and other documents. Owner will (bind and distribute the executed Contract Documents) (provide the executed Contract Documents to Engineer for binding and distribution) as required. Each duly executed counterpart will be accompanied by a complete set of Drawings with appropriate identification.

ARTICLE 7 - REFUND OF DEPOSIT ON BID DOCUMENTS: NOT APPLICABLE

END OF SECTION 00 21 13

DOCUMENT 00 40 00 – BID FORM

Project Name: Quality Liquid Feed Expansion
BID TO:
Owner: The Muskogee City-County Port Authority
5201 Three Forks Road
Fort Gibson, Oklahoma 74434

BID FROM:
Bidder: _____
_____
_____
_____

ARTICLE 1 - BIDDER'S INTENT

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid price and within the Bid time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

ARTICLE 2 - TERMS AND CONDITIONS

2.01 Bidder accepts all of the terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 30 days after the day of Bid opening. Bidder will sign and deliver the required number of counterparts of the Agreement with the Bonds and other documents required by the Bidding Requirements within 15 days after the date of Owner's Notice of Award.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bid Documents, and the following Addenda, receipt of all which is hereby acknowledged:

Number	Date
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, performance, and furnishing of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, performance, and furnishing of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site; and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site. Bidder acknowledges that such reports and drawings are not Contract Documents and may not be complete for Bidder's purposes.

Bidder acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bid Documents with respect to Underground Facilities at or contiguous to the Site.

E. Bidder has obtained and carefully studied or assumes responsibility for having done so all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions at or contiguous to the Site or otherwise which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs incident thereto.

F. Bidder does not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performing and furnishing of the Work in accordance with the times, price, and other terms and conditions of the Contract Documents.

G. Bidder is aware of the general nature of Work to be performed by Owner and others at the Site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports, and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

K. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm, or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 4 - BID PRICE

4.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

ITEM NO.	ESTIMATED QUANTITY		ITEM DESCRIPTION & UNIT BID PRICE (written in words)	UNIT BID PRICE (figures)	TOTAL AMOUNT
			2023 Quality Liquid Feed Expansion Phase 1		
1	1	LS	Construction Contingency (Not to exceed 10% of Total Amount of Construction Cost Excluding Construction Contungency Cost) complete in place dollars & cents per LUMP SUM.		
2	1	LS	Mobilization (Not to exceed 6% of Total Amount of Construction Cost Excluding Construction Contungency Cost) complete in place dollars & cents per LUMP SUM.		
3	1	LS	Stormwater management complete in place dollars & cents per LUMP SUM.		
3	1	LS	Construction Management (Not to exceed 10% of Total Amount of Construction Cost) complete in place dollars & cents per LUMP SUM.		
4	1	LS	Payment and Performance Bond (Not to exceed 2% of Total Amount of Construction Cost) complete in place dollars & cents per LUMP SUM.		
5	1	LS	Builders Risk Insurance (Not to exceed 0.2% of Total Amount of Construction Cost) complete in place dollars & cents per LUMP SUM.		
6	1	LS	Construction Fee (Not to exceed 10% of Total Amount of Construction Cost) complete in place dollars & cents per LUMP SUM.		
7	128	LF	Remove Existing 24" Diameter Pipe complete in place dollars & cents per LINEAR FOOT.		
8	2,296	SY	Remove and Replace Gravel Paving complete in place dollars & cents per SQUARE YARD.		
9	239	LF	24" Diameter R.C.Pipe Class III complete in place dollars & cents per LINEAR FOOT.		
10	122	LF	18" Diameter R.C.Pipe Class III complete in place dollars & cents per LINEAR FOOT.		

ITEM NO.	ESTIMATED QUANTITY		ITEM DESCRIPTION & UNIT BID PRICE (written in words)	UNIT BID PRICE (figures)	TOTAL AMOUNT
11	4	EA	24" Culvert End Section complete in place dollars & cents per EACH.		
12	140	LF	24" Diameter HDPE complete in place dollars & cents per LINEAR FOOT.		
13	4	EA	Type A4 Sloped Concrete End Section complete in place dollars & cents per EACH.		
14	2	EA	Type B4 Sloped Concrete End Section complete in place dollars & cents per EACH.		
15	2	EA	Drop Inlet complete in place dollars & cents per EACH.		
16	1,218	CY	Pipe Bedding, Class B complete in place dollars & cents per CUBIC YARD.		
17	2,830	CY	Earthwork for Trench Backfill complete in place dollars & cents per CUBIC YARD.		
17	3	EA	48" Diameter Sanitary Sewer Manhole complete in place dollars & cents per EACH.		
18	840	LF	8" Diameter PVC Sanitary Line complete in place dollars & cents per LINEAR FOOT.		
19	517	LF	6" Diameter PVC Sanitary Line complete in place dollars & cents per LINEAR FOOT.		
20	7	EA	Sanitary Cleanout complete in place dollars & cents per EACH.		
21	1	EA	Sanitary Sewer Connections to existing complete in place dollars & cents per EACH.		

ITEM NO.	ESTIMATED QUANTITY		ITEM DESCRIPTION & UNIT BID PRICE (written in words)	UNIT BID PRICE (figures)	TOTAL AMOUNT
22	4	EA	Fire Hydrant complete in place dollars & cents per EACH.		
23	2,487	LF	8" Diameter HDPE complete in place dollars & cents per LINEAR FOOT.		
24	132	LF	4" Diameter HDPE complete in place dollars & cents per LINEAR FOOT.		
25	108	LF	6" Diameter Ductile Iron Pipe complete in place dollars & cents per LINEAR FOOT.		
26	1	EA	4" Gate Valve complete in place dollars & cents per EACH.		
27	4	EA	6" Gate Valve complete in place dollars & cents per EACH.		
28	2	EA	8" Gate Valve complete in place dollars & cents per EACH.		
29	1	EA	14"x8" Tapping Sleeve and Valve complete in place dollars & cents per EACH.		
30	1	EA	8"x8"x8" Tee connection complete in place dollars & cents per EACH.		
31	5	EA	8"x8"x6" Tee connection complete in place dollars & cents per EACH.		
32	1	EA	8"x8"x4" Tee connection complete in place dollars & cents per EACH.		
33	1	EA	4" Diameter 11.25º Fitting complete in place dollars & cents per EACH.		
34	1	EA	8" Diameter 45º Fitting complete in place dollars &		

ITEM NO.	ESTIMATED QUANTITY		ITEM DESCRIPTION & UNIT BID PRICE (written in words)	UNIT BID PRICE (figures)	TOTAL AMOUNT
			cents per EACH.		
35	12	EA	Bollard complete in place dollars & cents per EACH.		
36	60	SY	Rip Rap complete in place dollars & cents per SQUARE YARD.		
37	50	LF	Fiber Log complete in place dollars & cents per LINEAR FOOT.		
38	3,875	LF	Temporary Silt Fence complete in place dollars & cents per LINEAR FOOT.		
39	2	EA	Construction Exit complete in place dollars & cents per EACH.		
TOTAL BID			dollars & cents		

ACKNOWLEDGEMENT OF ADDENDUM

Bidder hereby acknowledges receipt of the following addendum:

Addendum Number	Dated

Bidder acknowledges that quantities are not guaranteed, and final payment will be based on actual quantities determined as provided in the Contract Documents.

ARTICLE 5 - CONTRACT TIMES

5.01 Bidder agrees that the Work will be completed within the following time(s):

A. The Work shall be Substantially Completed within ninety (90) calendar days after the date when the Contract Times commence to run as provided in the GENERAL CONDITIONS and completed and ready for final payment in accordance with the GENERAL CONDITIONS within one hundred and twenty (120) calendar days after the date when the Contract Times commence to run.

B. Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified in the Agreement.

ARTICLE 6 - BID CONTENT

6.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid security in the form of a Bid Bond in the amount of 5% of the total Bid price.

B. Required Bidder's Qualification Statement with supporting data.

C. Manufacturer's data were called for in Specifications.

D. A tabulation of Subcontractors and other persons and organizations required to be identified in this Bid.

ARTICLE 7 - COMMUNICATIONS

7.01 Communications concerning this Bid shall be addressed to the Bidder as follows:

_____
_____
_____
Phone No. _____
FAX No. _____
e-mail address _____

ARTICLE 8 - TERMINOLOGY

8.01 The terms used in this Bid which are defined in the GENERAL CONDITIONS or Instructions to Bidders will have the meanings assigned to them.

SUBMITTED on _____, 20__.

State Contractor License No. _____. (If applicable)

Bidder is:

An Individual

Name (type or printed): _____

By: _____ (SEAL)
(Individual's Signature)

Doing business as: _____
Business address: _____
_____
Phone No.: _____ FAX No.: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (type or printed): _____

Business address: _____
_____
Phone No.: _____ FAX No.: _____

A Corporation

Corporation Name: _____ (SEAL)
State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability): _____
_____

By: _____
(Signature – attach evidence of authority to sign)

Name (type or printed): _____

Title: _____

(CORPORATE SEAL)

Attest: _____
(Signature of Corporate Secretary)

Business address: _____
_____
Phone No.: _____ FAX No.: _____

END OF SECTION 00 40 00

DOCUMENT 00 43 13 – BID BOND

KNOW ALL MEN BY THESE PRESENTS: that we

_____
_____
_____

as Principal, hereinafter called the Principal, and

_____
_____
_____

a corporation duly organized under the laws of the State of _____ as Surety, hereinafter called Surety, are held and firmly bound unto

_____
_____
_____

as Obligee, hereinafter called the Owner, in the sum of _____
_____ dollars $_____, for the payment of which sum, well and truly to be made, Principal and said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for

[_____]

[_____
_____
_____]

NOW, THEREFORE, if the Owner shall accept the Bid of Principal and the Principal shall enter into a Contract with the Owner in accordance with the terms of such Bid, and give such Bond or Bonds as may be specified in the Bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of Principal to enter such Contract and give such Bond or Bonds, if the Principal shall pay to the Owner the difference not to exceed the penalty hereof between the amount specified in said Bid and such larger amount for which the Owner may in good faith contract with another party to perform the Work covered by said Bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____ 20___.

PRINCIPAL (CORPORATE SEAL)

_____

By _____

_____

SURETY

_____

By _____

_____

ATTORNEY-IN-FACT (CORPORATE SEAL)

_____

_____

(This Bond shall be accompanied with
Attorney-in-Fact's authority from Surety)

END OF SECTION 00 43 13

DOCUMENT 00 50 00 – AGREEMENT BETWEEN OWNER AND CONTRACTOR

Project Name: Quality Liquid Feed Expansion

THIS AGREEMENT is dated as of the ____ day of _____ in the year 2023 by and between The Port Muskogee Authority (hereinafter called Owner) and
_____ (hereinafter called Contractor).

Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work under this Contract is generally described as installing sanitary sewer and water service for future building development and stormwater drainage for existing site.

ARTICLE 2 - ENGINEER

2.01 The Project has been designed by Burns & McDonnell Engineering Co. Inc., who is hereinafter called Engineer and who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT TIME

3.01 TIME OF THE ESSENCE:

A. All time limits for milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

3.02 DATES FOR SUBSTANTIAL COMPLETION AND FINAL PAYMENT:

A. The Work shall be Substantially Completed within ninety (90) calendar days after the date when the Contract Times commence to run as provided in the GENERAL CONDITIONS and completed and ready for final payment in accordance with the GENERAL CONDITIONS within one hundred and twenty (120) calendar days after the date when the Contract Times commence to run.

1. The Contract is determined to be Substantially Complete when all water, sanitary sewer and storm sewer pipes shall be installed and fully functioning with all trenches backfilled and graded to the plan grade.

3.03 LIQUIDATED DAMAGES:

A. Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the time specified above, plus any extensions thereof allowed in accordance with the GENERAL CONDITIONS. The parties also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by Owner if the Work is not Substantially Completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner Five Thousand dollars ($ 5,000.00) for each day that expires after the time specified above in Paragraph 3.02 for Substantial Completion until the Work is Substantially Complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the time specified in Paragraph 3.02 for completion and

readiness for final payment or any proper extension thereof granted by Owner, Contractor shall pay Owner Five Thousand dollars ($ 5,000.00) for each day that expires after the time specified for completion and readiness for final payment.

ARTICLE 4 - CONTRACT PRICE

4.01 Owner agrees to pay Contract, as full and final compensation, for completion of the Work in accordance with the Contract Documents the amount based on the Unit Prices in the Bid, which is hereto attached, for the actual amount of Work performed under each pay item. Said payments will be made in lawful money of the United States at the time and in the manner set forth in the Project Documents.

4.02 As provided for in the Contract, bid quantities are not guaranteed, and determination of the actual quantities and classifications will be made by the OWNER as provided for in the GENERAL CONDITIONS. Unit Prices shall be subject to a change-by-Change Order if actual quantities vary more than 30% above or below bid quantities.

4.03 Changes, modifications, or amendments in scope, price, or fee to this Contract shall not be allowed without a Change Order, recommended by the Owner and/or Engineer and properly executed by the Owner and Contractor in advance of the change in scope, price, or fees.

ARTICLE 5 - PAYMENT PROCEDURES

5.01 SUBMITTAL AND PROCESSING OF PAYMENTS:

A. Contractor shall submit Applications for Payment in accordance with the GENERAL CONDITIONS.

5.02 PROGRESS PAYMENTS, RETAINAGE:

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer, on or about the thirtieth (30^{th}) day of each month during construction. All such payments will be measured by the schedule of values established in the GENERAL CONDITIONS or, in the event there is no schedule of values, as provided in the General Requirements.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as Engineer shall determine, or Owner may withhold, in accordance with the GENERAL CONDITIONS.
    a. 90% of Work completed with the balance being retainage. If Work has been 75% completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner on recommendation of Engineer, may determine that as long as the character and progress of the Work subsequently remain satisfactory to them, there will be no additional retainage on account of Work subsequently completed, in which case the remaining progress payments prior to Substantial Completion will be an amount equal to 100% of the Work completed less the aggregate of payments previously made; and
    b. 90% with the balance being retainage of Equipment and Materials not incorporated in the Work but delivered, suitably stored, and accompanied by documentation satisfactory to Owner as provided in the GENERAL CONDITIONS.

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95% of the Contract Price (with the balance being retainage), less such amounts as Engineer shall determine, or Owner may withhold, in accordance with the GENERAL CONDITIONS.

5.03 FINAL PAYMENT:

A. Upon final completion and acceptance of the Work in accordance with the GENERAL CONDITIONS, Owner shall pay the remainder of the Contract Price as recommended by Engineer and as provided in the GENERAL CONDITIONS.

ARTICLE 6 - INTEREST – NOT APPLICABLE

ARTICLE 7 - CONTRACTOR'S REPRESENTATIONS

7.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents including the Addenda and other related data identified in the Bid Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, performance, and furnishing of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, performance, and furnishing of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site; and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site. Contractor acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the Site.

E. Contractor has obtained and carefully studied (or assumes responsibility of having done so) all such additional supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise which may affect cost, progress, performance, and furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto.

F. Contractor does not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the performing and furnishing of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 8 - CONTRACT DOCUMENTS

8.01 CONTENTS:

A. The Contract Documents which comprise the entire Agreement between Owner and Contractor concerning the Work consist of the following and may only be amended, modified, or supplemented as provided in the GENERAL CONDITIONS:

1. This Agreement.
2. Exhibits to this Agreement (enumerated as follows):
   a. Notice to Proceed.
   b. Contractor's Bid.
   c. Documentation submitted by Contractor prior to Notice of Award.
3. Performance, Payment, and other Bonds.
4. General Conditions.
5. Specifications consisting of divisions and sections as listed in table of contents of Project Manual.
6. Drawings consisting of a cover sheet and sheets as listed in the table of contents thereof.
7. Addenda numbers 1 to 4, inclusive.
8. The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to the GENERAL CONDITIONS.

ARTICLE 9 - MISCELLANEOUS

9.01 TERMS:

A. Terms used in this Agreement which are defined in the GENERAL CONDITIONS shall have the meanings stated in the GENERAL CONDITIONS.

9.02 ASSIGNMENT OF CONTRACT:

A. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by Law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.03 SUCCESSORS AND ASSIGNS:

A. Owner and Contractor each bind himself, his partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 SEVERABILITY:

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be

valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

This Agreement will be effective on _____, 20__, which is the Effective Date of the Agreement.

CONTRACTOR	OWNER
_____	The Port Muskogee Authority
_____	_____
By: _____	By: _____
Title: _____	Title: _____
(SEAL)	(SEAL)
Attest _____	Attest _____
Address for giving notices	Address for giving notices
_____	Muskogee City County Port Authority
_____	Three Forks Harbor
_____	5201 Three Forks Road, Fort Gibson, OK, 74434
License No. _____ (If required by Law)	(If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Agreement)
Agent for Service of process	
_____ (If required by law)	
(If Contractor is a corporation, attach evidence of authority to sign.)	

END OF SECTION 00 50 00

DOCUMENT 00 51 00 – NOTICE OF AWARD

To: _____ (Bidder)
_____
_____
_____

Project Name: Quality Liquid Feed Expansion
Owner: Muskogee City County Port Authority

You are notified that your Bid, dated _____, 20___ for the above Contract has been considered. You are the apparent successful Bidder and are being awarded the Contract for the above stated Project and which is described as follows:
_____
_____
_____.

The Contract Price of your Contract is _____
_____ dollars ($_____).

Three copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award. You must comply with the following conditions precedent within 15 days of the date of this Notice of Award, that is by _____, 20___.

Deliver to the Owner three fully executed counterparts of the Contract Documents. Each of the counterparts must bear your signature on
_____.

1. Deliver with the executed Agreement the Contract security (Bonds) as specified in the Instructions to Bidders, General Conditions, and Supplementary Conditions as applicable.

Failure to comply with these conditions within the time specified will entitle Owner to consider your Bid in default, to annul this Notice of Award, and to declare your Bid security forfeited. Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterparts of the Agreement with the Contract Documents attached. You are required to return an acknowledgement copy of this Notice of Award to the Owner.

Dated this _____ day of _____, 20___.

OWNER

Muskogee City County Port Authority

_____

By _____

Title _____

Date _____ 20___

ACCEPTANCE OF AWARD

CONTRACTOR

_____

By _____

Title _____

Date _____ 20___

Copy to Engineer
(Use Certified Mail, Return Receipt requested)

END OF SECTION 00 51 00

DOCUMENT 00 55 00 – NOTICE TO PROCEED

To: _____ (Contractor)
_____
_____
_____

Project Name: Quality Liquid Feed Expansion
Owner: Muskogee City County Port Authority

You are notified that the Contract Time(s) under the above Contract will commence to run on _____, 20__. By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement Between Owner and Contractor, the date(s) of Substantial Completion and final completion ready for final payment are _____ _____, 20__ and _____, 20__, respectively.

Before you may start any work at the Site, the General Conditions provide that you and Owner must each deliver to the other, with copies to Engineer and other identified additional insureds certificates of insurance, which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any work at the Site, you must submit the following:

1. Preliminary construction progress schedule.
2. Preliminary procurement schedule.
3. Preliminary schedule of Submittals.
4. Preliminary schedule of values.

You are required to return an acknowledgement copy of this Notice to Proceed to the Owner.
Dated this _____ day of _____, 20 __.

OWNER

Muskogee City County Port Authority
_____

By: _____

Title: _____

ACCEPTANCE OF NOTICE TO PROCEED

CONTRACTOR

_____

By: _____

Title: _____

Date: _____, 20__

Copy to Engineer
(Use Certified Mail,
Return Receipt Requested)

END OF SECTION 00 55 00

DOCUMENT 00 61 01 – PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____

_____

_____

as Principal, hereinafter called Contractor, and

_____

_____

_____

as Surety, hereinafter called Surety, are held and firmly bound unto

_____

_____

_____

as Obligee, hereinafter called Owner, in the amount of _____ dollars ($_____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written Agreement dated _____, 20__, entered into a contract with Owner for _____

_____.

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner. Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations, thereunder, the Surety may promptly remedy the default, or shall promptly:

A. Complete the Contract in accordance with its terms and conditions, or

B. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this Bond must be instituted before the expiration of two years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators, or successors of the Owner.

Signed and sealed this _____ day of _____ 20____.

CONTRACTOR (CORPORATE SEAL)

_____

By _____

_____

SURETY

_____

By _____

_____

COUNTERSIGNED: Resident Agent

State of Oklahoma

_____

By _____

_____

ATTORNEY-IN-FACT

_____

_____

(CORPORATE SEAL)

(This Bond shall be accompanied with

Attorney-in-Fact's authority from Surety)

END OF SECTION 00 61 01

DOCUMENT 00 61 11 – LABOR AND MATERIAL PAYMENT BOND

This Bond is issued simultaneously with Performance Bond in favor of Owner conditioned on the full and faithful performance of the Contract.

KNOW ALL MEN BY THESE PRESENTS: that

_____

_____

_____

as Principal, hereinafter called Contractor, and

_____

_____

_____

as Surety, hereinafter called Surety, are held, and firmly bound unto

_____

_____

_____

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of _____ dollars ($_____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written Agreement dated _____, 20__, entered into a contract with Owner for _____
_____
which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject, however, to the following conditions:

A. A claimant is defined as one having a direct contract with the Contractor or with a Subcontractor of the Contractor for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental of equipment directly applicable to the Contract.

B. The above named Contractor and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of 90 days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this Bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

C. No suit or action shall be commenced hereunder by any claimant:
   1. Unless claimant other than one having a direct contract with Contractor, shall have given written notice to any two of the following: the Contractor, the Owner, or the Surety within 90 days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to Contractor, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid Project is located, save that such service need not be made by a public officer.
   2. After the expiration of one year following the date on which Contractor ceased Work on the Contract, it being understood, however, that if any limitation embodied in this Bond is prohibited by any Law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such Law.
   3. Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

D. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this Bond.

Signed and sealed this _____ day of _____ 20____.

CONTRACTOR (CORPORATE SEAL)

_____

By _____

_____

SURETY	COUNTERSIGNED: Resident Agent
	State of Oklahoma
_____	_____
By _____	By _____
_____	_____
ATTORNEY-IN-FACT	(CORPORATE SEAL)
_____	
_____	

(This Bond shall be accompanied with
Attorney-in-Fact's authority from Surety)

_____

END OF SECTION 00 61 11

BOND NO. [_____]

DOCUMENT 00 61 19 – MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____

_____

_____

as Principal, hereinafter called Contractor, and

_____

_____

_____

as Surety, hereinafter called Surety, are held and firmly bound unto

_____

_____

_____

as Obligee, hereinafter called Owner, in the sum of _____ _____ dollars ($_____), lawful money of the United States of America, for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written Agreement dated _____ 20__, entered into a contract with Owner for _____ _____ in accordance with the Contract Documents, which contract is by reference incorporated herein, and made a part hereof, and is referred to as the Contract.

NOW, THEREFORE, the condition of this obligation is such that, if Contractor shall remedy any defects due to faulty materials or workmanship, and pay for any damage to other work resulting therefrom, which shall appear within a period of 1 year from the Date of Substantial Completion of the Work provided for in the Contract, then this obligation to be null and void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that Owner shall give Contractor and Surety notice of observed defects with reasonable promptness.

Signed and sealed this _____ day of _____ 20___.

CONTRACTOR (CORPORATE SEAL)

_____

By _____

_____

SURETY COUNTERSIGNED: Resident Agent

State of Oklahoma

_____ _____

By _____ By _____

_____ _____

ATTORNEY-IN-FACT (CORPORATE SEAL)

_____

_____

(This Bond shall be accompanied with
Attorney-in-Fact's authority from Surety)

_____

END OF SECTION 00 61 19

SECTION 01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section summarizes the Work covered in detail in the complete Contract Documents.

B. Owner: The Muskogee City County Port Authority is contracting for Work described in the Contract Documents.

1. Contract Identification: Economic Development Authority
2. Work Site Location: Port Muskogee, Oklahoma

C. Engineer: The Contract Documents were prepared by Burns & McDonnell Engineering Company, Inc., 1317 Executive Blvd., Suite 300, Chesapeake, Virginia 23320.

1.02 PROJECT DESCRIPTION:

A. Description of Project: Economic Development Authority

B. Work Covered by Contract Documents: The Contract provides for installing sanitary sewer and water service for future building development and stormwater drainage for existing site.

1.03 CONTRACTOR'S USE OF PREMISES:

A. Limited Use:

1. Limit use of the premises for storage and execution of the Work to allow for work by other contractors and for Owner occupancy. Confine operations to areas within Contract limits indicated. Portions of Site outside the Contract limits shall not be disturbed.
2. Coordinate with other separate contractors and Owner to avoid interference of operations.
3. Conduct operations so as to ensure the least inconvenience to Owner and the general public.

1.04 OWNER'S USE OF PREMISES:

A. Full Owner Occupancy: The Owner will occupy the Site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operations.

1.05 WORK SEQUENCE:

A. General: Construction sequence shall be determined by Contractor subject to Owner's need for continuous operation of existing facilities.

B. Continuous Service of Existing Facilities: Exercise caution and schedule operations to ensure that functioning of present facilities will not be disrupted. Shutdown of Owner's operating facilities to perform the Work shall be held to a minimum length of time and shall be coordinated with Owner who shall have control over the timing and schedules of such shutdowns.

C. Substantially Completed Areas: Owner intends to place in service, in accordance with the provisions for use of completed Work set forth in the GENERAL CONDITIONS, the completed areas or facilities as soon as they are Substantially Complete and ready for their intended use.

1.06 MEASUREMENT AND PAYMENT:

A. Unit Price Contracts: All Work indicated on the Contract Drawings and specified in the Contract Documents shall be included in the "Unit Price Schedule" in the Agreement. A Unit

Price is an amount proposed by Contractor and stated in the Agreement as a price per unit of measurement for materials or services.

1.07 COPIES OF DOCUMENTS:

A. Furnished Copies: No hard copies of project plans or specifications will be provided to the Contractor.

1.08 LIST OF DRAWINGS:

A. Contract Drawings:
   1. Individual sheet numbers and titles are as stated on index sheet under "Contract Drawings".

B. Reference Drawings:
   1. Reference Drawings included with the set of Contract Drawings are as stated on index sheet under "Reference Drawings."

1.09 PERMIT INFORMATION

A. Contractor is required to obtain all permits for the Work.

PART 2 - PRODUCTS - NOT APPLICABLE.

PART 3 - EXECUTION – NOT APPLICABLE.

END OF SECTION 01 11 00

SECTION 01 25 00 – SUBSTITUTIONS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1.02 RELATED REQUIREMENTS:

A. Requirements for submitting Contractor's construction progress schedule and the Submittal schedule: Sections 01 32 00 and 01 33 00.

B. Requirements governing Contractor's selection of products: Section 01 60 00.

1.03 DEFINITIONS:

A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Changes in products, Materials, Equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

1. Revisions to the Contract Documents requested by Owner or Engineer.
2. Specified options of products and construction methods included in the Contract Documents.

1.04 SUBMITTALS:

A. Substitution Request Submittal: Engineer will consider written requests for substitution if received within twenty (20) days after commencement of the Work. Requests received more than twenty (20) days after commencement of the Work may be considered or rejected at the discretion of Engineer.

1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for Change Order proposals. Requests for substitution shall not be submitted in the form of a Request for Information (RFI).
2. Identify the Equipment or Material, the fabrication, or installation method to be replaced in each request. Include related Specification Section/Article and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    a. Statement indicating why specified product or method of construction cannot be provided.
    b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate the proposed substitution.
    c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    d. Product data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Samples, where applicable or requested.
    f. Identification of available sales, maintenance, repair, and replacement services.
    g. A statement indicating the effect of the substitution on Contractor's construction progress schedule compared to the schedule without approval of the substitution.

Indicate the effect of the proposed substitution on the overall Contract Times. If specified product cannot be provided within the Contract Times, provide letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delay in delivery.

h. An itemized estimate of costs that will result directly or indirectly from approval of the substitution, including:
   (1) A proposal for the net change, if any, in the Contract Price.
   (2) Costs of redesign required by the proposed change.
   (3) Costs of resulting claims as determined in coordination with other contractors having worked on the Project affected by the substitution.

i. Statement indicating whether or not incorporation or use of the substitute is subject to payment of any license fee or royalty.

j. Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents, will perform adequately the functions and achieve the results called for by the general design, is similar in substance to that specified, and is suitable for same use as that indicated and specified.

k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation of a request for substitution. Engineer will notify Contractor of acceptance or rejection of the substitution within one (1) week of receipt of the request or of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a Change Order.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS:

A. Conditions: Engineer will receive and consider Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by Engineer. If the following conditions are not satisfied, Engineer will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.
2. Proposed substitution is in keeping with the general intent of the Contract Documents and will produce indicated results.
3. Substitution request is timely, fully documented, and properly submitted.
4. The specified product or method of construction cannot be provided within the Contract Times. Engineers will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
5. The requested substitution offers Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where Contractor certifies that the substitution will overcome the incompatibility.

8. The specified product or method of construction cannot be coordinated with other materials and where Contractor certifies that the proposed substitution can be coordinated.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where Contractor certifies that the proposed substitution provides the required warranty.

B. Engineer's review and acceptance of Submittals shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents. Engineer's acceptance of Submittals not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval of a substitute. Acceptance by Engineer shall not relieve Contractor from responsibility for errors or omissions in the Submittals.

PART 3 - EXECUTION - NOT APPLICABLE

END OF SECTION 01 25 00

SECTION 01 31 00 – PROJECT COORDINATION AND MEETINGS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Coordination drawings.
   2. Project meetings.
   3. Requests for information (RFIs).

1.02 RELATED REQUIREMENTS:

A. For preparing and submitting Contractor's construction progress schedule: Section 01 32 00.
B. For Submittal Requirements: Section 01 33 00.
C. For coordinating closeout of the Contract: Section 01 78 00.

1.03 DEFINITIONS:

A. RFI: Request for information prepared by Contractor and submitted to Engineer seeking interpretation or clarification of the Contract Documents.

1.04 COORDINATION:

A. The Contractor shall coordinate the completion of their activities with work performed by the Owner, any other Contractors, and other entities, to facilitate proper installation and construction. This includes all requirements specified in each Section of the contract.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to allow optimum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to allow optimum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of others to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of construction progress schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of Submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.

9. Project closeout activities.

1.05 PROJECT MEETINGS:

A. Preconstruction Conference:
   1. Owner and/or Engineer will conduct a meeting within ten (10) days after the Effective Date of the Agreement, to review items stated in the following agenda and to establish a working understanding between the parties as to their relationships during performance of the Work.
   2. Preconstruction conference shall be attended by:
      a. Representative(s) of Contractor including Contractor's superintendent.
      b. Engineer and/or and Resident Project Representative.
      c. Representative(s) of Owner.
      d. At Owner's option, representatives of principal Subcontractors and Suppliers.
   3. Meeting Agenda:
      a. Construction schedules.
      b. Phasing.
      c. Critical Work sequencing and long-lead items.
      d. Designation of key personnel and their duties; lines of communication.
      e. Project coordination.
      f. Procedures and Processing of:
         (1) RFIs.
         (2) Field decisions.
         (3) Substitutions.
         (4) Submittals.
         (5) Change Orders.
         (6) Applications for Payment.
      g. Procedures for testing.
      h. Procedures for preparing and maintaining record documents.
      i. Use of Premises:
         (1) Office, work, storage, laydown, and parking areas.
         (2) Owner's requirements.
         (3) Work restrictions and hours.
      j. Construction facilities, controls, and construction aids.
      k. Temporary utilities.
      l. Safety and first-aid.
      m. Security.
      n. Deliveries of Equipment and Materials.
   4. Location of Meeting: At or near the Project Site
   5. Reporting:
      a. Within five (5) working days after the meeting, Engineer and/or Owner will prepare and distribute minutes of the meeting.
      b. Contractor shall provide copies to Subcontractors and major Suppliers.

B. Construction Progress Meetings:
   1. Contractor shall schedule and conduct a meeting bi-weekly and at other times requested by Engineer and/or Owner. Representatives of the Owner, Engineer, and Contractor shall be present at each meeting. With Engineer's concurrence, Contractor may request attendance by representatives of Subcontractors, Suppliers, or other entities concerned with current program or involved with planning, coordination, or performance of future

activities. All participants in the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.

2. Contractor and each Subcontractor represented shall be prepared to discuss the current construction progress report and any anticipated future changes to the schedule. Each Subcontractor shall comment on the schedules of Contractor and other Subcontractors and advise if their current progress or anticipated activities are compatible with that Subcontractor's Work.
3. If one Subcontractor is delaying another, Contractor shall issue such directions as are necessary to resolve the situation and promote construction progress.
4. Meeting Agenda:
    a. Review of construction progress since previous meeting.
    b. Field observations, interface requirements, conflicts.
    c. Issues which may impede construction schedule.
    d. Off-Site fabrication.
    e. Delivery schedules.
    f. Submittal schedules and status.
    g. Site use; coordination with other contractors.
    h. Temporary facilities, controls, and services.
    i. Hours of Work.
    j. Hazards and risks.
    k. Housekeeping.
    l. Quality and Work standards.
    m. RFIs.
    n. Status of Change Orders.
    o. Documentation of information for payment requests.
    p. Corrective measures and procedures to regain construction schedule if necessary.
    q. Revisions to construction schedule.
    r. Review of proposed activities for succeeding Work period.
    s. Review proposed Contract modifications for:
        (1) Effect on construction schedule and on completion date.
    t. Other business.
5. Location of Meetings: At or near Project Site.
6. Reporting:
    a. Within three working days after each meeting, Contractor shall prepare and distribute minutes of the meeting to Owner and Engineer.
    b. Contractor shall distribute copies to principal Subcontractors and Suppliers.

1.06 REQUESTS FOR INFORMATION (RFI):

A. Procedure: Promptly on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI with the content specified.
    1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor shall be returned with no response.
    2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's Work or work of Subcontractors.
B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
    1. Project name.
    2. Date.

3. Name of Contractor.
4. Contract number and title.
5. Name of Engineer.
6. RFI number, numbered sequentially.
7. Specification Section number and title and related paragraphs, as appropriate.
8. Drawing number and detail references, as appropriate.
9. Field dimensions and conditions, as appropriate.
10. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Times or the Contract Price, Contractor shall state impact in the RFI.
11. Contractor's signature.
12. Attachments: Include drawings, descriptions, measurements, photos, product data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

C. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
   1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Engineer's Action: Engineer will review each RFI, determine action required, and return it. Allow seven (7) working days for Engineer's response for each RFI. RFIs received after 1:00 p.m. local time will be considered as received the following working day.
   1. The following RFIs shall be returned without action:
      a. Requests for approval of Submittals.
      b. Requests for approval of substitutions.
      c. Requests for coordination information already indicated in the Contract Documents.
      d. Requests for adjustments in the Contract Times or the Contract Price.
      e. Requests for interpretation of Engineer's actions on Submittals.
      f. Incomplete RFIs or RFIs with numerous errors.
   2. Multiple RFIs addressing similar or identical issues may be addressed by Engineer with a single broad response.
   3. Engineer's action may include a request for additional information, in which case Engineer's time for response will start again upon Contractor's response and resubmittal.
   4. If Contractor believes the RFI response warrants change in the Contract Times or the Contract Price, notify Engineer in writing within ten (10) days of receipt of the RFI response.

E. On receipt of Engineer's action, update the RFI log and promptly distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

F. RFI Log: Contractor shall prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Electronic log with not less than the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Contractor representative name and telephone number.
   4. Name and address of Engineer.
   5. RFI number including RFIs that were dropped and not submitted.
   6. RFI description.
   7. Date the RFI was submitted.
   8. Date Engineer's response was received.
   9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION - NOT APPLICABLE

END OF SECTION 01 31 00

SECTION 01 32 00 – CONSTRUCTION PROGRESS SCHEDULES AND REPORTS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Preliminary construction progress schedule.
   2. Construction progress schedule.
   3. Schedule of Submittals.
   4. Schedule of values.
   5. Construction progress reports.
   6. Daily construction reports.
   7. Equipment and Material location reports.
   8. Field condition reports.
   9. Special reports.

1.02 RELATED REQUIREMENTS:

A. For submitting and distributing meeting and conference minutes: Section 01 31 00 – "Project Coordination and Meetings."
B. For submitting schedules and reports: Section 01 33 00 – "Submittals."
C. For submitting construction photographs: Section 01 32 33 – "Project Photographs."

1.03 REFERENCE STANDARDS:

A. Associated General Contractor's of America (AGC):
   1. Construction Planning and Scheduling.

1.04 DEFINITIONS:

A. Activity: A discrete part of a contract that can be identified for planning, scheduling, monitoring, and controlling the construction Work. Activities included in a construction schedule consume time and resources but shall not include planned work stoppages. Activities shall not normally reflect the Work of more than one trade.
   1. Critical activities are activities on the critical path and have zero or negative float. Critical activities must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.
B. "Baseline" schedule: The schedule submitted and accepted by Engineer for the Work.
C. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Price, unless otherwise approved by Engineer.
D. CPM: Critical path method (CPM), which is a method of planning and scheduling a construction contract where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Contract.
E. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Contract duration and contains no float.
F. Event: The starting or ending point of an activity. An event has no duration.
G. Float: The measure of leeway in starting and completing an activity.
   1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting an intermediate deadline or the planned Contract completion date.

H. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

I. Milestone: A key or critical point in time for reference or measurement. A milestone has no duration.

J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.05 SUBMITTALS:

A. Qualification Data: For scheduling consultant.

B. Schedule of Submittals: Submit in specified electronic format. Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (technical or informational).
4. Name of Subcontractor or Supplier.
5. Description of the Work covered.
6. Scheduled date for Engineer's final release or approval.

C. Preliminary Construction Progress Schedule: Submit in specified electronic format.
1. Acceptance of cost-loaded preliminary construction schedule will not constitute acceptance of schedule of values for cost-loaded activities.

D. Construction Progress Reports: Submit electronic copies at monthly intervals.

E. Daily Construction Reports: Submit electronic copies at weekly intervals.

F. Material Location Reports: Submit electronic copies at weekly intervals.

G. Field Condition Reports: Submit electronic copies at time of discovery of differing conditions.

H. Special Reports: Submit electronic at time of unusual event.

1.06 COORDINATION:

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate construction progress schedule with the schedule of values, list of subcontracts, schedule of Submittals, Material and Equipment procurement, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.01 SCHEDULE OF SUBMITTALS:

A. Preparation: Submit a schedule of Submittals, arranged in chronological order by dates required by construction progress schedule. Include time required for review, resubmittal,

ordering, manufacturing, fabrication, and delivery when establishing dates as required in Section 01 33 00 – "Submittals."

1. Coordinate Submittals schedule with list of subcontracts, the schedule of values, and "Baseline" construction progress schedule.
2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include Submittals required during the first thirty (30) days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of construction progress schedule.

2.02 CONTRACTOR'S CONSTRUCTION PROGRESS SCHEDULE, GENERAL:

A. Time Frame: Extend schedule from date established for commencement of the Work in the Notice to Proceed to date of Final Completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each building floor or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than twenty (20) calendar days, unless specifically allowed by Engineer.
   2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than twenty (20) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, Submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 – "Submittals" in schedule. Coordinate Submittal review times in Contractor's construction progress schedule with schedule of Submittals.
   4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
   1. Phasing: Arrange list of activities on schedule by phase.
   2. Work Restrictions: Show the effect of the following items on the schedule:
      a. Coordination with existing construction.
      b. Limitations of continued occupancies.
      c. Uninterruptible services.
      d. Partial occupancy before Substantial Completion.
      e. Use of premises restrictions.
      f. Provisions for future construction.
      g. Seasonal variations.
      h. Environmental control.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

F. Contract Modifications: For each proposed Contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall schedule.

2.03 PRELIMINARY CONSTRUCTION PROGRESS SCHEDULE:

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven (7) days of date established for commencement of the Work in the Notice to Proceed.

1. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first thirty (30) days of construction. Include skeleton diagram for the remainder of the Work.

2.04 CONSTRUCTION PROGRESS SCHEDULE (GANTT CHART):

A. Gantt-Chart Schedule: After submittal of preliminary construction progress schedule as stated above, submit a detailed construction progress schedule within twenty (20) days of the Notice of Award. Base the schedule on the preliminary construction progress schedule and incorporate review comments and other feedback.

B. The schedule shall show the Work in a horizontal bar chart or other graphic format suitable for displaying scheduled and actual progress.

1. The schedule shall indicate phases of the Work, starting date, interim milestones, and dates of Substantial Completion and Final Completion.
2. Breakdown Work phases into separate time bar for each significant construction activity entry, with dates Work is expected to begin and be completed. Within each time bar, indicate estimated completion percentage in 10% increments.
3. Scale and spacing shall allow room for notation and revisions.
4. Sheet Size: Minimum 11 x 17 inches.

C. Provide subschedules to define in more detail critical portions of schedules, including inspections and tests.

D. Coordinate construction progress schedule with schedule of values, schedule of Submittals schedule, procurement schedule, progress reports, and payment requests.

E. Engineer will review and comment on construction progress schedule and, upon agreement between Engineer and Contractor on necessary changes:

1. Contractor shall distribute copies as specified of the accepted "baseline" schedule to Engineer. Contractor shall provide additional copies to Subcontractors and other parties required to comply with scheduled dates, one copy to each party.

F. Revise the construction progress schedule after each meeting, event, or activity where revisions have been recognized and accepted to reflect impacts of new developments on the schedule.

G. Update and submit electronic copies to Engineer of the revised schedule at least once each month to show actual progress compared to the originally accepted "baseline" schedule and any proposed changes in the schedule of remaining Work. Include with construction progress report.

2.05 REPORTS:

A. Construction Progress Reports:

1. Submit a report on actual construction progress on a monthly basis. More frequent reports may be required should the Work fall behind the accepted schedule.

a. Submit a weekly report (and three-week look-ahead schedule) to coordinate with and supplement the monthly construction progress report and which details Work scheduled for the following one-week interval, including:
   (1) Work activities which will occur.
   (2) Number and size of crews.
   (3) Construction equipment on Site.
   (4) Major items of Equipment and Material to be installed.
b. Format shall be on 8-1/2-inch paper, submitted to Engineer in electronic format.

2. Construction progress reports shall consist of the revised construction progress schedule and a narrative report which shall include but not be limited to the following:
   a. Comparison of actual progress to planned progress shown on originally accepted schedule.
   b. Summary of activities completed since the previous construction progress report.
   c. Summary of activities planned for next reporting period.
   d. Planned, earned, and spent earned value analysis for the month.
   e. Identification of problem areas.
   f. A description of current and anticipated delaying factors, if any.
   g. Impact of possible delaying factors.
   h. Proposed corrective actions.
3. Submit a construction progress report to Engineer with each application for partial payment. Work reported complete but not readily apparent to Engineer must be substantiated with supporting data when requested by Engineer.
4. If a schedule update reveals that, through no fault of Owner, the Work is likely to be completed later than the Contract completion date, Contractor shall:
   a. Establish a plan for making up for lost time.
      (1) Increase number of workers, or
      (2) Increase amount or kinds of tools, or
      (3) Work overtime or additional shifts, or
      (4) A combination of 2 or more of the above 3 actions.
   b. Submit plan to Owner and Engineer before implementing the plan.
   c. Take actions as necessary to get the Work back on schedule at no additional cost to Owner.

B. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project Site:
1. List of Subcontractors at Project Site.
2. List of separate contractors at Project Site.
3. Approximate count of personnel at Project Site, and breakdown by craft.
4. Equipment at Project Site.
5. Material deliveries.
6. High and low temperatures and general weather conditions.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.

C. Equipment and Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of Equipment and Materials delivered to and stored at Project Site. List shall be cumulative, showing Equipment and Materials previously reported plus items recently

delivered. Include with list a statement of progress on and delivery dates for Materials or items of Equipment fabricated or stored away from Project Site.

D. Field Condition Reports: Promptly on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for information (RFI). Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

E. Special Reports:
   1. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
   2. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project Site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.01 CONSTRUCTION PROGRESS SCHEDULE:

A. Construction Progress Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled construction progress meeting.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate actual completion percentage for each activity.

B. Distribution: Distribute copies of accepted schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules 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 performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 32 33 – CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section specifies administrative and procedural requirements for construction photographs.

1.02 SUBMITTALS:

A. Submit as specified in Section 01 33 00 – "Submittals" and in PART 3 - this Section.

B. Contractor shall submit two sample prints of the type and quality required during construction, for review and acceptance by Engineer.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHIC REQUIREMENTS: SPECIFIED IN PART 3, THIS SECTION.

PART 3 - EXECUTION

3.01 PROGRESS SITE PHOTOGRAPHS:

A. Contractor shall be responsible for photographs of the Site to show the existing and general progress of the Work. Owner and/or Engineer will advise as to which views are of interest. Photographs shall be taken of the following areas and at the following times.

1. Existing Site conditions before Site work is started. Number of views shall be adequate to cover the Site.
2. Progress of the Work from excavation throughout construction. There shall be a minimum five (5) different views or as required to adequately show the progress of the work taken on or about the first of each month and submitted with the monthly report.
3. Finished Project after completion of Work. Number of views shall be adequate to show the finished Work.
4. If Project is not completed during the Contract Time or authorized extensions, photographs shall continue to be taken at no increase in Contract Price.

B. Digital Images:

1. Submit a complete set of digital image electronic files with each submittal of photographs as required in PARAGRAPH 3.01.A.
    a. Provide images in JPEG format, with minimum sensor size of 4.0 megapixels.
    b. Provide image resolution of not less than 1600 by 1200 pixels.
    c. Submit images that have same aspect ratio as the sensor, uncropped.

C. Identification:

1. Identify each photographic file or print a file name and/or label which contains the Contract name and Contract number, date of exposure, and description of view.
2. Identify each photographic file with date digital photographs were taken.

D. Submit digital files for the Project as specified in SECTION 01 33 00. In addition, include all photographs taken within a monthly period and/or in PARAGRAPH 3.01.A.2 with the Monthly Report Documents

3.02 ROUTE PHOTOGRAPHS:

A. Contractor shall be responsible for photographs along the entire construction route showing the condition of the terrain previous to any alterations by Contractor and before construction is started. These same views shall be rephotographed after completion of all construction.

B. The principal reason for obtaining photographs is so that items such as cracked curbs, shrubs, lawns, broken pavement or sidewalks, plugged culverts in driveways, or other problems along the construction route may be more clearly shown and recorded. This will to some degree preclude the possibility of post construction litigation with property owners adjacent to the Work.

C. Photographs shall be taken at intervals of not more than 50 feet and at other intervals deemed necessary to record detailed conditions, possible field conflicts, and as may be designated by Engineer.

D. Each photograph shall be identified in the view using an identification board stating the Contract name and Contract number, station number, street or other suitable identification date and sequential view number.

E. Contractor shall keep a log of all photographs noting detailed information or comments pertinent to each photograph.

F. Digital Images:
   1. Submit a complete set of digital image electronic files as a Project record document.
      a. Provide images in JPEG format, with minimum sensor size of 4.0 megapixels.
      b. Provide image resolution of not less than 1600 by 1200 pixels.
      c. Submit images that have same aspect ratio as the sensor, uncropped.
      d. Submit digital files as specified in SECTION 01 33 00.

G. Identification:
   1. Identify each photographic file or print a file name and/or label which contains the Contract name and Contract number, date of exposure, and description of view.
   2. Identify each photographic file with date digital photographs were taken.

3.03 AUDIO/VIDEO RECORDINGS:

A. Audio/video recordings shall be made along the entire construction route showing the condition of the Site or terrain previous to any alterations by Contractor and before disturbing of the Site is started. A second audio/video recording shall be produced after completion of all construction operations, showing the same view or views as close as possible, to illustrate "before" and "after" conditions. This is the responsibility of Contractor.

B. The principal reason for producing this recording is so that items such as cracked or broken curbs, pavement, or sidewalks; plugged culverts in driveways; condition of shrubs or lawns or other problems along the construction route may be more clearly shown and recorded. This will to some degree preclude the possibility of post construction litigation with property owners adjacent to the Work.

C. All required equipment, accessories, materials, and labor for the timely production of this documentation shall be arranged/furnished through Contractor.
   1. The audio/video system utilized shall be capable of producing bright, sharp, clear visual images which render accurate colors free from imperfections and distortions that might obscure recorded information during playback. The simultaneous audio record shall be made directly onto the original recording, and shall record narration clearly and audibly, with adequate volume, free from unnecessary interruptions and distortions that might eliminate recorded information during playback.

D. Zone of Influence: Unless otherwise indicated by Engineer or Owner, the "Zone of Influence" which might be affected by the construction operations and, therefore, shall be documented in these recordings, shall be whichever of the following includes the greatest area.
   1. All areas within the temporary construction right-of-ways and grading limits, as indicated on the Contract Drawings.

2. The permanent easement for the completed improvements, as indicated on the Contract Drawings.
3. All areas within 35 feet of the proposed improvements.
4. All areas within the Project Site.

E. Production Procedures:
1. It is recommended that the audio/video recordings be produced while actually walking the construction route - NOT through the use of wheeled vehicles.
2. All recordings shall display digital information continuously; this information shall include the current time and date, showing the month, day, and year. This information shall be audibly acknowledged at appropriate times during recording sequences.
3. Each recording shall begin with a visual of the current date and time on digital display, plus audible and visual, if possible, indication of Contract name and numbers, Owner's name, name of Contractor, and other pertinent information. Thereafter, each recording sequence should begin with the current time and date, followed by the location recording, direction of view, and description of the scene being recorded. Continuous updates of this information, plus other pertinent comments, shall be given throughout the recording sequence. Such audio and video records shall include, but not be limited to, conditions of existing pavement, curbs, sidewalks, driveways, culverts, ditches, mailboxes, fences, shrubs and landscaping, major structural conditions of residences and commercial buildings, fences, signs, headwalls, general terrain, and similar items.
4. A log sheet showing the recording sequences shall be maintained; it shall list the start and stop time/date for each sequence, plus a brief description of the areas documented. The end of each recording shall include a visual record of the original log sheet to preserve this information in the event of loss or damage.
5. All recordings shall be completed during periods of adequate lighting and visibility. Sufficient lighting must be available to provide proper illumination of shadowed areas, and proper exposure adjustments shall be made where required. No taping shall be completed during precipitation, mist, fog, or when more than 10% of the ground surface has snow cover.

F. Ownership and Authenticity of Original Recording: All recordings shall become the property of the Owner.

G. Submit digital files as specified in SECTION 01 33 00.

3.04 ADDITIONAL PHOTOGRAPHS:

A. Engineer and/or Owner may issue requests for additional photographs, in addition to periodic photographs specified.
1. In emergency situations, the Contractor shall take additional photographs within 24 hours of Engineer's and/or Owner's request.
2. Circumstances that could require additional photographs include, but are not limited to:
a. Substantial Completion of a major phase or component of Work.
b. Owner's request for special photographs.
c. Immediate follow-up when on-site events result in construction damage or losses.
d. Photographs to be taken at fabrication locations away from Project Site.
e. Extra record photographs at time of final acceptance.

END OF SECTION 01 32 33

SECTION 01 33 00 – SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes definitions, descriptions, transmittal, and review of Submittals.

1.02 RELATED REQUIREMENTS:

A. Section 01 31 00 – "Construction Progress Schedules and Reports."
B. Section 01 31 00 – "Project Coordination Meetings."
C. Section 01 32 33 – "Construction Photographs."
D. Section 01 78 00 – "Contract Closeout."

1.03 GENERAL INFORMATION:

A. Definitions:
   1. Shop Drawings, product data, and Samples are technical Submittals prepared by Contractor, Subcontractor, manufacturer, or Supplier and submitted by Contractor to Engineer as a basis for approval of the use of Equipment and Materials proposed for incorporation in the Work or needed to describe installation, operation, maintenance, or technical properties, as specified in each Division of the Specifications.
      a. Shop Drawings include custom-prepared data of all types including drawings, diagrams, performance curves, material schedules, templates, instructions, and similar information not in standard printed form applicable to other projects.
      b. Product data includes standard printed information on materials, products, and systems; not custom-prepared for this Project, other than the designation of selections from available choices.
      c. Samples include both fabricated and unfabricated physical examples of materials, products, and Work; both as complete units and as smaller portions of units of Work; either for limited visual inspection or (where indicated) for more detailed testing and analysis. Mock-ups are a special form of Samples which are too large to be handled in the specified manner for transmittal of Sample Submittals.
      d. Descriptions of submittal requirements (as applicable) are defined in Appendix B – Submittal Descriptions.
   2. Informational Submittals are those technical reports, administrative Submittals, certificates, and guarantees not defined as Shop Drawings, product data, or Samples.
      a. Technical reports include laboratory reports, tests, technical procedures, technical records, and Contractor's design analysis.
      b. Administrative Submittals are those nontechnical Submittals required by the Contract Documents or deemed necessary for administrative records. These Submittals include maintenance agreements, Bonds, Project photographs, physical work records, statements of applicability, copies of industry standards, Project record data, schedules, security/protection/safety data, and similar type Submittals.
      c. Certificates and guarantees are those Submittals on Equipment and Materials where a written certificate or guarantee from the manufacturer or Supplier is called for in the Specifications.
   3. Refer to ARTICLES 1.03 and 1.04 of this Part for detailed lists of Submittals and specific requirements.
B. Quality Requirements:
   1. Submittals such as Shop Drawings and product data shall be of suitable quality for legibility and reproduction purposes. Every line, character, and letter shall be clearly

legible. Drawings such as reproducibles shall be useable for further reproduction to yield legible hard copy.

2. Documents submitted to Engineer that do not conform to specified requirements shall be subject to rejection by Engineer, and upon request by Engineer, Contractor shall resubmit conforming documents. If conforming Submittals cannot be obtained, such documents shall be retraced, redrawn, or photographically restored as may be necessary to meet such requirements. Contractor's or his Subcontractor's failure to initially satisfy the legibility quality requirements will not relieve Contractor or his Subcontractors from meeting the required schedule for Submittals.

C. Language and Dimensions:
   1. All words and dimensional units shall be in the English language.
   2. Metric dimensional unit equivalents may be stated in addition to the English units. However, English units of measurement shall prevail.

D. Submittal Completeness:
   1. Submittals shall be complete with respect to dimensions, design criteria, materials of construction, and other information specified to enable Engineer to review the information effectively.
   2. Where standard drawings are furnished which cover a number of variations of the general class of Equipment, each drawing shall be annotated to indicate exactly which parts of the drawing apply to the Equipment being furnished. Use hatch marks to indicate variations that do not apply to the Submittal. The use of "highlighting markers" will not be an acceptable means of annotating Submittals. Annotation shall also include proper identification of the Submittal permanently attached to the drawing.
   3. Reproductions or copies of Contract Drawings or portions thereof will not be accepted as complete fabrication or erection drawings. Contractor may use a reproduction of Contract Drawings for erection drawings to indicate information on erection or to identify detail drawing references. Whenever the Drawings are revised to show this additional Contractor information, Engineer's title block shall be replaced with Contractor's title block, and Engineer's professional seal shall be removed from the drawing. Contractor shall revise these erection drawings for subsequent Engineer revisions to the Contract Drawings.

E. Form of Submittals:
   1. Submittals and other Project documents shall be transmitted in electronic format as specified.
      a. Selected Submittals may be provided in paper ("hardcopy") copies only with advance approval of Engineer, and using procedures specified herein.
      b. Equipment instruction books and operating manuals shall be provided in paper copies in addition to specified electronic format.
   2. Electronic Format:
      a. Scanned Submittals and documents are not acceptable. Transmit Submittals and Project documents in:
         (1) Nonproprietary, native electronic format incorporating any necessary reference files, or
         (2) Adobe *PDF files created directly from native electronic format, or
         (3) Engineer-approved equal.
         (4) Electronic submittal PDF files are not to be combined files or collections of files/drawings. Each drawing document must stand alone.
         (5) Each file will be right reading and orientation the same for all consecutive resubmissions.

(6) For any given Submittal, the filename and format shall be consistent for initial submission and subsequent revisions of the same. Use consistent naming convention throughout. Reference to revision or dates shall not be included in a filename.

(7) Nonconforming Submittals are subject to rejection by Engineer.

b. Provide "as-constructed" Submittals, record documents, Equipment instruction books and operating manuals, and other documents on CD-ROM in Adobe *PDF format as required and approved by Owner.

c. Equipment instruction books and operating and maintenance manuals shall be in Adobe *PDF format combined in one pdf file for the complete O&M manual or divided into pdf files that represent entire volumes (corresponding to hardcopy volumes). The pdf files shall be completely bookmarked with links within the index sheet to the different sections within the manuals/volumes, corresponding to the defined tabs within the hardcopy version.

(1) Digital delivery media shall be Engineer's File Transfer Protocol (FTP) site(s).

1.04 TECHNICAL SUBMITTALS

A. Items shall include, but not be limited to, the following:

1. Manufacturer's specifications.
2. Catalogs, or parts thereof, of manufactured Equipment.
3. Shop fabrication and erection drawings.
4. General outline drawings of Equipment showing overall dimensions, location of major components, weights, and location of required building openings and floor plates.
5. Detailed Equipment installation drawings, showing foundation details, anchor bolt sizes and locations, baseplate sizes, location of Owner's connections; and all clearances required for erection, operation, and disassembly for maintenance.
6. Schematic diagrams for electrical items, showing external connections, terminal block numbers, internal wiring diagrams and one-line diagrams.
7. Bills of material and spare parts list.
8. Instruction books and operating manuals.
9. Material lists or schedules.
10. Performance tests on Equipment by manufacturers.
11. Concrete mix design information.
12. Samples and color charts.
13. All drawings, catalogs or parts thereof, manufacturer's specifications and data, Samples, instructions, and other information specified or necessary:
    a. For Engineer to determine that Equipment and Materials conform to the design concept and comply with intent of the Contract Documents.
    b. For proper erection, installation, operation, and maintenance of Equipment and Materials which Engineer will review for general content but not for basic details.
    c. For Engineer to determine what supports, anchorages, structural details, connections, and services are required for Equipment and Materials, and effects on contiguous or related structures and Equipment and Materials.

B. Schedule of Submittals:

1. Prepare for Engineer's concurrence, a schedule for submission of all Submittals specified or necessary for Engineer's approval of the use of Equipment and Materials proposed for incorporation in the Work or needed for proper installation, operation, or maintenance. Submit the schedule with the procurement schedule and construction progress schedule.

Schedule submission of all Submittals to permit review, fabrication, and delivery in time so as to not cause a delay in the Work of Contractor or his Subcontractors or any other contractors as described in the Contract Documents.

2. In establishing schedule for Submittals, allow fifteen (15) days in Engineer's office for reviewing original Submittals and ten (10) days in Engineer's office for reviewing resubmittals.
3. Submittals requiring revision shall be resubmitted within five (5) days after receipt of Engineer's review notations.
4. The schedule shall indicate the anticipated dates of original submission for each item and Engineer's approval thereof and shall be based upon at least one resubmission of each item.
5. Schedule all Submittals (Shop Drawings, product data, and Samples) required prior to fabrication or manufacture for submission within fifteen (15) days of the Notice to Proceed. Schedule Submittals pertaining to storage, installation, and operation at the Site for Engineer's approval prior to delivery of the Equipment and Materials.
6. Resubmit Submittals the number of times required for Engineer's "Submittal Approved." However, any need for resubmittals in excess of the number set forth in the accepted schedule, or any other delay in obtaining approval of Submittals, will not be grounds for extension of the Contract Times, provided Engineer completes his reviews within the times specified.
7. Where a Submittal is required by the Contract Documents or the accepted schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertaining Submittal will be at the sole expense and responsibility of Contractor.

C. Transmittal of Submittals:
   1. All Submittals (Shop Drawings, product data, and Samples) for Equipment and Materials furnished by Contractor, Subcontractors, manufacturers, and Suppliers shall be submitted to Engineer by Contractor.
   2. After checking and verifying all field measurements, transmit all Submittals to Engineer for approval as follows:
      a. Submittal Information Block:
         (1) Affix to all electronic and paper copies whether Submittal is prepared by Contractor, Subcontractor, or Supplier. Use transparent decal type Submittal Information Blocks for Shop Drawings and use gummed paper type for product data and Sample Submittals that are submitted in paper format.
      b. Mark each Submittal by Project name and number, Contract title and number, and applicable Specification Section and Article number. Include in the letter of transmittal the Drawing number and title, sheet number (if applicable), revision number, and electronic filename (if applicable). Unidentifiable Submittals will be returned for proper identification.
      c. Check and approve Submittals of Subcontractors, Suppliers, and manufacturers prior to transmitting them to Engineer. Contractor's submission shall constitute a representation to Owner and Engineer that Contractor approves Submittals and has determined and verified all design criteria, quantities, dimensions, field construction and installation criteria, materials, catalog numbers, compliance with Laws and Regulations, and similar data, and Contractor assumes full responsibility for doing so; and Contractor has coordinated each Submittal with the requirements of the Work and the Contract Documents.
      d. At the time of each submission, call to the attention of Engineer in the letter of transmittal any deviations from requirements of the Contract Documents.

e. Make all modifications noted or indicated by Engineer and return the required number of revised Submittals until approved. Direct specific attention in writing, or on revised Submittals, to changes other than the modifications called for by Engineer on previous Submittals. After paper copy Submittals have been approved, submit copies thereof for final distribution. Previously approved Submittals transmitted for final distribution will not be further reviewed and are not to be revised. If errors are discovered during manufacture or fabrication, correct the Submittal, and resubmit for review.

f. Following completion of the Work and prior to final payment, furnish record documents and approved Samples and Shop Drawings necessary to indicate "as constructed" conditions, including field modifications, in the number of copies specified. Furnish additional copies for insertion in Equipment instruction books and operating manuals as required. All such copies shall be clearly marked "PROJECT RECORD."

(1) Submit a final record copy of the Master Field Drawing list which shall indicate the final revision status of each drawing on the list.

g. Keep a copy or sample of each Submittal in good order at the Site.

3. Quantity Requirements:

a. Except as otherwise specified, transmit all Shop Drawings in the following quantities:

(1) Initial Submittal:
(a) Electronic - One copy to Engineer.
(2) Resubmittals:
(a) Electronic - One copy to Engineer.
(3) Submittal for final distribution:
(a) Electronic - One copy to Engineer.
(4) As-constructed documents:
(a) Electronic - One copy to Engineer.

b. Transmit Submittals of product data as follows:

(1) Initial Submittal:
(a) Electronic - One copy to Engineer.
(2) Resubmittals:
(a) Electronic - One copy to Engineer.
(3) Submittal for final distribution:
(a) Electronic - One copy to Engineer.

c. Transmit Submittals of Material Samples, color charts, and similar items as follows:

(1) Initial Submittal – Three copies to Engineer.
(2) Resubmittal – Three to Engineer.
(3) Upon approval, One Sample will be returned to Contractor.

d. Transmit Submittals of Equipment instruction books and operating manuals as follows:

(1) Initial Submittal:
(a) Electronic - One copy to Engineer.
(2) Resubmittals:
(a) Electronic - One copy to Engineer.
(3) Submittal for Final Distribution – One paper copy and one electronic to Engineer. One paper copy and one electronic copy to Owner.

e. When all Submittals have been updated to "as-constructed" conditions, transmit to Engineer and to Owner in electronic format.

f. Owner may copy and use for internal operations and staff training purposes any and all document Submittals required by this Contract and approved for final distribution, whether or not such documents are copyrighted, at no additional cost to Owner. If permission to copy any such Submittal for the purposes stated is unreasonably withheld from Owner by Contractor or any Subcontractor, manufacturer, or Supplier, Contractor shall provide to Engineer 50 copies plus the number of copies required by Contractor at each final distribution issue.

4. Equipment erection drawings and other Submittals required for installation of Equipment furnished by others under separate contract for installation under this Contract will be transmitted to Contractor by Engineer in the final distribution of such Submittals.

D. Engineer's Review:

1. Engineer will review and take appropriate action on Submittals in accordance with the accepted schedule of Submittals. Engineer's review and approval will be only to determine if the items of Equipment and Materials covered by the Submittals will, after installation or incorporation in the Work, conform to information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to design data reflected in Submittals which is peculiarly within the special expertise of Contractor or Contractor's Subcontractors or Suppliers. Review and approval of a component item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval of Shop Drawings, product data, or Samples will not relieve Contractor of responsibility for any deviation from requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to such deviation at the time of submission, and Engineer has given written concurrence in and approval of the specific deviation. Approval by Engineer shall not relieve Contractor from responsibility for errors or omissions in Submittals.

E. Submittal Action Stamp:

1. Engineer's review action stamp, appropriately completed, will appear on all Submittals of Contractor when returned by Engineer. Review status designations listed on Engineer's action stamp are defined as follows:

   A - SUBMITTAL APPROVED: Signifies Equipment or Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is approved for incorporation in the Work. Contractor is to proceed with fabrication or procurement of the items and with related Work. Copies of the Submittal are to be transmitted to Engineer for final distribution.

   B - SUBMITTAL APPROVED AS NOTED (RESUBMIT): Signifies Equipment and Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is approved for incorporation in the Work in accordance with Engineer's notations. Contractor is to proceed with fabrication or procurement of the items and with related Work in accordance with Engineer's notations and shall submit a revised Submittal responsive to notations marked on the returned Submittal or written in the letter of transmittal.

   C - SUBMITTAL RETURNED FOR REVISION (RESUBMIT): Signifies Equipment and Material represented by the Submittal appears to conform with the design concept and comply with the intent of the Contract Documents, but information is either insuffi-

cient in detail or contains discrepancies which prevent Engineer from completing his review. Contractor shall resubmit revised information responsive to Engineer's annotations on the returned Submittal or written in the letter of transmittal. Fabrication or procurement of items represented by the Submittal and related Work is not to proceed until the Submittal is approved.

D - SUBMITTAL NOT APPROVED (SUBMIT ANEW): Signifies Equipment and Material represented by the Submittal does not conform with the design concept or comply with the intent of the Contract Documents and is disapproved for use in the Work. Contractors shall provide Submittals responsive to the Contract Documents.

E - PRELIMINARY SUBMITTAL: Signifies Submittals of such preliminary nature that a determination of conformance with the design concept or compliance with the intent of the Contract Documents must be deferred until additional information is furnished. Contractor is to submit such additional information to permit layout and related activities to proceed.

F - FOR REFERENCE, NO APPROVAL REQUIRED: Signifies Submittals which are for supplementary information only; pamphlets, general information sheets, catalog cuts, standard sheets, bulletins and similar data, all of which are useful to Engineer or Owner in design, operation, or maintenance, but which by their nature do not constitute a basis for determining that items represented thereby conform with the design concept or comply with the intent of the Contract Documents. Engineer reviews such Submittals for general content but not for basic details.

G - DISTRIBUTION COPY (PREVIOUSLY APPROVED): Signifies Submittals which have been previously approved and are being distributed to Contractor, Owner, Resident Project Representative, and others for coordination and construction purposes.

F. Instruction Books and Operating Manuals:
   1. In addition to electronic Submittals specified above, Equipment instruction books and operating manuals prepared by the manufacturer shall include the following:
      a. Index and tabs.
      b. Instructions for installation, start-up, operation, inspection, maintenance, parts lists and recommended spare parts, and data sheets showing model numbers.
      c. Applicable drawings.
      d. Warranties and guarantees.
      e. Address of nearest manufacturer-authorized service facility.
      f. All additional data specified.
   2. Information listed above shall be bound into hard-back binders of three-ring type. Sheet size shall be 8-1/2 x 11. Binder color shall be black. Capacity shall be a minimum of 1-1/2 inches, but sufficient to contain and use sheets with ease.
      a. Provide the following accessories:
         (1) Label holder.
         (2) Business card holder.
         (3) Sheetlifters.
         (4) Horizontal pockets.
         (5) Owner's name.
         (6) Owner's facility or plant name.

(7) Equipment item name.
(8) Volume number (if applicable).
(9) Contract number.
(10) Manufacturer's name and address.

b. The following information shall be imprinted, inserted, or affixed by label on the binder spine:
(1) Equipment item name.
(2) Owner's name and Owner's facility or plant name.
(3) Manufacturer's name.
(4) Contract number.
(5) Volume number (if applicable).

c. Submit mockup of cover and spine for Engineer's review.

G. Samples:
1. Office Samples shall be of sufficient size and quantity to clearly illustrate the following:
a. Functional characteristics of the product, with integrally related parts and attachment devices.
b. Full range of color, texture, and pattern.
c. Material, manufacturer, pertinent catalog number, and intended use.
2. Field Samples and Mock-ups:
a. Erect field Samples and mock-ups at the Project Site and at a location acceptable to Engineer.
b. Size or area shall be as specified in respective Specification Section.
c. Fabricate each Sample and mock-up complete and finished.
d. Remove mock-ups at conclusion of Work or when acceptable to Engineer if not a permanent part of construction.

1.05 INFORMATIONAL SUBMITTALS:

A. Informational Submittals are comprised of technical reports, administrative Submittals, and guarantees which relate to the Work, but do not require Engineer approval prior to proceeding with the Work. Informational Submittals include:
1. Welder qualification tests.
2. Welding procedure qualification tests.
3. X-ray and radiographic reports.
4. Hydrostatic testing of pipes.
5. Field test reports.
6. Concrete cylinder test reports.
7. ASME pressure vessel test reports.
8. Certification on Materials:
a. Steel mill tests.
b. Roofing laboratory tests.
c. Brick and concrete masonry unit laboratory tests.
d. Paint laboratory tests.
e. Metal paneling laboratory tests.
f. Cement tests.
9. Soil test reports.
10. Air handling balancing reports.
11. Temperature records.
12. Piping stress analysis.
13. Shipping or packing lists.

14. Job progress schedules.
15. Equipment and Material delivery schedules.
16. Progress photographs.
17. Warranties and guarantees.
18. Fire protection and hydraulic calculations.

B. Transmittal of Informational Submittals:
   1. All informational Submittals furnished by Subcontractors, manufacturers, and Suppliers shall be submitted to Engineer by Contractor unless otherwise specified.
      a. Identify each informational Submittal by Project name and number, Contract title and number, and Specification Section and Article number marked thereon or in letter of transmittal. Unidentifiable Submittals will be returned for proper identification.
      b. At the time of each submission, call to the attention of Engineer in the letter of transmittal any deviations from requirements of the Contract Documents.
   2. Quantity Requirements:
      a. Technical reports and administrative Submittals except as otherwise specified:
         (1) Electronic: One electronic copy to Engineer.
      b. Written Certificates and Guarantees:
         (1) Engineer: One electronic copy to Engineer.
   3. Test Reports:
      a. Responsibilities of Contractor, Owner, and Engineer regarding tests and inspections of Equipment and Materials and completed Work are set forth elsewhere in these Contract Documents.
      b. The party specified responsible for testing or inspection shall in each case, unless otherwise specified, arrange for the testing laboratory or reporting agency to distribute test reports as follows:
         (1) Owner: Two copies.
         (2) Engineer: One electronic copy.
         (3) Resident Project Representative: One electronic copy.
         (4) Contractor: Two copies.
         (5) Manufacturer or Supplier: One copy.

C. Engineer's Review:
   1. Engineer will review informational Submittals for indications of Work or Material deficiencies.
   2. Engineer will respond to Contractor on those informational Submittals which indicate Work or Material deficiency.

PART 2 - EXECUTION - NOT APPLICABLE.

PART 3 - EXECUTION - NOT APPLICABLE.

END OF SECTION 01 33 00

SECTION 01 42 00 – DEFINITIONS AND STANDARDS TEST

PART 1 - GENERAL

1.01 SUMMARY:

A. Definitions:

1. Basic contract definitions used in the Contract Documents are defined in the GENERAL CONDITIONS. Definitions and explanations are not necessarily either complete or exclusive, but are general for the Work.
2. General Requirements are the provisions or requirements of DIVISION 01 Sections, which apply to the entire Work of the Contract.

1.02 RELATED REQUIREMENTS:

A. Specification standards and associations applicable to the Work are specified in each Section.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATIONS:

A. Specification Format: The Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's (CSI) Section Format and Master Format numbering system. Some portions may not fully comply, and no particular significance will be attached to such compliance or noncompliance.

1. Divisions and Sections: For convenience, a basic unit of Specification text is a "Section," each unit of which is numbered and named. These are organized with related Sections, into "Divisions," which are recognized as the present industry consensus on uniform organization and sequencing of Specifications. The Section title is not intended to limit meaning or content of Section, nor to be fully descriptive of requirements specified therein, nor to be an integral part of text.
2. Section Numbering: Used for identification and to facilitate cross-references in Contract Documents. Sections are placed in numeric sequence; however, numbering sequence is not complete, and listing of Sections in Table of Contents at beginning of the Project Manual must be consulted to determine numbers and names of Specification Sections in these Contract Documents.
3. Page Numbering: Numbered independently for each Section. Section number is shown with page number at bottom of each page, to facilitate location of text.
4. Parts: Each Section of Specifications generally has been subdivided into three basic "parts" for uniformity and convenience (PART 1 - GENERAL, PART 2 - PRODUCTS, and PART 3 - EXECUTION). These "Parts" do not limit the meaning of text within. Some Sections may not contain all three "Parts" when some are not applicable, or may contain more than three "Parts" to add clarity to organization of Section.
5. Underscoring of Titles: Used strictly to assist reader of Specification in scanning text for key words in content. No emphasis on or relative importance is intended except where underscoring may be used in body of text to emphasize a duty, critical requirement, or similar situation.
6. Project Identification: Project file number and identification are recorded at bottom of each page of Specifications to minimize possible misuse of Specifications, or confusion with other Project Specifications.

B. Specification Content:

1. These Specifications apply certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
    a. Imperative and Streamlined Language: These Specifications are written in imperative and abbreviated form. This imperative language of the technical

Sections is directed at the Contractor, unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall," "the Contractor shall," and "shall be," and similar mandatory phrases by inference in the same manner as they are applied to notes on the Drawings. The words "shall be" shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated imperatively or otherwise.

b. Specifying Methods: The techniques or methods of specifying requirements varies throughout text, and may include "prescriptive," "compliance with standards," "performance," "proprietary," or a combination of these. The method used for specifying one unit of Work has no bearing on requirements for another unit of Work.

c. Overlapping and Conflicting Requirements: Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, notify Engineer in writing for a decision, which Engineer will render in writing within a reasonable time.

d. Abbreviations: Throughout the Contract Documents are abbreviations implying words and meanings which shall be appropriately interpreted. Specific abbreviations have been established, principally for lengthy technical terminology and in conjunction with coordination of Specification requirements with notations on Drawings and in schedules. These are normally defined at first instance of use. Organizational and association names and titles of general standards are also abbreviated.

C. Assignment of Specialists: In certain instances, Specification text requires that specific Work be assigned to specialists in the operations to be performed. These specialists shall be engaged for performance of those units of Work, and assignments are requirements over which Contractor has no choice or option. These assignments shall not be confused with, and are not intended to interfere with, enforcement of building codes and similar regulations governing the Work, local trade and union jurisdictions, and similar conventions. Nevertheless, final responsibility for fulfillment of Contract requirements remains with Contractor.

D. Trades: Except as otherwise specified or indicated, the use of titles such as "carpentry" in Specification text, implies neither that the Work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradespersons of that corresponding generic name.

1.04 DRAWING SYMBOLS:

A. Except as otherwise indicated, graphic symbols used on Drawings are those symbols recognized in the construction industry for purposes indicated. Refer instances of uncertainty to Engineer for clarification.

1.05 INDUSTRY STANDARDS:

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference and are stated in each Section.

1. Referenced standards, referenced directly in Contract Documents or by governing regulations, have precedence over non-referenced standards which are recognized in industry for applicability to the Work.

2. Where compliance with an industry standard is required, the latest standard in effect at time of opening Bids shall govern.
3. Where an applicable code or standard has been revised and reissued after the effective date of the Contract and before performance of Work affected by the revision, Engineer will decide whether to issue a Change Order to proceed with the revised standard.
4. In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to Engineer for a decision before proceeding.
5. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
    a. Where copies of standards are needed for performance of a required construction activity, Contractor shall obtain copies directly from the publication source.

B. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision.

PART 2 - PRODUCTS - NOT APPLICABLE.

PART 3 - EXECUTION - NOT APPLICABLE.

END OF SECTION 01 42 00

SECTION 01 51 00 – TEMPORARY UTILITIES AND FACILITIES

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes requirements of a temporary nature not normally incorporated into final Work. It includes the following:
   1. Utility services.
   2. Construction and support facilities.
   3. Construction aids.
   4. Safety and health.
   5. Fire protection.

1.02 RELATED REQUIREMENTS:

A. Temporary Barriers and Controls: Section 01 57 00.
B. Field Offices and Sheds: Section 01 52 00.

1.03 REFERENCE STANDARDS:

A. American National Standards Association (ANSI):
   1. A10 Series - Safety Requirements for Construction and Demolition.
B. National Electrical Contractors Association (NECA):
   1. Electrical Design Library - Temporary Electrical Facilities.
C. National Fire Protection Association (NFPA):
   1. 10 - Portable Fire Extinguishers.
   2. 70 - National Electrical Code.
   3. 241 - Safeguarding Construction, Alterations, and Demolition Operations.
D. National Electrical Manufacturers Association (NEMA).
E. Underwriters Laboratories (UL).

1.04 SUBMITTALS:

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

1.05 QUALITY ASSURANCE:

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
   1. Building Code requirements.
   2. Health and safety regulations.
   3. Utility company regulations.
   4. Police, Fire Department, and rescue squad rules.
   5. Environmental protection regulations.
B. Standards:
   1. Comply with NFPA 10 and 241, and ANSI A10 Series standards "Temporary Electrical Facilities.".
   2. Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.
C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.06 PROJECT CONDITIONS:

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of the permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous, dangerous, unsanitary conditions, or public nuisances to develop or persist on the Site.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

A. Provide new materials and equipment. If acceptable to Engineer, undamaged previously used materials and equipment in serviceable condition may be used. Provide materials and equipment suitable for the use intended, of capacity for required usage, and meeting applicable codes and standards. Comply with requirements of the Project Specifications.

B. Water: Provide potable water approved by local health authorities.

C. Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

D. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

E. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

F. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

G. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

H. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES:

A. General:

1. Engage the appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

2. Provide adequate utility capacity at each stage of construction. Prior to availability of temporary utilities at the Site, provide trucked-in services as required for start-up of construction operations.
3. Obtain and pay for temporary easements required to bring temporary utilities to the Project Site, where Owner's permanent easement cannot be used for that purpose.
4. Furnish, install, and maintain temporary utilities required for adequate construction, safety, and security. Modify, relocate, and extend systems as Work progresses. Repair damage caused by installation or use of temporary facilities. Grade the areas of Site affected by temporary installations to required elevations and grades, and clean the area. Remove on completion of Work or until service or facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
5. The types of temporary construction utilities and facilities required include, but not by way of limitation, water distribution, drainage, dewatering equipment, enclosure of Work, heat, ventilation, electrical power distribution, lighting, hoisting facilities, stairs, ladders, and roads.
6. Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities, and obtain required certifications and permits for use.
7. Materials used for temporary service shall not be used in the permanent system unless so specified or acceptable to Engineer.

B. Because of operational requirements, Owner may restrict or curtail Contractor's use of electric power and water. If these utilities are critical to Contractor's operations and completion of the Contract on the agreed schedule, Contractor shall consider furnishing alternate sources for its own use. Restriction or curtailment of these utilities shall not be a basis for a claim against Owner or an extension of the agreed schedule.

3.02 TEMPORARY ELECTRICITY AND LIGHTING:

A. New Service:
1. Arrange with utility company and provide service required for power and lighting.
2. Connect temporary service in a manner directed by utility company officials. Provide separate meter for metering of power used by all entities authorized to be at or perform Work at the Project Site.
3. The electric service shall be of sufficient capacity and characteristics for the various construction tools, machinery, lights, heating and air conditioning, pumps, and other tools required by Contractor and its Subcontractors.
4. Provide weatherproof, grounded, power distribution system sufficient to accommodate construction operations requiring power, use of power tools, electrical heating, and lighting. Provide overload protection. Locate multiple outlets spaced so that entire area of construction can be reached by power tools on a single extension cord of 100-foot maximum length. Supply power for electric welding, if any, from either temporary power distribution system or by engine-driven, power-generator sets at Contractor's option.
5. Provide all necessary temporary wiring, panelboards, switches, outlets, and other devices so that power and lighting is available throughout the construction area. Include meters, transformers, overload protection disconnects, automatic ground fault interrupters, and main distribution switch gear. Include overcurrent protection on all conductors of the temporary system.
6. Provide adequate artificial lighting for all areas of Work when natural light is not adequate for Work.

a. Sufficient light shall be provided for general construction areas and floor areas, with additional sufficient lighting for specific tasks and to meet safety requirements.

7. Owner's existing system may be used for temporary electricity.
8. Provide connections to existing facilities, size to provide service required for power and lighting.
9. Power Source: Make connections to Owner's service, located at point indicated or instructed by Owner.
10. Modify, supplement, and extend service as necessary to meet needed requirements and prevent overloading of existing system.
11. Protect system to prevent interference with Owner's normal usage.

B. Costs of Installation and Operation:
1. Pay fees and charges for permits and applications.
2. Pay costs of installation, maintenance, removal of temporary services, and restoration of any permanent facilities used.
3. Cost of power used will be paid by Owner.

3.03 TEMPORARY HEAT AND VENTILATION:

A. General:
1. Provide temporary heat, ventilation, and cooling as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage. Protect from adverse effects of low temperatures or high humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
2. Methods of heating and fuel shall be suitable for particular purposes. Portable heaters shall be standard approved units with controls.

B. Costs of Installation and Operation:
1. Pay fees and charges for applications, permits, and inspections.
2. Pay costs of installation, operation, maintenance, removal of equipment, and restoration of existing or permanent facilities if used.
3. Cost of power and fuel used will be paid by Owner.

3.04 TEMPORARY WATER:

A. New Service:
1. Arrange with utility service company to provide water for construction purposes.
2. Connect service to water main in a manner directed by utility company officials. Provide with meter and shut off valve near connection to the water main.
3. Size water service to provide adequate volume for all anticipated construction uses, and to maintain minimum required pressure.
4. Install piping with outlets located so that water is available throughout the construction area.
5. Prevent freezing of water distribution system. Maintain hose connections and outlet valves in leakproof condition.
6. Sterilize temporary water piping prior to use.
7. Owner's existing system may be used for temporary water.
8. Make connections to existing facilities to provide water for construction purposes.
a. Water Source: Make connections to Owner's service located at point indicated or where instructed by Owner.

9. Modify, supplement, and extend system as necessary to meet temporary water requirements and prevent overloading of existing system.
10. Regulate system to prevent interference with Owner's usage.

B. Costs of Installation and Operation:
1. Pay all costs for installation, maintenance, and removal.
2. Cost of water used will be paid by Owner.

3.05 TEMPORARY TELEPHONE SERVICE:

A. General:
1. Arrange with local cellular/mobile telephone service company and provide mobile telephone service for use by Contractor and so Contractor can be reached at construction Site during normal working hours.

B. Costs of Installation and Operation:
1. Pay all costs for installation, maintenance and removal, and service charges for service.

3.06 TEMPORARY GAS:

A. Use of Existing System:
1. Owner's existing system may be used for temporary gas.
2. Provide connections to existing facilities. Size to provide service required.
a. Gas Source: Make connections to Owner's service, located at point indicated or where instructed by Owner.
3. Modify, supplement and extend system as necessary to meet temporary gas requirements.
4. Regulate system to prevent interference with Owner's usage.

B. Costs of Installation and Operation:
1. Pay all costs for installation, maintenance, and removal.
2. Cost of gas used will be paid by Owner.

3.07 TEMPORARY SANITARY FACILITIES:

A. Contractor-Furnished Facilities:
1. Furnish, install, and maintain temporary sanitary facilities for use through construction period. Remove on completion of Work.
2. Provide for all construction workers under this Contract and representatives at the Site.
3. Toilet facilities shall be of the chemical, aerated recirculation, or combustion type, properly vented, and fully enclosed with a glass- fiber-reinforced polyester shell or similar nonabsorbent material.
4. Wash Facilities: Install potable water-supplied wash facilities at locations convenient to construction personnel involved in the handling of compounds and materials where wash-up is necessary to maintain a safe, healthy and sanitary condition. Where recommended or required by governing authorities and regulations or recognized standards provide emergency safety showers, emergency eye-wash fountains, showers, and similar facilities. Dispose of drainage properly. Supply soap and other cleaning compounds appropriate for each condition.
5. Drinking Water Fixtures: Provide containerized tap-dispenser type drinking water units.
6. Supply and maintain toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide appropriate covered waste containers for used material.

B. Use of Existing Facilities:
1. Existing restrooms facilities shall not be used.

3.08 SEWERS AND DRAINAGE:

A. General: Where sewers or drainage facilities are not available for discharge of effluent, provide containers to remove and dispose of effluent off the Site in a lawful manner. If existing sewers are available for temporary drainage near the Site prior to completion of permanent sewers, provide temporary connections to remove effluent that can be lawfully discharged into the sewers. If existing sewers cannot be used for discharge, provide drainage ditches, dry wells, waste stabilization ponds, and similar discharge facilities to remove effluent that can be lawfully discharged in that manner.

B. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy usage, restore to normal conditions promptly. Provide and maintain temporary earthen embankments and similar barriers in and around construction excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rain storms.

3.09 TEMPORARY CONSTRUCTION AIDS:

A. General:
   1. Provide construction aids and equipment required by personnel and to facilitate the execution of the Work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, and other such facilities and equipment.
   2. Materials may be new or used, must be suitable for the intended purpose, and meet the requirements of applicable codes, regulations, and standards.
   3. When permanent stair framing is in place, provide temporary treads, platforms, and railings for use by construction personnel.

B. Use of Existing Stairs, Elevators, Hoists, and Similar Facilities:
   1. Stairs in existing building shall not be used by construction personnel.

3.10 TEMPORARY ENCLOSURES:

A. New Construction:
   1. Provide temporary enclosure of exterior walls as Work progresses, to provide acceptable working conditions, weather protection for interior materials, allow for effective temporary heating, and to prevent entry of unauthorized persons.
      a. Provide temporary exterior doors with hardware, including being lockable.
      b. Other enclosures shall be removable as necessary for Work and for handling of materials.
   2. Restore permanent facilities used for temporary purposes to specified condition.

3.11 TEMPORARY SAFETY AND HEALTH:

A. General: Contractor shall be solely responsible for initiating, maintaining, and supervising all safety and health precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide necessary protections to prevent injury or loss to, all employees on the Work and other persons and organizations who may be affected thereby.

3.12 TEMPORARY FIRE PROTECTION:

A. General:
   1. Contractor shall be responsible for development of a fire prevention and protection program for all Work under this Contract.
   2. The program shall comply with the applicable provisions for safety and protection specified in the Contract Documents and with applicable parts of the NFPA 10 and 241.

3. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near such usable stairwell.
4. Store combustible materials in containers in fire-safe locations.
5. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
6. Provide supervision of welding operations and similar sources of fire ignition.
7. Post warning and instructions at each extinguisher location, and instruct construction personnel on proper use of extinguishers and other available facilities at Project Site. Post local fire department telephone number on or near each telephone instrument at Project Site.

3.13 INSTALLATION AND REMOVAL:

A. Relocation: Relocate construction aids as required by progress of construction, storage limitations, or Work requirements and to accommodate requirements of Owner and other contractors at the Site.

B. Removal: Remove temporary materials, equipment, and services when construction needs can be met and allowed by use of permanent construction, or at completion of the Project.

C. Repair: Clean and repair damage caused by installation or by use of temporary facilities.
   1. Remove foundations and underground installations for construction aids.
   2. Grade the areas of the Site affected by temporary installations to required elevations and clean the area.

END OF SECTION 01 51 00

SECTION 01 57 00 – TEMPORARY BARRIERS AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes General Requirements for:
   1. Safety and Protection of Work and Property.
   2. Barriers.
   3. Security and Protection Facilities Installation.
   4. Environmental Controls.
   5. Access Roads and Parking Areas.
   6. Traffic Control and Use of Roadways.
   7. Railroad Service.

1.02 RELATED REQUIREMENTS:

A. Section 01 10 00 - "Summary" for work restrictions and limitations.
B. Section 01 52 00 - "Field Offices and Sheds."

PART 2 - PRODUCTS

2.01 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts.
B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
C. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.01 SAFETY AND PROTECTION OF WORK AND PROPERTY:

A. General:
   1. Provide for the safety and protection of the Work and of Materials and Equipment to be incorporated therein, whether in storage on or off the Site. Provide protection at all times against rain, wind, storms, frost, freezing, condensation, or heat so as to maintain all Work and Equipment and Materials free from injury or damage. At the end of each day, all new Work likely to be damaged shall be appropriately protected.
   2. Notify Engineer immediately at any time operations are stopped due to conditions which make it impossible to continue operations safely or to obtain proper results.
   3. Construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations, floors, pits, trenches, manholes, and ducts free of water.
   4. Protect floors from damage by proper covering and care when handling heavy equipment, painting, or handling mortar or other such materials. Use proper cribbing and shoring to prevent overloading of floors while moving heavy equipment. Provide metal pans under pipe-threading machines and clean such pans daily, keeping oil off floors. Restore floors to former condition where damaged or stained.

5. Concrete floors less than 28 days old shall not be loaded without written permission from Engineer.
6. Restrict access to roofs except as required by the Work. Where access is required, provide protection with plywood, boards, or other suitable materials.

B. Property Other than Owner's:
1. Provide for the safety and protection of property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction. Report immediately to the owners thereof and promptly repair damage to existing facilities resulting from construction operations.
2. Names and telephone numbers of representatives of agencies and utilities having jurisdiction over streets and utilities in the Work area [are listed below for Contractor's convenience.][can be obtained from Engineer for the agencies listed below.] Concerned agencies or utilities shall be contacted a minimum of 24 hours prior to performing Work, closing streets and other traffic areas, or excavating near underground utilities or pole lines.
3. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.
4. Where fences are to be breached on private property, the owners thereof shall be contacted, and arrangements made to ensure proper protection of any livestock or other property thus exposed.
5. The applicable requirements specified for protection of the Work shall also apply to the protection of existing property of others.
6. Before acceptance of the Work by Owner, restore all property affected by Contractor's operations to the original or better condition.

3.02 BARRIERS:

A. General:
1. Furnish, install, and maintain suitable barriers as required to prevent public entry, to protect the public, and to protect the Work, existing facilities, trees, and plants from construction operations. Remove when no longer needed or at completion of Work.
2. Materials may be new or used, suitable for the intended purpose, but shall not violate requirements of applicable codes and standards or regulatory agencies.
3. Barriers shall be of a neat and reasonable uniform appearance, structurally adequate for the required purposes.
4. Maintain barriers in good repair and clean condition for adequate visibility. Relocate barriers as required by progress of Work.
5. Repair damage caused by installation and restore area to original or better condition. Clean the area.

B. Tree and Plant Protection:
1. Preserve and protect existing trees and plants at the Site which are designated to remain and those adjacent to the Site.
2. Provide temporary barriers around each, or around each group of trees and plants. Construct to a height of six feet around trees, and to a diameter at the drip line or five feet from trunk, whichever is greater, to adequately protect plants.
3. Consult with Engineer and remove agreed-on roots and branches which will interfere with construction. Employ qualified tree surgeon to remove and to treat cuts.
4. Protect root zones of trees and plants as follows:
   a. Do not allow vehicular traffic or parking.

b. Do not store materials or products.
c. Prevent dumping of refuse or chemically injurious materials or liquids.
d. Prevent puddling or continuous running water.

5. Carefully supervise excavating, grading and filling, and subsequent construction operations to prevent damage.
6. Remove and replace, or suitably repair, trees and plants which are damaged or destroyed due to construction operations, and which were designated to remain.

3.03 ENVIRONMENTAL CONTROLS:

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
   1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Comply with work restrictions specified in Section 01 10 00 - "Summary."

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
   1. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
   2. Hold the areas of bare soil exposed at one time to a minimum.
   3. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
   4. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
   5. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
   6. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control:
   1. Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
   2. Provide methods to control surface water to prevent damage to the Project, the Site, or adjoining properties.
   3. Provide temporary control measures such as berms, dikes, and drains.
   4. Control fill, grading, and ditching to direct surface drainage away from excavations, pits, tunnels, and other construction areas; and to direct drainage to proper runoff.
   5. Provide, operate, and maintain hydraulic equipment of adequate capacity to control surface and groundwater.
   6. Provide temporary drainage where the roofing or similar waterproof deck construction is completed prior to the connection and operation of the permanent drainage piping system.

E. Tree and Plant Protection: Comply with requirements specified in Section 01 56 39 - "Temporary Tree and Plant Protection."

F. Dust Control:
   1. Provide positive methods and apply dust control materials to minimize raising dust from construction operations; and to prevent airborne dust from dispersing into the atmosphere.
   2. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
   3. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

G. Debris Control and Clean-Up:
   1. Keep the premises free at all times from accumulations of debris, waste materials, and rubbish caused by construction operations and employees. Responsibilities shall include:
      a. Adequate trash receptacles about the Site, emptied promptly when filled.
      b. Periodic cleanup to avoid hazards or interference with operations at the Site and to maintain the Site in a reasonably neat condition.
      c. The keeping of construction materials such as forms and scaffolding neatly stacked.
      d. Immediate cleanup to protect the Work by removing splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from walls, floors, and metal surfaces before surfaces are marred.
   2. Prohibit overloading of trucks to prevent spillages on access and haul routes. Provide periodic inspection of traffic areas to enforce requirements.
   3. Final cleanup is specified in Section 01 78 00 - Contract Closeout.

H. Pollution Control:
   1. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of hazardous or toxic substances from construction operations.
   2. Provide equipment and personnel, perform emergency measures required to contain any spillages, and remove contaminated soils or liquids. Excavate and dispose of any contaminated earth off-Site in approved locations, and replace with suitable compacted fill and topsoil.
   3. Take special measures to prevent harmful substances from entering public waters, sanitary, or storm sewers.

3.04 ACCESS ROADS AND PARKING AREAS:

A. New Temporary On-Site Roads and Parking Areas:
   1. Locate roads, drives, walks, and parking facilities to provide access to construction offices, mobilization, Work, storage areas, and other areas required for execution of the Contract.
      a. Consult with Engineer regarding any desired deviation therefrom.
      b. Size of parking facilities shall be adequate to provide for needs of Contractor's personnel, Resident Project Representatives, and visits to Site by Engineer and Owner.
   2. Provide access for emergency vehicles. Maintain driveways a minimum of 15 feet wide between and around combustible materials in storage and mobilization areas.
   3. Maintain traffic areas free of excavated materials, construction equipment, snow, ice, and debris.

4. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
5. Keep fire hydrants and water control valves free from obstruction and accessible for use.
6. Construction:
    a. Clear areas required.
    b. Fill, compact, and grade areas as necessary to provide suitable support for vehicular traffic under anticipated loadings. Materials and construction shall be as specified in Project Documents.
    c. Provide for surface drainage of facilities and surrounding areas.
    d. Maintain roads, walks, and parking areas in a sound, clean condition. Repair or replace portions damaged during progress of Work.
7. Removal:
    a. Completely remove temporary materials and construction when construction needs can be met by use of permanent installation, unless construction is to be integrated into permanent construction. Remove and dispose of compacted materials to depths required by various conditions to be met in completed Work.
    b. Restore areas to original, better, or specified condition at completion of Work.

B. Existing On-Site Roads and Parking Areas:
1. Do not allow existing on-Site streets, parking facilities, or walks to be used for construction traffic, equipment, or personnel.

3.05 TRAFFIC CONTROL AND USE OF ROADWAYS:

A. Traffic Controls:
1. Comply with requirements of authorities having jurisdiction.
2. Protect existing site improvements to remain including curbs, pavement, and utilities.
3. Maintain access for fire-fighting equipment and access to fire hydrants.
4. Provide, operate, and maintain equipment, services, and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow on haul routes, at Site entrances, on-Site access roads, and parking areas. This includes traffic signals and signs, flagmen, flares, lights, barricades, and other devices or personnel as necessary to adequately protect the public.
5. Remove temporary equipment and facilities when no longer required. Restore grounds to original, better, or specified condition when no longer required.
6. Provide and maintain suitable detours or other temporary expedients if necessary.
7. Bridge over open trenches where necessary to maintain traffic.
8. Consult with governing authorities to establish public thoroughfares which will be used as haul routes and Site access. All operations shall meet the approval of owners or agencies having jurisdiction.

B. Parking: Provide temporary parking areas for construction personnel.

C. Maintenance of Roadways:
1. Repair roads, walkways, and other traffic areas damaged by operations. Keep traffic areas as free as possible of excavated materials and maintain in a manner to eliminate dust, mud, and hazardous conditions.
2. All operations and repairs shall meet the approval of owners or agencies having jurisdiction.

A. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in locations approved by Owner.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

SECTION 01 60 00 – EQUIPMENT AND MATERIALS

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes administrative and procedural requirements governing Contractor's selection of products for use in the Project.

1.02 RELATED REQUIREMENTS:

A. The following Sections contain requirements that relate to this Section:
B. For the applicability of industry standards to products specified: Reference Project Manual
C. For submittal of Contractor's construction progress schedule and the Submittal schedule: Sections 01 32 00 and 01 33 00.
D. For handling requests for substitutions made after award of the Contract: Section 01 25 00.

1.03 DEFINITIONS:

A. Definitions used in this Article are not intended to change the meaning of other terms used in these Contract Documents, such as "specialties," "systems," "structures," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
    1. "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 "Material," "Equipment," "system," and terms of similar intent.
        a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
        b. "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50% or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50%) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
    2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
    3. "Equipment" is a product with operational or nonoperational parts, whether motorized, or manually operated, that may require service connections, such as wiring or piping.

1.04 SUBMITTALS:

A. Submittal of preliminary procurement schedule is specified in Section 01 32 00 - Construction Progress Schedules and Reports.
B. Submittals for products are specified in Section 01 33 00.

1.05 QUALITY ASSURANCE:

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
    1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete Project requirements in a timely manner, consult with Engineer to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility.

When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:
   1. No available domestic product complies with the Contract Documents.
   2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.

D. Nameplates: Along with required labels and operating data, manufacturer or producer's nameplates, imprints, or trademarks may be placed on surfaces exposed to view.
   1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
   2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated Equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
      a. Name of product and manufacturer including address (and telephone number).
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

E. Electronic Equipment Compliance:
   1. Contractor warrants that all equipment, devices, items, systems, software, hardware, or firmware provided shall properly, appropriately, and consistently function and accurately process date and time data including without limitation: calculating, comparing, and sequencing. This warranty supersedes anything in the Specifications or other Contract Documents which might be construed inconsistently. This warranty is applicable whether the equipment, device, item, system, software, hardware, or firmware is specified with or without reference to a manufacturer's name, make, or model number.

1.06 TRANSPORTATION AND SHIPMENT:

A. Shipment Preparation:
   1. Contractor shall require manufacturers and Suppliers to prepare products for shipment in a manner to facilitate unloading and handling, and to protect against damage, deterioration, or unnecessary exposure to the elements in transit and storage. Provisions for protection shall include the following:
      a. Crates or other suitable packaging materials.
      b. Covers and other means to prevent corrosion, moisture damage, mechanical injury, and accumulation of dirt in motors, electrical equipment, and machinery.
      c. Suitable rust-preventive compound on exposed machined surfaces and unpainted iron and steel.
      d. Grease packing or oil lubrication in all bearings and similar items.

B. Marking: Each product item shall be tagged or marked as identified in the delivery schedule or on Submittals. Complete packing lists and bills of material shall be included with each shipment. Each piece of every item need not be marked separately, provided that all pieces of

each item are packed or bundled together and the packages or bundles are properly tagged or marked.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
   1. Schedule delivery to minimize long-term storage at the Site and to prevent overcrowding of construction spaces. Allow ample time to avoid delay of the Work.
   2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to the Site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected. Inspect shipment to assure:
      a. Product complies with requirements of Contract Documents and reviewed Submittals.
      b. Quantities are correct.
      c. Containers and packages are intact and labels are legible.
      d. Products are properly protected and undamaged.
   5. Store products at the Site in a manner that will facilitate inspection and measurement of quantity or counting of units. Mark deliveries of component parts of Equipment to identify the Equipment, to permit easy accumulation of parts, and to facilitate inspection and measurement of quantity or counting of units.
   6. Store heavy Materials away from the Project structure in a manner that will not endanger the supporting construction.
   7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, and with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
   8. Protect motors, electrical Equipment, plumbing fixtures, and machinery of all kinds against corrosion, moisture deteriorations, mechanical injury, and accumulation of dirt or other foreign matter.
   9. Protect exposed machined surfaces and unpainted iron and steel as necessary with suitable rust-preventive compounds.
   10. Protect bearings and similar items with grease packing or oil lubrication.
   11. Handle and store steel plate, sheet metal, and similar items in a manner to prevent deformation.
   12. For storage of pipe and other products on easements and rights-of-way in residential and commercial areas, do not exceed the minimum required by scheduled laying operations, and conform to all requirements of public authorities. Store or place pipe along roads, set back from shoulder or curb, and at an angle tending to deflect vehicles if struck. Place or block pipe to preclude its accidental movement.

B. Handling:
   1. Provide equipment and personnel necessary to unload and handle products, by methods to prevent damage or soiling to products, or packaging.
   2. Handle by methods to prevent bending or overstressing. Where lifting points are designated, lift components only at those points.
   3. Provide additional protection to surrounding surfaces as necessary to prevent damage.

C. Maintenance of Storage:
   1. Inspect stored products on a scheduled basis.
   2. Verify that storage facilities comply with manufacturer's product storage requirements, including environmental conditions continually maintained.
   3. Verify that surfaces of products exposed to elements are not adversely affected; that any weathering of finishes is acceptable under requirements of Contract Documents.
   4. For mechanical and electrical Equipment in long-term storage, provide manufacturer's service instructions to accompany each item, with notice of enclosed instructions on exterior of package. Service Equipment on a regularly scheduled basis.

D. Protection After Installation: Provide substantial coverings as necessary to protect installed products from damage from subsequent construction operations. Remove coverings when no longer needed or as specified.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION:

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise specified or indicated, new at the time of installation.
   1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
   2. Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Continued Availability: Where, because of the nature of its application, Owner is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard products for which the manufacturer has published assurances that the products and its parts are likely to be available to Owner at a later date.
   4. Conform to applicable Specifications, codes, standards, and regulatory agencies.
   5. Comply with size, make, type, and quality specified, or as specifically approved in writing by Engineer.
   6. Manufactured and Fabricated Products:
      a. Design, fabricate, and assemble in accordance with the best engineering and shop practices.
      b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
      c. Equipment and Materials shall be suitable for service conditions intended.
      d. Equipment capacities, sizes, and dimensions indicated or specified shall be adhered to unless variations are specifically approved in writing by Engineer.
      e. Provide labels and nameplates where required by regulatory agencies or to state identification and essential operating data.
   7. Do not use products for any purpose other than that for which designed.
   8. To the fullest extent possible, provide products of the same kind from a single source.

PART 3 - EXECUTION

3.01 INSTALLATION OF PRODUCTS:

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place except as required for proper movement and performance, and accurately located and aligned with other Work.

1. Obtain and distribute copies of manufacturer's printed instructions and recommendations if not a part of Submittals, containers, or packaging to parties involved in the installation, including a copy to Engineer [and Resident Project Representative].
2. Maintain one complete set of instructions at the Site during installation and until completion.
3. Handle, install, connect, clean, condition, and adjust products in accordance with such instructions and in conformance with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.

B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 60 00

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY:

A. Definition: Cutting and patching includes cutting into existing construction to provide for the installation of Work, and the repair required to restore materials to their original or better condition.
   1. Cutting and patching is performed for coordination of the Work, to uncover Work for access or inspection, to obtain samples for testing, to permit alterations to be performed, or for other similar purposes.
   2. Cutting and patching performed during the manufacture of products or during the initial fabrication, erection, or installation process is not considered to be cutting and patching under this definition. Drilling of holes to install fasteners and similar operations is also not considered to be cutting and patching.

1.02 RELATED REQUIREMENTS:

A. Refer to Project Documents for demolition of selected portions for performance of the Work.
B. Refer to other Sections of these Specifications for specific cutting and patching requirements and limitations applicable to individual units of Work.

1.03 SUBMITTALS:

A. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
   1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
   2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
   3. List products to be used and firms or entities that will perform Work.
   4. Indicate dates when cutting and patching will be performed.
   5. List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
   6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
   7. Approval by Engineer to proceed with cutting and patching does not waive Engineer's right to later require complete removal and replacement of defective Work.

1.04 QUALITY ASSURANCE:

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
   1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
      a. Foundation construction.
      b. Bearing and retaining walls.
      c. Structural concrete.
      d. Structural steel.

e. Lintels.
f. Timber and primary wood framing.
g. Structural decking.
h. Stair systems.
i. Miscellaneous structural metals.
j. Exterior curtain-wall construction.
k. Equipment supports.
l. Piping, ductwork, vessels, and Equipment.
m. Structural systems for special construction.

B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
a. Primary operational systems and Equipment.
b. Air or smoke barriers.
c. Water, moisture, or vapor barriers.
d. Membranes and flashings.
e. Fire protection systems.
f. Noise and vibration control elements and systems.
g. Control systems.
h. Communication systems.
i. Conveying systems.
j. Electrical wiring systems.
k. Operating systems for special construction.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Engineer's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually satisfactory manner.
1. If possible, retain the original installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
a. Processed concrete finishes.
b. Stonework and stone masonry.
c. Ornamental metal.
d. Matched-veneer woodwork.
e. Preformed metal panels.
f. Firestopping.
g. Window wall system.
h. Stucco and ornamental plaster.
i. Acoustical ceilings.
j. Terrazzo.
k. Finished wood flooring.
l. Fluid-applied flooring.
m. Carpeting.
n. Aggregate wall coating.
o. Wall covering.

p. Swimming pool finishes.
q. HVAC enclosures, cabinets, or covers.

1.05 WARRANTY:

A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. GENERAL: Except as otherwise indicated, specified, or as directed by Engineer, use materials for cutting and patching that are identical to existing materials. If identical materials are not available or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.01 ÍNSPECTION:

A. Before cutting, examine the surfaces to be cut and patched and the conditions under which the Work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the Work.
B. Before the start of cutting Work, meet at the Project site with all parties involved in cutting and patching. Review areas of potential interference and conflict between the various trades. Coordinate procedures and resolve potential conflicts before proceeding with the Work.

3.02 PREPARATION:

A. Temporary Support: Provide adequate temporary support of Work to be cut to prevent failure.
B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that may be exposed during cutting and patching operations. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
C. Precautions: Take precautions not to cut existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated, until provisions have been made to bypass them.

3.03 PERFORMANCE:

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete Work without delay.
   1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
B. Cutting:
   1. Cut existing construction using methods that are least likely to damage elements to be retained, or adjoining construction. Where possible, review proposed procedures with the original installer.
   2. In general, when cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill. Cut holes and slots as small

as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

3. Comply with requirements of applicable Sections of DIVISION 31 where cutting and patching requires excavating and backfilling.
4. Bypass utility services such as pipe and conduit before cutting, where such utility services are shown or required to be removed, relocated, or abandoned. Cut off conduit and pipe in walls or partitions to be removed. After bypass and cutting, cap, valve, or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

C. Patching:
1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the Work.
2. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
3. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining Work in a manner which will eliminate evidence of patching and refinishing.
4. Where removal of walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. If necessary to achieve uniform color and appearance, remove existing floor and wall coverings and replace them with new materials.
    a. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and second coat.
5. Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.04 CLEANING:

A. Thoroughly clean areas and spaces where Work is performed. Remove dirt, dust, grease, paint splatter, mortar, oils, sealants, and items of similar nature. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

SECTION 01 78 00 – CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes administrative and procedural requirements for Contract closeout including, but not limited to, the following:
   1. Inspection procedures.
   2. Project record document submittal.
   3. Instruction book and operating manual submittal.
   4. Submittal of warranties.
   5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections of the Specifications.

1.02 RELATED REQUIREMENTS:

A. Prerequisites to Substantial Completion and Final Acceptance: GENERAL CONDITIONS.
B. Submittals: Section 01 33 00.
C. Warranties: Section 01 78 36.

1.03 SUBSTANTIAL COMPLETION:

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
   1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100% completion for the portion of the Work claimed as Substantially Complete.
      a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Price.
      b. If 100% completion cannot be shown, include a list of incomplete items, the value of incomplete Work, and reasons the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship Bonds, maintenance agreements, final certifications, and similar documents.
   4. Obtain and submit releases enabling Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Submit record drawings, instruction books and operating manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver tools, spare parts, extra stock, and similar items.
   7. Make final changeover of permanent locks and transmit keys to Owner. Advise Owner's personnel of changeover in security provisions.
   8. Complete start-up testing of systems and instruction of Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the Site, along with mockups, construction tools, and similar elements.
   9. Complete final cleanup requirements, including touchup painting.
   10. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, Engineer will either proceed with inspection or advise Contractor of unfilled requirements. Engineer will prepare the

Certificate of Substantial Completion following inspection or advise Contractor of construction that must be completed or corrected before the certificate will be issued.

1. Engineer will repeat inspection when requested and assured by Contractor that the Work is Substantially Complete.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE:

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
   1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
   2. Submit an updated final statement, accounting for final additional changes to the Contract Price.
   3. Submit a certified copy of Engineer's final inspection list of items to be completed or corrected, endorsed, and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by Engineer.
   4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the Date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
   5. Submit consent of surety to final payment.
   6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure: Engineer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to Engineer.
   1. Upon completion of reinspection, Engineer will prepare a certificate of final acceptance. If the Work is incomplete, Engineer will advise Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
   2. If necessary, reinspection will be repeated.

1.05 RECORD DOCUMENT SUBMITTALS:

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for Engineer's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   1. Record information concurrently with construction progress.
   2. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Mark each document "PROJECT RECORD" in neat, large, printed letters.

3. Mark new information that is important to Owner but was not shown on Contract Drawings or Shop Drawings.
4. Note related Change Order numbers where applicable.
5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
6. Upon completion of the Work, submit record drawings to Engineer for Owner's records.
7. Include the following:
    a. Depths of various elements of foundation in relation to finish first floor datum.
    b. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
    c. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of construction.
    d. Where Submittals are used for mark-up, record a cross-reference at corresponding location on Drawings.
    e. Field changes of dimension and detail.
    f. Changes made by Change Order or other Modifications.
    g. Details not on original Contract Drawings.

C. Record Specifications: Maintain one complete copy of the Project Manual including Addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and Modifications issued in printed form during construction.
1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
3. Note related record drawing information and product data.
4. Upon completion of the Work, submit record Specifications to Engineer for Owner's records.
5. Include the following:
    a. Manufacturer, trade name, catalog number, and Supplier of each product and item of Equipment actually installed, particularly optional and substitute items.
    b. Changes made by Addendum, Change Order, or other Modifications.
    c. Related Submittals.

D. Record Product Data: Maintain one copy of each product data Submittal. Note related Change Orders and markup of record drawings and specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Site and from the manufacturer's installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit complete set of record product data to Engineer for Owner's records.

E. Record Samples Submitted: Immediately prior to Substantial Completion, Contractor shall meet with Engineer and Owner's personnel at the Project Site to determine which Samples are to be transmitted to Owner for record purposes. Comply with Owner's instructions regarding packaging, identification, and delivery to Owner.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and Submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete

miscellaneous records, and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to Engineer for Owner's records.

G. Instruction Books and Operating Manuals: Organize operation and maintenance data into suitable sets of manageable size as specified in Section 01 33 00.

H. Electronic Documentation:
   1. In addition to paper copies, provide electronic versions of record documents showing "as-constructed" conditions, "as-constructed" construction progress schedule, master field drawing list showing final revisions, instruction books, and operating manuals on CD-ROM in Adobe *PDF format.

I. Warranties and Bonds: Specified in GENERAL CONDITIONS, Section 01 33 00, and Section 01 78 36.

1.06 SPARE PARTS:

A. Products Required:
   1. Provide to Owner the quantities of products, spare parts, maintenance tools, and maintenance materials specified in individual Sections, in addition to that required for completion of Work.
   2. Products shall be identical to those installed in the Work. Include quantities required from Supplier or manufacturer of original purchase to avoid variations in manufacture.

B. Storage, Maintenance:
   1. Coordinate with Owner. Deliver and unload spare products to Owner at Project Site and obtain receipt prior to final payment.
   2. For portions of the Work accepted and occupied by Owner prior to Substantial Completion, deliver the applicable spare products to Owner at time of acceptance. Obtain receipt.
   3. Maintain spare products in original containers with labels intact and legible, until delivery to Owner.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 CLOSEOUT PROCEDURES:

A. Operation and Maintenance Instructions: Arrange for each installer of Equipment that requires regular maintenance to meet with Owner's personnel at Project Site to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
   1. Instruction books and operating manuals.
   2. Record documents.
   3. Spare parts and materials.
   4. Tools.
   5. Lubricants.
   6. Fuels.
   7. Identification systems.
   8. Control sequences.
   9. Hazards, hazardous chemicals data sheets.
   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.

C. Manufacturer's Field Services: Specified in Section 01 75 00.

3.02 FINAL CLEANING:

A. General: Contractor shall keep the Site premises free from accumulations of waste materials, rubbish, and other debris resulting from the Work. Regular Site cleaning is included in Section 01 57 00.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
      a. Remove labels that are not permanent labels.
      b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
      c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Clean concrete floors to a "broom clean" condition. Vacuum carpeted surfaces.
      d. Wipe surfaces of mechanical and electrical Equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
      e. Remove debris and surface dirt from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.
      f. Clean the Site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
      g. Clean and polish plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.
      h. Clean light fixtures and lamps so as to function with full efficiency.
   2. Remove temporary structures, tools, equipment, supplies, and surplus materials.
   3. Remove temporary protection devices and facilities which were installed to protect previously completed Work.
   4. Special Cleaning: Cleaning for specific units of Work is specified in applicable Sections of Specifications.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the Site and dispose of lawfully.
   1. Extra materials of value remaining after completion of associated Work become Owner's property. Dispose of these materials as directed by Owner.

E. Repairs:
   1. Repair damaged protective coated surfaces.
   2. Repair roads, walks, fences, and other items damaged or deteriorated because of construction operations.
   3. Restore all ground areas affected by construction operations.

END OF SECTION 01 78 00

SECTION 01 78 36 – WARRANTIES

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
   1. Refer to the GENERAL CONDITIONS for terms of the Contractor's period for correction of the Work.

1.02 RELATED SECTIONS:

A. The following Sections contain requirements that relate to this Section:
   1. Procedures for submitting warranties: Section 01 33 00.
   2. Contract closeout procedures: Section 01 78 00.
   3. Specific requirements for warranties on products and installations specified to be warranted are as specified in the Contract Documents.
   4. Certifications and other commitments and agreements for continuing services to Owner: Specified throughout the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve Suppliers, manufacturers, and Subcontractors required to countersign special warranties with Contractor.

1.03 DEFINITIONS:

A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by manufacturer to Owner.

B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for Owner.

1.04 WARRANTY REQUIREMENTS:

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Expressed warranties made to Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the Law. Expressed warranty periods shall not be interpreted as limitations on the time in which Owner can enforce such other duties, obligations, rights, or remedies.
   1. Rejection of Warranties: Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, Owner reserves the right to refuse to accept the Work, until Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS:

A. Submit written warranties to Engineer prior to the date certified for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the Date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of Engineer.
   1. When a designated portion of the Work is completed and occupied or used by Owner, by separate agreement with Contractor during the construction period, submit properly executed warranties to Engineer within 15 days of completion of that designated portion of the Work.

B. When the Contract Documents require Contractor, or Contractor and a Subcontractor, Supplier, or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by required parties. Submit a draft to Owner, through Engineer, for approval prior to final execution.

C. Forms for special warranties are included at the end of this Section. Prepare a written document using the appropriate form, ready for execution by Contractor, or by Contractor and a Subcontractor, Supplier, or manufacturer. Submit a draft to Owner, through Engineer, for approval prior to final execution.
   1. Refer to specifications for specific content requirements and particular requirements for submitting special warranties.

D. Form of Submittal: At Final Completion, compile two copies of each required warranty properly executed by Contractor, or by Contractor and a Subcontractor, Supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Contract Documents.

E. Bind warranties and bonds in heavy-duty, commercial-quality, durable three-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
   2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," and as required by Section 01 33 00.
   3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION – NOT APPLICABLE

QUALITY LIQUID FEED EXPANSION

TECHNICAL SPECIFICATIONS

All Work shall be performed in accordance with the Technical Specifications contained herein.

Where work required by the CONTRACT DOCUMENTS is not addressed by these Technical Specifications, the "Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction" shall apply.

Where conflicts between these Technical Specifications and the CONTRACT DOCUMENTS exist, the CONTRACT DOCUMENTS shall govern.

SECTION 03 30 53 – MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. This Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes, for cast-in-place concrete besides that used for bridge structures or covered by other specifications contained within Division 02.

B. Related Sections, if applicable to the Project:

1. Section 31 20 00 - Site Preparation and Earthwork
2. Section 32 13 13 - Concrete Pavement

1.03 REFERENCE STANDARDS:

A. Applicable Standards:

1. Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.
2. American Association of State Highway and Transportation Officials:
   a. AASHTO M 182-2005 (Reapproved 2009) - Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats.
3. American Concrete Institute:
   a. ACI 117-2010 - Specifications for Tolerances for Concrete Construction and Materials.
   b. ACI 301-2010 - Specifications for Structural Concrete.
   c. ACI 302.1R-2004 - Guide for Concrete Floor and Slab Construction.
   d. ACI 305R-2010 - Guide to Hot Weather Concreting.
   e. ACI 306R-2010 - Guide to Cold Weather Concreting.
   f. ACI 308.1-2011 - Specification for Curing Concrete.
   g. ACI SP-66-2004 - ACI Detailing Manual.
4. ASTM International:
   a. ASTM A82 - Specification for Steel Wire, Plain, for Concrete Reinforcement.
   b. ASTM A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   c. ASTM A1064 - Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
   d. ASTM C31 - Practice for Making and Curing Concrete Test Specimens in the Field.
   e. ASTM C33 - Specification for Concrete Aggregates.
   f. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   g. ASTM C94 - Specification for Ready-Mixed Concrete.
   h. ASTM C143 - Test Method for Slump of Hydraulic-Cement Concrete.
   i. ASTM C150-09 - Specification for Portland Cement.
   j. ASTM C171-07 - Specification for Sheet Materials for Curing Concrete.
   k. ASTM C173 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
   l. ASTM C231-09b - Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   m. ASTM C260-06 - Specification for Air-Entraining Admixtures for Concrete.

n. ASTM C309-07 - Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
o. ASTM C330 - Specification for Lightweight Aggregates for Structural Concrete.
p. ASTM C494 - Specification for Chemical Admixtures for Concrete.
q. ASTM C567-05a - Test Method for Density of Structural Lightweight Concrete.
r. ASTM C595 - Specification for Blended Hydraulic Cements.
s. ASTM C618-08a - Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
t. ASTM C989-09a - Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
u. ASTM C1017 - Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
v. ASTM C1064 - Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
w. ASTM C1116 - Specification for Fiber-Reinforced Concrete.
x. ASTM C1315-08 - Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
y. ASTM D1751-04 - Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
z. ASTM D1752-04a - Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
aa. ASTM D4397-02 - Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
bb. ASTM E1643-98 (Reapproved 2005) - Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
cc. ASTM E1745-97 (Reapproved 2004) - Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

5. Concrete Reinforcing Steel Institute (CRSI):
   a. Manual of Standard Practice, 28th ed., 2009.

1.04 SUBMITTALS:

A. Product Data: For each type of product indicated.
B. Other Submittals:
   1. Design Mixtures: For each concrete mixture, including aggregate gradation data.
   2. Steel Reinforcement Shop Drawings: Detail fabrication, bending, and placement according to ACI SP-66.
   3. Field quality-control reports.

1.05 QUALITY ASSURANCE:

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, Sections 1 through 5.
   2. ACI 117.

PART 2 - PRODUCTS

2.01 FORMWORK:

A. Furnish formwork and formwork accessories according to ACI 301.

2.02 STEEL REINFORCEMENT:

A. Reinforcing Bars: ASTM A615, Grade 60 (Grade 420), deformed.
B. Plain-Steel Wire: ASTM A82, as drawn.
C. Plain-Steel and Deformed-Steel Welded Wire Reinforcement: ASTM A1064, flat sheet.

2.03 CONCRETE MATERIALS:

A. Concrete materials, including the use of admixtures, shall meet the requirements of Section 802 of the Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.
    1. Class C concrete may be used for thrust blocking and soil erosion control structures.
    2. Class A concrete shall be used for all concrete construction, unless a different class is called for in the Drawings.

2.04 RELATED MATERIALS:

A. Vapor Retarder: Plastic sheet, ASTM E1745, Class A or B.
B. Vapor Retarder: Polyethylene sheet, ASTM D4397, not less than 10 mils thick; or plastic sheet, ASTM E1745, Class C.
C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D448, Size 57, with 100% passing a 1-1/2-inch sieve and 0 to 5% passing a No. 8 sieve.
D. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D448, Size 10, with 100% passing a 3/8-inch sieve, 10 to 30% passing a No. 100 sieve, and at least 5% passing No. 200; complying with deleterious substance limits of ASTM C33 for fine aggregates.
E. Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber, or ASTM D1752, cork or self-expanding cork.

2.05 CURING MATERIALS:

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
C. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
D. Water: Potable.
E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B
F. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
    1. VOC Content: 200 g/L or less.

2.06 CONCRETE MIXING:

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94[and ASTM C1116] and furnish batch ticket information.
    1. When air temperature is above 90ºF, reduce mixing and delivery time to 60 minutes.
B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.01 FORMWORK:

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

B. Earth Forming: Concrete not exposed to public view may be placed directly against soil, provided that the earth or rock has been carefully trimmed, is uniform and stable, and meets compaction requirements specified in Section 312000 - Site Preparation and Earthwork. Increase width of elements by a minimum of 2 inches from that indicated on Drawings to provide additional concrete cover for reinforcement.

3.02 EMBEDDED ITEMS:

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.03 VAPOR RETARDERS:

A. Place, protect, and repair vapor retarders according to ASTM E1643 and manufacturer's written instructions.
   1. Lap joints 6 inches and seal with manufacturer's recommended tape.

B. Granular Courses: Place vapor retarder over a 1/2-inch-thick layer of fine-graded granular material over granular fill with minimum thickness equal to thickness of concrete slab, unless indicated otherwise.

3.04 STEEL REINFORCEMENT:

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Install welded wire reinforcement in longest practicable lengths on bar supports spaced in both directions to minimize sagging. Do not place reinforcement directly on subgrade, vapor barrier, or steel form deck and then pull up during concrete placement. Lap edges and ends of adjoining sheets at least one mesh spacing plus 2 inches.

3.05 JOINTS:

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with a groover tool to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete as soon as cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random shrinkage cracks.

D. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, retaining walls, grade beams, and other locations, as indicated.
1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.06 CONCRETE PLACEMENT:

A. Comply with ACI 301 for placing concrete.
B. Before test sampling and placing concrete, water may be added at Project Site, subject to limitations of ACI 301.
C. Do not add water to concrete during delivery, at Project Site, or during placement.
D. Consolidate concrete with mechanical vibrating equipment.
E. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings and as follows. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases at a thickness as indicated on the Drawings unless otherwise indicated and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4,000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 12-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to placing concrete, place, and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Cast anchor bolts or other inserts into bases. Install anchor bolts as required for proper attachment to supported equipment.

3.07 FINISHING FORMED SURFACES:

A. Rough-Formed Finish: SF-1.0 per ACI 301. As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch.
1. Apply to concrete surfaces not exposed to public view.
B. Smooth-Formed Finish: SF-3.0 per ACI 301. As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed finished as-cast concrete where indicated:
   1. Smooth-rubbed finish.
   2. Grout-cleaned finish.
   3. Cork-floated finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.08 FINISHING UNFORMED SURFACES:

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
   1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, Portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic, or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
   1. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
   1. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen surface by brooming with fiber-bristle broom perpendicular to main traffic route, making uniform corrugations not more than 1/16 inch deep.

3.09 CONCRETE PROTECTING AND CURING:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 301, ACI 306R for cold-weather protection, and ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. per hour before and during finishing operations, as determined by Figure 4.2 of ACI 305R. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete according to ACI 308.1 for not less than seven days (or 72 hours for Type III cement) by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL:

A. Testing Agency: Contractor shall engage a qualified testing agency to perform tests and inspections.

B. Tests: Perform on each composite sample according to ACI 301.

1. Testing Frequency: One composite sample shall be obtained for each day's placement of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: One composite sample shall be obtained for each 100-cu. yd. or fraction thereof of each concrete mix placed each day.
3. Slump: ASTM C143.
4. Air Content: ASTM C231, pressure method, for normal-weight concrete; ASTM C173, volumetric method, for structural lightweight concrete.
5. Concrete Temperature: ASTM C1064.
6. Unit Weight: ASTM C567, fresh unit weight of structural lightweight concrete.
7. Compression Test Specimens: ASTM C31; cast and laboratory cure two sets of two standard cylinder specimens.
8. Compressive-Strength Tests: ASTM C39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
b. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

9. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
10. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.11 REPAIRS:

A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION 03 30 53

SECTION 31 20 00 – SITE PREPARATION AND EARTHWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. This Section includes Site preparation activities and certain items of earthwork common to other related work as necessary to complete the Work including:
   1. Demolition.
   2. Clearing and Grubbing.
   3. Disposal of Waste Materials.
   4. Stripping.
   5. Excavation.
   6. Stockpiling.
   7. Fill.
   8. Borrow.
   9. Site Grading.
   10. Subgrade Preparation.
   11. Topsoiling.
   12. Weed-Killer.
   13. Maintenance and Repair.

B. Related Sections, if applicable to the Project:
   1. Section 31 23 16 - Excavation and Filling for Structures.
   2. Section 31 23 33 - Trenching and Backfilling for Utilities.
   3. Section 32 15 00 - Aggregate Surface Course.

1.03 REFERENCE STANDARDS:

A. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

B. American Association of State Highway and Transportation Officials (AASHTO):
   1. M80 - Coarse Aggregate for Portland Cement Concrete.
   2. T99 - The Moisture-Density Relations of Soils Using a 5.5-Pound Rammer and a 12-Inch Drop.
   3. T104 - Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
   4. T180 - The Moisture-Density Relations of Soils Using a 10-Pound Rammer and an 18-Inch Drop.

C. ASTM International (ASTM):
   1. D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Standard Effort (12,400 ft-lbf/ft3).
   2. D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
   3. D4254 - Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   4. D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   5. D4546 - Test Methods for One-Dimensional Swell/Settlement Potential of Cohesive Soils.
   6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

D. Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

1.04 DEFINITIONS:

A. Refer to PART 2 for detailed definitions and included materials.
B. Borrow: Earth materials obtained from sources other than excavations or stockpiles within the area to be graded by Contractor.
C. Clearing: The removal of trees, shrubs, and other vegetation above the existing grade surface.
D. Demolition: The removal of improvements without regard to class and type of construction or material.
E. Dike: A fill that will be required to hold water.
F. Excavation: Material removed (cut) below the elevation of the original (existing) ground surface.
G. Fill: Material placed above the elevation of the original (existing) ground surface after stripping or material used in restoring an earlier excavation.
H. Grubbing: The removal of roots, shrubs, and other vegetation to a depth below the ground surface.
I. Stripping: Excavation of any overlying layer of material to expose material of a different type, use, or class.
J. Subgrade: The surface layer of earth on which structures, pavements, railroads, or other surfacing materials, except topsoil, are to be placed.
K. Topsoil: The final surface layer of earth material intended to support vegetation.

1.05 SUBMITTALS:

A. Submit as specified in Division 01.
B. Includes, but not limited to, the following:
   1. Test results from laboratory testing of proposed borrow materials.
   2. Test results from laboratory testing of granular fill and pipe embedment materials.
   3. Erosion Control Plan.
   4. Dewatering Plan.

1.06 QUALITY ASSURANCE:

A. Sampling and Testing:
   1. Tests to determine conformance with all requirements of this specification for quality and properties of all Contractor-secured materials, including borrow materials (both on or off-Site) proposed for use, shall be performed by an independent, commercial laboratory retained and compensated by Contractor, and approved by Engineer.
   2. When incorporating materials into the Work, quality control testing will be performed during construction by a testing laboratory retained and compensated by Owner.

1.07 JOB CONDITIONS:

A. Lines and grades shall be as indicated. Engineer will furnish benchmarks, base lines, and reference points as necessary to permit Contractor to lay out and construct the Work properly.
B. Carefully maintain all benchmarks, monuments, and other reference points and replace as directed by Engineer if disturbed or destroyed.
C. Prior to submitting Bid, make arrangements with Owner for entry to Site for the purpose of conducting subsurface investigations, including test borings.
D. Temporary Erosion and Sediment Controls: Contractor shall furnish, install, construct, and maintain temporary measures to control erosion and minimize the siltation of intermittent streams and the pollution of private properties. Temporary erosion and sediment control

measures shall be constructed in substantial compliance with local, state, federal, and jurisdictional agencies regulation and shall be maintained until completion of Contract.

E. Protection of Trees: Protect tops, trunks, and roots of existing trees indicated to remain, as follows:
   1. Box, fence around, or otherwise protect trees before any construction work is started.
   2. Do not permit heavy equipment or stockpiles within branch spread.
   3. Trim or prune to obtain working space in lieu of complete removal when possible. Conduct operation as follows:
      a. With experienced personnel.
      b. Conform to good horticultural practice.
      c. Preserve natural shape and character.
      d. Protect cuts with approved tree paint.
   4. Grade around trees as follows:
      a. Trenching: Where trenching is required around trees which are to remain, avoid cutting the tree roots by careful hand tunneling under or around the roots. Avoid injury to or prolonged exposure of roots.
      b. Raising Grades: Where existing grade at a tree is below the finished grade and fill not exceeding sixteen inches (16") is required, place clean, washed gravel, one to two inches (1-2") in size, directly around the tree trunk. Extend gravel out from trunk on all sides at least eighteen inches (18") and to a height of two inches (2") above finished grade at tree. Install gravel before earth fill is placed. Do not leave new earth fill in contact with any tree trunks.
      c. Lowering Grades: Regrade by hand to elevation required around existing trees in areas where new finished grade is to be lowered. As required, cut the roots cleanly three inches (3") below finished grade, and cover scars with tree paint.
   5. Remove and grub when damage occurs which would make survival doubtful.
   6. Replace with similar item when damaged through carelessness.

F. Disposition of Utilities:
   1. Adequately protect from damage all active utilities and remove or relocate only as indicated or specified.
   2. Report inactive and abandoned utilities encountered in excavating and grading operations. Remove, plug, or cap as directed by Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Definitions and classifications of materials used in this Section are stated in PART 3 - EXECUTION, this Section.

2.02 EARTHWORK:

A. Materials suitable for use in embankment and fill include material free of debris, roots, organic matter, and frozen matter; and free of stone having any dimension greater than 2 inches in areas requiring a high degree of compaction or 4 inches in other embankment and fill areas:
   1. Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands exclusive of clayey material:
      a. Free-draining.
      b. Materials for which impact compaction will not produce a well- defined, moisture-density relationship curve.

c. Maximum density by impact methods will generally be less than by vibratory methods.
d. For which generally less than 15% by dry weight, of soil particles pass the No. 200 sieve.

2. Cohesive materials include silts and clays generally exclusive of sands and gravel:
a. Materials for which impact compaction will produce a well-defined, moisture-density relationship curve.

B. Materials unsuitable for use in embankment and fill include all material that contains debris, roots, organic matter, frozen matter, gravel, stone, or shale particles with any dimension greater than 2 inches in areas requiring a high degree of compaction or 4 inches in other embankment and fill areas, or other materials that are determined by Engineer to be too wet or otherwise unsuitable for providing a stable subgrade or stable foundation for structures. It is anticipated that the current on-site soil will not be compatible as fill material and shall be considered unsuitable.

C. Material for Embankment or Fill:
1. Borrow materials shall not exhibit characteristics of high shrink-swell potential as determined from Atterberg limit tests (ASTM D4318) and/or swell/pressure tests (ASTM D4546).

D. Waste materials include excess usable materials and materials unsuitable for use in the Work, in accordance with Paragraph 3.02A.6.

E. Borrow materials include all fill materials and topsoil obtained from locations off the Site:
1. Material shall be subject to approval of Engineer.
2. Borrow areas shall be as follows:
a. Arranged for by Contractor at no additional cost to Owner.
b. Subject to approval of Engineer.

PART 3 - EXECUTION

3.01 DEMOLITION:

A. Carefully dismantle, in a manner to avoid damage, all materials and equipment indicated to be relocated or returned to Owner.

B. Any of the material or equipment, specified or indicated to be relocated or returned to the Owner, that is damaged due to Contractor's negligence shall be repaired or replaced, as determined by Engineer, at Contractor's expense.

C. Materials not indicated or specified to be relocated or returned to Owner shall become the property of Contractor and be disposed of as specified in "Disposal of Debris," this Section.

D. Perform demolition work to protect existing facilities, structures, and property which are to remain, against damage from operations, falling debris, or other cause.

E. Make provisions for temporarily accommodating flows in existing facilities that are to be relocated or disturbed.

F. Take precautions to guard against movement or settlement and provide shoring and bracing as necessary.

G. If at any time safety of existing structure to remain is endangered, cease operations, notify Engineer, and do not resume operations prior to approval.

H. Remove concrete by jack hammering, sawing, core drilling, or other approved method.

I. Remove existing asphaltic pavement by jack hammering, sawing, scarifying, or other approved methods except as follows:
1. Existing asphaltic (or Portland cement concrete) pavement shall be sawed at point where pavement indicated to remain ends and pavement indicated to be removed begins.

3.02 CLEARING AND GRUBBING:

A. Clear and grub all areas where earthwork is to be performed, including borrow areas, and any other areas beyond the earthwork limits where indicated.

B. Clearing:
   1. Clearing includes felling and disposal of trees, brush, and all other vegetation or combustible material found on or above the existing ground surface inside the clearing limits.
   2. Remove existing fence within the limits of clearing.
   3. Conduct work in a manner to prevent damage to property and to provide for the safety of employees and others.
   4. Keep operations within construction limits indicated.

C. Grubbing:
   1. Grubbing includes the removal and disposal of all tree stumps and roots where fill is to be placed and when the excavated material is to be used as fill. Removal and disposal of tree stumps and roots larger than three inches (3") in diameter will be required at all other locations.
   2. Remove to a depth of at least eighteen inches (18") below existing grade elevation at all water containment areas (dikes, ponds, and similar areas). Remove to a depth of at least twelve inches (12") below existing grade elevation at all other locations.
   3. Backfill all excavated depressions with approved material and grade to drain.

D. Protection of Trees:
   1. Protect tops, trunks, and roots of existing trees on Project Site which are to remain, as follows:
      a. Box, fence around, or otherwise protect trees before any construction Work is started.
      b. Do not permit heavy equipment or stockpiles within branch spread.
      c. Trim or prune to obtain working space in lieu of complete removal when possible. Conduct operation as follows:
         (1) With experienced personnel.
         (2) Conform with good horticultural practice.
         (3) Preserve natural shape and character.
         (4) Protect cuts with approved tree paint.
      d. Grade around trees as follows:
         (1) Trenching: Where trenching is required around trees which are to remain, avoid cutting the tree roots by careful hand tunneling under or around the roots. Avoid injury to or prolonged exposure of roots.
         (2) Raising Grades: Where existing grade at a tree is below the new finished grade and fill not exceeding 16 inches is required, place 1 to 2 inches of clean, washed gravel directly around the tree trunk. Extend gravel out from trunk on all sides at least 18 inches and finish 2 inches above finished grade at tree. Install gravel before earth fill is placed. Do not leave new earth fill in contact with any tree trunks.
         (3) Lowering Grades: Regrade by hand to elevation required around existing trees in areas where new finished grade is to be lower. As required, cut the roots cleanly 3 inches below finished grade, and cover scars with tree paint.
      e. Remove when damage occurs and survival is doubtful.
      f. Replace with similar item when damaged through carelessness and so requested.

E. Disposal of Debris:
   1. Dispose of debris from clearing and grubbing and demolition at a location off the Site, as arranged for by Contractor, at no additional cost to Owner.
   2. Contractor may claim and salvage any timber or other debris which he may consider of value but shall not delay in any manner either this Contract or other work with salvaging operations.

3.03 DISPOSAL OF WASTE MATERIALS:

A. Waste Materials: Includes excess suitable materials, and materials unsuitable for use in the Work.
   1. Unsuitable materials include all material that contains debris, roots, organic matter, frozen matter, rock (with any dimension greater than one-half the loose layer thickness), or other materials that are determined by the Resident Project Representative (RPR) as too wet or otherwise unsuitable for providing an acceptable fill or subgrade for roads and structures.
   2. Suitable materials include material that is free of debris, roots, organic matter, refuse, coal, ashes, cinders, frozen matter and, which is free of rock with any dimension greater than one-half the specified loose layer thickness and conform to the cohesive or cohesionless fill material specified herein.

B. Remove unsuitable materials from work area as excavated.

C. Keep excess suitable material segregated from unsuitable waste in the disposal area for possible use by others.

D. Unsuitable materials shall be disposed of at a location off site and arranged for by Contractor and approved by Owner, at no additional cost to Owner.

3.04 STRIPPING:

A. Stripping shall consist of scraping areas clean of all brush, grass, weeds, roots, and other materials.

B. Remove topsoil from areas within limits of excavation, trenching, borrow, and areas designated to receive fill.

C. Strip to a minimum depth of 6 inches, but to a sufficient depth to remove excessive roots in heavy vegetation, unsuitable material, or brush areas and as required to remove all soil containing organic material or segregate topsoil.

D. Stockpile topsoil in areas designated where it will not interfere with construction operations or existing facilities. Stockpiled topsoil shall be reasonably free of subsoil, debris, and stones larger than 2-inch diameter.

3.05 EXCAVATION:

A. General:
   1. Excavate all materials found within the designated limits for excavation.
   2. Perform excavation by any recognized method of good practice to complete the Work in the most expeditious manner and in conformance with specified requirements.
   3. Take precautions to ensure no damage to existing facilities or equipment, or other work.
   4. All materials encountered, regardless of type, character composition, and condition thereof, shall be considered "unclassified" for the purpose of payment. Determine quantity of various materials to be excavated prior to submitting BID FORM (Section 004000 - Bid Form). Rock encountered shall be handled at no extra cost to Owner.
   5. Contractor shall designate and obtain the services of a Surveyor Licensed in the State of Oklahoma to verify existing topographic information and to confirm post construction finished grades within the proposed limits of disturbance. These surveys will be used to

confirm final earthwork quantities for the project. Contractor shall supply digital survey files in .dwg format to Owner and Engineer for confirmation of earthwork quantities.

B. Dewatering:

a. General:

(1) Contractor shall design and provide the dewatering system using accepted and professional methods of design and engineering consistent with the best current practice to eliminate water entering the excavation under hydrostatic head from the bottom and/or sides. The system shall be designed to prevent differential hydrostatic head which may occur from rising water levels from adjoining or nearby bodies of water, proximity of excavation to phreatic groundwater level, or surface runoff, and which would result in floating out soil particles in a manner termed as a "quick" or "boiling" condition. System shall not be dependent solely upon sumps and/or pumping water from within the excavation where differential head would result in a "quick" condition, which would continue to worsen the integrity of the excavation's stability.

(2) Provide dewatering system of a sufficient size and capacity as required to control ground and surface water flow into the excavation and to allow all Work to be installed in a dry condition, including the obtaining of a licensed well-driller, where required.

(3) Control, by acceptable means, all water regardless of source and be fully responsible for disposal of the water.

(4) Confine all discharge piping and/or ditches to the available easement or to additional easement obtained by Contractor. Provide all necessary means for disposal of the water, including the obtaining of all necessary permits and of additional easement at no additional cost to Owner.

(5) Control groundwater in a manner that preserves the strength of the foundation soils, does not cause instability or raveling of the excavation slopes, and does not result in damage to existing structures. Where necessary to these purposes, lower the water level in advance of excavation, using wells, wellpoints, jet eductors, or similar positive methods. The water level as measured in piezometers shall be maintained a minimum of 3 feet below the prevailing excavation level.

(6) Commence dewatering with means to provide positive dewatering of all water sources prior to any appearance of water in excavation and continue until Work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.

(7) Open pumping with sumps and ditches shall be allowed, provided it does not result in boils, loss of fines, softening of the ground, or instability of slopes.

(8) Install wells and/or wellpoints, if required, with suitable screens and filters, so that continuous pumping of fines does not occur. Arrange the discharge to facilitate collection of samples by Owner or Resident Project Representative. During normal pumping, and upon development of well(s), levels of fine sand or silt in the discharge water shall not exceed 5 ppm. Install a sand tester on the discharge of each pump during testing to verify that levels are not exceeded.

(9) Install, operate, and maintain the dewatering system required to control surface and/or groundwater.

(10) Control grading around excavations to prevent surface water from flowing into excavation areas.

(11) Drain or pump as required to continually maintain all excavations and trenches free of water or mud from any source, and discharge to approved drains or channels. Commence when water first appears and continue until Work is complete to the extent that no damage will result from hydrostatic pressure, flotation, or other causes.

(12) No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head.

b. Design:

(1) Contractor shall designate and obtain the services of a qualified dewatering specialist or expert to provide a dewatering plan as may be necessary to complete the Work. Items to be provided shall include, but not be limited to the following:

(a) Drawings indicating the general location and size of berms, dikes, ditches, all deep wells, observation piezometer wells, wellpoints, jet eductors, sumps and discharge lines, including their relation to water disposal ditches.

(b) Make, model and capacities of pumps, prime movers, power generators, and standby equipment.

(c) Design calculations, including any computer modeling, to show adequacy of system and selected equipment, estimated flow rate of water to be discharged, and estimated duration for groundwater to be drawn down to elevations required for excavation.

(d) Detailed description of dewatering procedure and maintenance method.

(e) Description of emergency plan to protect in-place construction in the event of an unanticipated rise in groundwater due to loss of power or other unexpected conditions or inundation from surface water.

(f) Additional details, as requested by Engineer.

(g) Specific items to be included addressing dewatering operations using wells, wellpoints, or jet eductors shall consist of the following:

1). Diameter of hole drilled.
2). Type of equipment and method of well installation.
3). Diameter and material type of well casing inserted.
4). Elevation of top of each well.
5). Screen opening sizes.
6). Screened interval or elevations of segments in well that are screened.
7). Backfill gravel pack zone elevations.
8). Gravel pack gradation.
9). Size of pumps (watts) (horsepower).
10). Anticipated pumping capacity (gpm).
11). Drawdown in well with time during pumping.
12). Drawdown in piezometers with time during pumping.
13). Number and location of wells.
14). Number and location of piezometers.
15). Wellpoint details.
16). Certification license of well-driller, where required.

(2) In preparing the dewatering plan, Contractor shall consider all available information, together with Site constraints, excavation/sheeting requirements,

and construction schedule. Other potential problems may require specific reference and amplification within the dewatering plan.

(3) After completion of the dewatering installation and prior to commencement of excavation, Contractor shall submit to Engineer for review a detailed plan of the dewatering system as constructed, together with test data and computations demonstrating that the system is capable of achieving the specified results.

(4) Contractor shall be solely responsible for proper design, installation, operation, maintenance, and any failure of any component of the system. Notice to Proceed issued by Owner or submittal of the dewatering plans and data by Contractor shall not relieve Contractor from full responsibility for errors therein or for complete and adequate design and performance of the system in controlling the water level in the excavated areas and for control of the hydrostatic pressures to the depths specified.

(5) Contractor shall be responsible for the accuracy of the drawings, design data, and operational records required by this Section.

(6) Piezometers and Groundwater Monitoring:

(a) Contractor shall install as a minimum 2 piezometers, in addition to any required by regulating agencies having jurisdiction, at locations prior to excavation below the groundwater level, for the purpose of monitoring groundwater elevations in the vicinity of the excavation. The design and location of the piezometers will be subject to approval by Engineer.

(b) Observe and record twice daily the elevation of the groundwater at all of the piezometers on a daily basis 7 days per week and furnish a daily written summary of the observations to Resident Project Representative. Record groundwater elevations to the nearest 0.1 foot, with observations conducted throughout the duration of any dewatering, and until dewatering is no longer required.

(c) Monitor upstream and downstream river/stream levels to anticipate rising groundwater levels.

(d) Repair or replace within 24 hours piezometers that become inactive, damaged, or destroyed. If required, suspend excavation and construction activities in areas where piezometers are not functioning properly until reliable observations can be made. Add or remove water from piezometer risers and demonstrate that observation wells are functioning properly.

(e) Remove and grout piezometers when dewatering is completed and in accordance with requirements of jurisdictional agencies.

c. Damages:

(1) Contractor shall be responsible for and shall repair without cost to Owner any damage to work in place, other contractor's equipment, utilities, residences, highways, roads, railroads, private and municipal well systems, adjacent structures, and the excavation, including, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

(2) Remove subgrade materials rendered unsuitable by excessive wetting and replace with approved backfill material at no additional cost to Owner.

d. Maintaining Excavation in Dewatered Condition:
   (1) Dewatering shall be a continuous operation. Interruptions due to power outages or any other reason shall not be permitted.
   (2) Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of subgrade, installation of pipe, and construction of structures until the critical period of construction and/or backfill is completed to prevent damage of subgrade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.
   (3) Provide standby equipment on site, installed, wired, and available, for immediate operation if required to maintain dewatering on a continuous basis in event any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.
   (4) Subsequent to completion of excavation and during the installation of all Work in the excavated area, Contractor shall maintain the excavation in a dewatered condition.
   (5) System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components and any other work required to maintain the excavation in a dewatered condition.

e. System Removal:
   (1) Contractor shall remove all dewatering equipment from the Site, including related temporary electrical service.
   (2) All wells shall be removed or cut off a minimum of 3 feet below the final ground surface, capped, and abandoned in accordance with regulations by agencies having jurisdiction.
   (3) Removal work required under this paragraph does not include any of the site cleanup work as required elsewhere in these Specifications.

f. River/Stream Crossings:
   (1) River/Stream crossings exist as indicated along this Project, requiring excavation below potential stream or river phreatic levels. Dewatering methods shall incorporate means to account for rising or varying water levels associated with these bodies of water and their interconnected waterways, whether surface or subsurface, to prevent threatening the integrity of the excavation, existing facilities, and Work under construction.
   (2) Conform to applicable requirements in all related Sections.
   (3) Maintain area drainage during construction.
   (4) Complete channel protection expeditiously following excavation.

C. Blasting:
   1. Blasting will not be permitted.

3.06 STOCKPILING:

A. Stockpile in amounts sufficient for and in a manner to segregate materials suitable for the following:
   1. Topsoiling.
   2. Constructing fills.
   3. Backfilling.
   4. Waste only.

B. Do not obstruct or prevent access to the following:
   1. Roads and driveways.
   2. Utility control devices.
   3. Ditches or natural drainage channels.
   4. Railroads.
   5. Indicated material storage (lay-down) areas.
   6. Indicated transmission lines and towers.

C. Perform in a manner to avoid endangering the Work, stability of banks or structures, or health of trees and shrubs to be saved.

D. Maintain safe distance between toe of stockpile and edge of excavation or trench.

E. Stockpile in other areas or off Site when adjacent structures, easement limitations, or other restrictions prohibit sufficient storage adjacent to the Work. Off-Site areas shall be arranged for by Contractor at no additional cost to Owner.

3.07 FILL:

A. General:
   1. The construction of "fill" shall consist of obtaining suitable materials and placing these materials in compacted lifts.
   2. Suitable fill materials include material from excavations and borrow areas that is free of debris, roots, organic matter, refuse, ashes, cinders, frozen earth, and which is free of rock with any dimension greater than one-half the specified loose layer thickness.
   3. Unsuitable fill materials include material that does not conform to the above or other materials that are determined by Engineer as too wet or otherwise unsuitable for providing a stable fill.
   4. That portion of material passing the No. 40 sieve shall have a liquid limit not exceeding 40 and a plastic index not exceeding 25 when tested in accordance with ASTM D4318.
   5. Construct fill to the contours and elevations indicated, using approved equipment and suitable approved materials specified above. Obtain materials for fill construction in the following order of priority:
      a. From indicated on-Site excavation.
      b. From indicated stockpiles.
      c. From borrow areas secured by Contractor.
   6. If the slope bounding the fill area is steeper than six horizontal to one vertical (6:1), step or serrate prior to placing the material as indicated.
   7. Do not place snow, ice, or frozen earth in fill and do not place fill on a frozen surface.
   8. Place fill material only on ground surfaces which conforms to the following:
      a. Scarified to 6” deep prior to placement of first lift.
      b. Compacted prior to placement of second or succeeding lifts.
      c. Wetted or dried as required to obtain correct moisture content.
      d. Approved by Engineer.
   9. Do not place fill for dikes on any fractured rock surface. If fractured rock is encountered, remove to a depth of 2’ below the impoundment bottom and replace with suitable compacted fill.
   10. All slopes on fills shall be constructed 1’ wider than indicated and then dressed to the final grade.

B. Earthen (Cohesive) Fill:
   1. Material shall be friable sandy or silty clay containing sufficient fine material to provide a dense mass free of voids when compacted. When impact compacted, these materials will produce a well-defined moisture-density relationship curve.

2. Material shall not contain more than 10% by volume of rock and gravel and not contain particles with maximum dimension greater than one-half the depth of the layer to be compacted.
3. Material for construction of dikes and impoundment liner shall not contain rock or gravel.
4. Compact with approved equipment to a minimum of 90% of maximum dry density within the optimum moisture content. Optimum moisture and maximum density shall be determined by ASTM D698.
5. Place fill material in 8-inch maximum layers (uncompacted depth).
6. Perform any wetting or drying of the material as required to obtain the specified density when compacted and to maintain specified moisture content range at the time of placement.

C. Sand and Gravel (Cohesionless) Fill:
1. Include gravels, gravel-sand mixtures, sands, and gravelly sands exclusive of clayey and silty components. These materials have the following properties:
   a. Free-draining.
   b. Impact compaction will not produce a well-defined moisture-density relationship curve.
   c. The maximum density by impact methods will generally be less than by vibratory methods.
2. Place sand and gravel fill in 12-inch maximum lifts (uncompacted depth).
3. Obtain compaction by use of approved vibratory rollers and other equipment during the placement and grading of layers.
4. Compact to a minimum of 95% of relative density as determined by ASTM D4253 and ASTM D4254.

D. Compaction Testing:
1. The method of in-place compaction testing including density and moisture content shall be as follows:
   a. Density - Cohesive materials: ASTM D6938.
   b. Density - Cohesionless materials: ASTM D6938.
   c. Moisture Content - ASTM D6938.
2. The minimum frequency of in-place compaction testing including density and moisture content will be as follows:
   a. At least one test for every 200 cubic yards of fill placed in trenches or surrounding structures.
   b. At least one test every 100 linear feet per lift along a roadway.
   c. At least one test for every 500 square feet where subgrade preparation for roadways, railroads, drives, and parking areas is being performed.
   d. At least one test for every 100 square feet per lift in structural fill.
   e. At least one test when Engineer suspects the quality of moisture control or effectiveness of compaction.
3. Fill failing to meet required densities shall be removed or scarified and recompacted as necessary to achieve specified results.
4. Removal of in-place material and replacement with approved new material will be required if scarifying and recompaction do not produce the required densities.

E. Equipment:
1. Compaction equipment shall conform to the following requirements and be subject to the approval of Engineer.
   a. Tamping Rollers:
      (1) May be towed or self-propelled.

(2) Have staggered uniformly spaced knobs or feet. When fully loaded, they shall exert at least 250 psi on combined area of tamping feet in contact with ground.
(3) Be equipped with cleaning fingers maintained at full length to prevent accumulation of material between feet.
(4) Maintain all equipment in good repair.

b. Pneumatic Rollers:
(1) Have two axles, not less than nine wheels with pneumatic tires of equal size, diameter, and ply rating, a rigid steel frame, and a body suitable for ballast loading. Tracking wheels shall overlap by a minimum of 1/4-inch.
(2) Tires shall be uniformly inflated at all times.
(3) Self-propelled or towed.

c. Vibratory Rollers:
(1) Have either one or two smooth-surfaced steel drums with a minimum diameter of 42 inches.
(2) Have a minimum vibrating force of 300 pounds per cycle per inch of drum width.
(3) Have a minimum vibrating frequency of 1,200 cycles per minute with a means of adjusting the resonance of the dynamic force.
(4) May be self-propelled or towed.

d. Power tampers shall be used for compaction of material in areas where it is impractical or unsafe to use heavy equipment, and as recommended by Engineer.

e. Vibratory plate compactor may be used for compaction of sand and/or gravel material in areas where it is impractical or unsafe to use heavy equipment, and as recommended by Engineer.

3.08 BORROW:

A. Borrow materials refers to all fill materials and topsoil obtained from approved locations either on or off the jobsite.

B. Borrow shall include all clearing, grubbing, excavating, handling, and final disposal of materials as specified. Borrow, if required, to bring fill areas to the lines and grades indicated, shall be furnished by Contractor, as specified, at no additional cost to Owner.

C. Borrow areas shall be:
1. Arranged for by Contractor at no additional cost to Owner.
2. Subject to approval by Engineer.

D. Prior to incorporating borrow materials into the Project, borrow material from each source shall be tested by an independent laboratory compensated by Contractor. Tests on borrow materials shall include, unified soil classification, grain size analysis, liquid limit, plasticity index, moisture density relations of soils, and permeability. Contractor shall submit copies of test results to Engineer, Owner, and Resident Project Representative (RPR). Material removed from borrow areas shall be as approved by Resident Project Representative (RPR). Excavate borrow material in uniform layers not greater than 2 feet in thickness except as indicated.

E. Leave borrow areas graded to drain and to present a neat appearance.

F. Seed and mulch surface of borrow area after grading. Contractor will be held responsible for any erosion that occurs until a sturdy growth over a minimum of 98% of the area seeded is established.

3.09 SITE GRADING:

A. Excavate, fill, and rough grade to bring Project area to subgrades as follows:
1. To underside of respective surfacing or base course for surfaced areas.

2. As indicated on grading sections for seeded areas, ditches, and slopes.

B. Finish Grading:
   1. Grade and compact all areas within the Project, including excavated and filled sections, and adjacent transition areas reasonably smooth and free from irregular surface changes.
   2. Degree of finish shall be that ordinarily obtained from blade grader or scraper operations, except as otherwise specified.
   3. Finished rough grades shall generally be not more than 0.25-foot above or below established grade or approved cross-sections with due allowance for topsoil.
   4. Tolerance for areas within 10 feet of building shall not exceed 0.15-foot above or below established subgrade.
   5. Finished subgrades for roads, drives, and surfaced areas shall not be lower than indicated, nor higher than 0.1-foot above that indicated.
   6. Finish all ditches and swales to drain readily.
   7. Unless otherwise indicated, slope the subgrade evenly to provide drainage away from building walls in all directions at a grade not less than 1/4-inch per foot.
   8. Provide rounding at top and bottom of banks and at other breaks in grade.

C. Construction Runoff Control:
   1. If, during construction, Contractor alters the flow characteristics of construction runoff such that untreated runoff is being released or the runoff exceeds the capacity of any of the control facilities designed by Engineer, Contractor shall upgrade existing facilities and/or provide new facilities designed to control construction runoff.
   2. All upgraded or new facilities shall be approved by Engineer before implementation.
   3. Construct silt fences at locations indicated.

3.10 SUBGRADE PREPARATION:

A. General:
   1. Excavate or fill as specified and as required to construct subgrades to the elevations and grades indicated.
   2. Remove all unsuitable material and replace with approved fill material, and perform all wetting, drying, shaping, and compacting required to prepare a suitable subgrade. Unsuitable material is defined under the Article "FILL," this Section.

B. Subgrade for Roadways, Railroads, Drives, Parking Areas:
   1. Extend subgrade the full width of surfaced areas plus, where possible, 1 foot outside the edges of the overlying course to be placed.
   2. Compaction:
      a. Cohesive Material:
         (1) Compact material, except for the top 6 inches, to a minimum of 95% of maximum dry density and within the optimum moisture content range from. Optimum moisture and maximum dry density shall be determined by ASTM D698.
         (2) Compact the top 6 inches of the material to a minimum of 98% of maximum dry density within the optimum moisture content range. Optimum moisture and maximum density shall be determined by ASTM D698.
         (3) Perform any wetting or drying of the material as required to obtain the specified density.
      b. Cohesionless Material:
         (1) Perform at moisture content required to achieve the specified densities with equipment used.

(2) Compact cohesionless material, except for the top 6 inches, to a minimum of 95% of relative density as determined by ASTM D4253 and ASTM D4254.
(3) Compact top 6 inches of the material to 98% of relative density as determined by ASTM D4253 and ASTM D4254.

3.11 TOPSOILING:

A. Topsoil Materials:
1. Shall be material excavated from within the upper 0.5-foot of on-Site excavations; and be obtained from Site areas having healthy plant growth prior to stripping.
2. Contractor may furnish topsoil from off-Site borrow areas at their option and without additional charge to Owner provided these materials are:
a. From that portion of the soil profile defined as the "A" horizon by the Soil Science Society of America.
b. Fertile, friable, and loamy soil of uniform quality without admixture of subsoil materials, gravel, hardpan, debris, or other similar impurities.
c. Demonstrate healthy plant growth prior to stripping.
d. From areas from which topsoil has not been previously removed by erosion or mechanical methods.

B. Treatment of Subgrade Prior to Topsoil Placement:
1. Clear Site of vegetation heavy enough to interfere with proper grading and tillage operations.
2. Clear surfaces of all stones or other objects larger than 3 inches in thickness or diameter, all roots, brush, wire, grade stakes, or other objectionable material.
3. Loosen subgrade by discing or scarifying to a depth of 2 inches wherever compacted by traffic or other causes to permit bonding of the topsoil to the subgrade.

C. Placement:
1. Distribute over required areas without compaction other than that obtained with spreading equipment.
2. Place to extent material is available within following limits:
a. Not less than 4 inches in depth.
b. Do not exceed 6 inches in depth.
3. Shape cuts and fills to drain as indicated.
4. Grade to match contours of adjacent areas and permit good natural drainage.
5. Provide gentle mound over trenches.

D. After topsoil has been spread, clear surface of stones or other objects larger than 2 inches in thickness or diameter and all other objects that might interfere with planting and maintenance operations.

E. Protect topsoiled areas from the elements until grass is established. Repair eroded areas as required.

F. Keep paved areas clean. Promptly remove topsoil or other dirt dropped on surfacing.

3.12 MAINTENANCE AND REPAIR:

A. Maintenance:
1. Protect newly graded and topsoiled areas from actions of the elements.
2. Settling or erosion occurring prior to landscaping shall be filled and repaired and grades reestablished to the required elevations and slopes.

B. Correction of Settlement:
1. Under provisions of the guarantee, Contractor is responsible for correcting any settlement in excess of the amount of the specified grading tolerance for the specific areas of fill and

damages created thereby within one year after acceptance of the work.

2. Make repairs within 10 days from the date of notification by Owner of fill settlement and resulting damage.
3. Make own arrangements for access to the Site for purposes of repair.

END OF SECTION 31 20 00

SECTION 31 23 16 – EXCAVATION AND FILLING FOR STRUCTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. This Section includes all necessary excavation and filling (under and adjacent to structures), for manholes, vaults, walls, and other structures shown on the Drawings, and all related work.

B. Related Work Specified Elsewhere:

1. Section 31 20 00 - Site Preparation and Earthwork.
2. Section 31 23 33 - Trenching and Backfilling for Utilities.
3. Section 03 30 53 - Miscellaneous Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS:

A. Applicable Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. T99 - The Moisture-Density Relations of Soils Using a 5.5-lb Rammer and a 12-inch Drop.
2. American Society for Testing and Materials (ASTM): Equivalent AASHTO Standards may be substituted as approved by Engineer.
   a. C88 - Test Methods for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
   b. D75 - Practice for Sampling Aggregates.
   c. D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft^3).
   d. D4253 - Test Methods for Maximum Index Density and Unit Weight of Soils using a Vibratory Table.
   e. D4254 - Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   f. D4318 - Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   g. D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
3. Occupational Safety and Health Administration (OSHA):
   a. Part 1926 - Safety and Health Regulations for Construction.
4. Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

1.04 SUBMITTALS:

A. Submit as specified in DIVISION 01.

B. Includes, but not limited to, the following:

1. Test results from laboratory testing of proposed borrow materials.
2. Test results from laboratory testing of granular fill and pipe embedment materials.
3. Erosion Control Plan

1.05 QUALITY ASSURANCE:

A. Sampling and Testing:

1. Tests to determine conformance with all requirements of this Specification for quality and properties of all Contractor-secured materials, including borrow materials (both on or

off Site) proposed for use, shall be performed by an independent commercial laboratory retained and compensated by Contractor, and approved by Engineer.

2. When incorporating materials into the Project, quality control testing will be performed during construction by a testing laboratory retained and compensated by Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Definitions and classifications of materials used in this Section are stated in PART 3 - EXECUTION this Section.

2.02 FILL AND BACKFILL MATERIAL:

A. Earth Backfill: Use suitable material as specified in Section 31 20 00 - Site Preparation and Earthwork.

B. Granular Fill: Material shall be open-graded crushed stone No. 57 as determined by ASTM C33.

PART 3 - EXECUTION

3.01 EXCAVATION:

A. General:
   1. Excavate all materials found within the designated limits for excavation.
   2. Excavate by hand in areas where space and access will not permit use of machines.
   3. Perform excavation by any recognized method of good practice to complete the Work in the most expeditious manner in conformance with specified requirements.
   4. Take precautions to ensure no damage to existing facilities or equipment, or other work.
   5. All materials encountered, regardless of type, character composition and condition thereof, shall be considered "unclassified" for the purpose of payment. Determine quantity of various materials to be excavated prior to submitting BID FORM (Section 00 40 00 - Bid Form). Rock encountered shall be handled at no additional cost to Owner.

B. Make excavation area adequate to permit efficient erection and removal of forms and to provide minimum clearances for filling as indicated.

C. Trim to neat lines where details call for concrete to be deposited against earth.

D. Excavate by hand in areas where space and access will not permit use of machines.

E. Notify Engineer immediately when excavation has reached the depth indicated.

F. Where rock is encountered in a portion of a structural excavation and a non-rock material is encountered in an adjacent area of the same structural excavation, remove the rock to a minimum of 18 inches below the depth indicated for the structure's base and replace with structural fill.

G. Restoring Overexcavation:
   1. Restore overexcavation of depth 6 inches or less as follows:
      a. For structures that are required to rest on undisturbed earth, restore with concrete.
      b. For structures that are required to rest on compacted granular fill base, restore with compacted granular fill.
   2. Restore uniform overexcavation of depth greater than 6 inches with structural fill.
   3. Restore nonuniform overexcavation by excavating to a uniform depth. Restore with granular material for depth less than 6 inches or with structural fill for depth more than 6 inches.
   4. Perform at no extra cost to Owner.

H. Blasting:
   1. Blasting will not be permitted.

I. Sheeting and Bracing:
   1. Design, furnish, place, maintain, and subsequently remove, to the extent required, a system of temporary supports for cut and cover, open cut, or trench excavations, including bracing, dewatering, and associated items to support the sides and ends of the excavations where excavation slopes might endanger in-place or proposed improvements, extend beyond construction rights-of-way, or where specified or indicated.
   2. Provide on-Site prior to start of excavation in each section, and make such adjustments as are required to meet unexpected conditions.
   3. Space and arrange sheeting and bracing as required to exclude adjacent material and according to the stability of excavation slopes.
   4. Contractor shall make his own assessment of existing conditions including adjacent property, the possible effects of his proposed temporary works and construction methods, and shall select and design such support systems, methods, and details as will assure safety to the public, adjacent property, and the completed Work.
   5. Modify or relocate Underground Facilities, at no additional cost to Owner or Engineer, if existing Underground Facilities interfere with Contractor's proposed method of support.
   6. Employ caution in the areas of Underground Facilities, which shall be exposed by hand or other excavation methods acceptable to Owner.
   7. Perform sheeting, shoring, and bracing for trench excavation, for Underground Facilities, and for other purposes in accordance with the safety and protection requirements of the General Conditions.
   8. Provide sheeting, shoring, and bracing for trench excavation in the subgrade of the excavation to prevent movement of the main excavation support system.
   9. Provide shoring, sheeting, and bracing as indicated or specified to meet the following requirements:
      a. Prevent undermining and damage to all structures, buildings, Underground Facilities, pavements and slabs.
      b. Excavations shall be accomplished with vertical banks where necessary for construction activities or as indicated, and also within all limits of excavation noted on the Drawings.
      c. Design excavation support system and components to support lateral earth pressures, unrelieved hydrostatic pressures, utility loads, traffic and construction loads, and building and other surcharge loads to allow the safe and expeditious construction of the permanent structures without movement or settlement of the ground, and to prevent damage to or movement of adjacent buildings, structures, Underground Facilities, and other improvements. The design shall account for staged removal of bracing to suit the sequence of concrete placement for permanent structures and backfill.
      d. Except as otherwise specified herein, shoring and sheeting materials may be extracted and reused at Contractor's option; however, Contractor shall remove and replace any existing structure or Underground Facility damaged during shoring and sheeting. Remove sheeting and bracing as backfill progresses. Fill voids left after withdrawal with sand or other approved material.
      e. Where shoring and sheeting materials must be left in-place in the completed Work to prevent settlements or damage to adjacent structures or as directed by Resident Project Representative, backfill the excavation to within 3 feet below the finished grade and remove the remaining exposed portion of the shoring before completing

the backfill. If soldier piles and wood lagging are used for shoring, remove wood lagging to within 3 feet of finished grade in incremental steps of approximately 6 inches as the backfill is constructed, or to Contractor's design if more stringent. The location of all shoring and sheeting left in-place shall be documented on drawings and provided to Engineer and Owner.

10. Contractor shall be solely responsible for proper design, installation, operation, maintenance, and any failure of any component of the system. Review by Engineer of the design and data submitted by Contractor shall not relieve Contractor from full responsibility for errors therein or from the entire responsibility for complete and adequate design and performance of the sheeting and shoring system.
11. Provision for Contingencies:
    a. The performance of the components of the support system shall be monitored for both vertical and horizontal movement at daily.
    b. A contingency plan or alternative procedure shall be provided for implementation, if the designed system does not adequately perform.
    c. The materials and equipment necessary to implement the contingency plan shall be kept readily available.
12. Damages:
    a. Contractor shall document all existing damage to adjacent facilities and submit the information to Owner prior to performing any excavation. Documentation shall include a written description, diagrams, measurements, and appropriate photographs.

3.02 STOCKPILING:

A. Stockpile in amounts sufficient for and in a manner to segregate materials suitable for the following:
    1. Topsoiling.
    2. Constructing fills.
    3. Structural fill.
    4. Waste only.
B. Do not obstruct or prevent access to the following:
    1. Roads and driveways.
    2. Utility control devices.
    3. Ditches or natural drainage channels.
    4. Railroads.
    5. Indicated material storage (lay-down) areas.
    6. Indicated transmission lines and towers.
C. Perform in a manner to avoid endangering the work, stability of banks or structures, or health of trees and shrubs to be saved.
D. Maintain safe distance between toe of stockpile and edge of excavation or trench.
E. Stockpile in other areas of the Site when adjacent structures, easement limitations, or other restrictions prohibit sufficient storage adjacent to the Work. Off-Site areas, if required, shall be arranged for by Contractor at no additional cost to Owner.

3.03 DEWATERING:

A. Control grading around excavations to prevent surface water from flowing into excavation areas.
B. Drain or pump as required to continually maintain, including days not normally worked, all excavations and trenches free of water or mud from any source, and discharge to approved

drains or channels. Commence when water first appears and continue as required to keep excavation free of standing water during entire time excavation is open.

C. Use pumps of adequate capacity to ensure rapid drainage of area, and construct and use drainage channels and subdrains with sumps as required.

D. When water is found in the excavation due to Contractor negligence, remove unsuitable excessively wet subgrade materials and replace with approved compacted fill material as directed by Engineer and at no additional cost to Owner.

E. Contractor shall submit a dewatering plan prior to beginning excavation.

3.04 FILL:

A. General:

1. Place on stable, suitable subgrade approved by Engineer.
   a. Obtain Engineer's approval and remove all forms, unsuitable material, and debris from the subgrade or excavation area prior to commencing placement of any fill.
   b. Do not place snow, ice, or frozen earth in fill and do not place fill on a frozen surface.
2. Place adjacent to structures only after concrete has attained 70% of design strength and, in the opinion of Engineer, a sufficient portion of the structure has been built to resist the imposed load.
3. Place in layers of uniform thickness keeping the working surface of the entire area level.
4. Place adjacent to structures simultaneously on all sides of structures.
5. Exercise care in the use of heavy equipment in areas adjacent to structures.

B. Granular Fill:

1. Material shall be (crushed natural stone) (crushed rock) with the following gradation:

Sieve Size (Square Openings)	% Passing (By Weight)
1"	100
3/4"	90-100
3/8"	30-65
No. 4	5-25
No. 8	0-10
No. 16	0-5

2. Gradation shall not vary from low limit on one sieve to high limit on adjacent sieve or vice versa.
3. Sampling procedure shall conform to ASTM D75.
4. Material shall not have a loss of more than 15% after 5 cycles when tested for soundness with sodium sulfate as described in ASTM C88.
5. Place on prepared subgrade where granular fill is indicated as a base for concrete slabs on grade.
6. Lifts for all granular fill placed shall not exceed 6 inches in loose layer thickness.
7. Compact to 98% maximum relative density as determined by ASTM D4253 and ASTM D4254.

C. Earthen (Cohesive) Fill:

1. Includes suitable material from excavations and borrow areas.
2. Suitable material includes material that is free of debris, roots, organic matter, refuse, ashes, cinders, and frozen matter, and which is free of rock with any dimension greater than one-half the specified loose layer thickness.

3. Unsuitable materials include all material that does not conform to the above or other materials that are determined by Engineer as too wet or otherwise unsuitable for providing a stable fill.
4. That portion of material passing the No. 40 sieve shall have a liquid limit not exceeding 40 and a plastic index not exceeding 25 when tested in accordance with ASTM D4318.
5. The slope bounding the fill area, if steeper than six horizontal to one vertical (6:1), shall be stepped or serrated prior to placing the fill material as indicated.
6. Material shall be friable sandy or silty clay containing sufficient fine material to provide a dense mass free of voids when compacted. When impact compacted, these materials will produce a well-defined moisture-density relationship curve.
7. Material shall not contain more than 10% by volume of rock and gravel and not contain particles with maximum dimension greater than one-half the depth of the layer to be compacted.
8. Material for construction of dikes and impoundment liner shall not contain rock or gravel.
9. Compact with approved equipment to a minimum of 95% of maximum dry density within the optimum moisture content range. Optimum moisture and maximum density shall be determined by ASTM D698.
10. Perform any wetting or drying of the material as required to obtain the specified density when compacted and to maintain specified moisture content range at the time of placement.

D. Concrete:
1. Includes all concrete used to restore bottom of excavation to proper elevation, and in concrete seal coats.
2. Concrete shall be as specified in Section 03 30 53 - Miscellaneous Cast-in-Place Concrete.

E. Borrow Materials:
1. Refers to suitable materials obtained from sources, on site or off site, other than excavations or stockpiles available which are designated for use by this Contract.
2. Borrow shall include all clearing, grubbing, excavating, handling and final disposal of materials as specified. Use borrow, if required, to bring fill to lines and grades indicated.
3. Borrow, if required, shall be furnished by the Contractor as specified without additional compensation.
4. Grade on-site borrow areas to drain and to present a neat appearance.
5. Seed and mulch surface of borrow area after grading. Contractor will be held responsible for any erosion that occurs until a sturdy growth over a minimum of 98% of the area seeded is established.

F. Compaction Testing:
1. The method of in-place compaction testing including density and moisture content shall be as follows:
   a. Density - Cohesive materials: ASTM D6938.
   b. Density - Cohesionless materials: ASTM D6938.
   c. Moisture Content: ASTM D6938.
2. The minimum frequency of in-place compaction testing including density and moisture content will be as follows:
   a. At least one test for every 200 cubic yards of fill placed in trenches or surrounding structures.
   b. At least one test every 100 linear feet per lift along a roadway.
   c. At least one test for every 500 square feet where subgrade preparation for roadways, railroads, drives, and parking areas is being performed.

d. At least one test for every 100 square feet per lift in structural fill.
e. At least one test when Engineer suspects the quality of moisture control or effectiveness of compaction.

3. Fill failing to meet required densities shall be removed or scarified and recompacted as necessary to achieve specified results.
4. Removal of in-place material and replacement with approved new material will be required if scarifying and recompaction do not produce the required densities.

G. Equipment:
1. Compaction equipment shall conform to the following requirements and be subject to the approval of Engineer.
a. Tamping Rollers:
(1) May be towed or self-propelled.
(2) Have staggered, uniformly spaced knobs or feet. When fully loaded, they shall exert at least 250 psi on combined area of tamping feet in contact with ground.
(3) Be equipped with cleaning fingers maintained at full length to prevent accumulation of material between feet.
(4) Maintain all equipment in good repair.
b. Pneumatic rollers:
(1) Have two axles, not less than 9 wheels with pneumatic tires of equal size, diameter, and ply rating, a rigid steel frame, and a body suitable for ballast loading. Tracking wheels shall overlap by a minimum of 1/4-inch.
(2) Tires shall be uniformly inflated at all times.
(3) May be self-propelled or towed.
c. Vibratory rollers:
(1) Have either one or two smooth-surfaced steel drums with a minimum diameter of 42 inches.
(2) Have a minimum vibrating force of 300 pounds per cycle per inch of drum width.
(3) Have a minimum vibrating frequency of 1,200 cycles per minute with a means of adjusting the resonance of the dynamic force.
(4) May be self-propelled or towed.
d. Power tampers shall be used for compaction of material in areas where it is impractical or unsafe to use heavy equipment, and as recommended by Engineer.
e. Vibratory plate compactor may be used for compaction of sand and/or gravel material in areas where it is impractical or unsafe to use heavy equipment, and as recommended by Engineer.

3.05 DISPOSAL OF WASTE MATERIALS AND DEBRIS:

A. Waste Materials:
1. Waste material includes all excess suitable materials and materials unsuitable for use in the Work.
2. Remove unsuitable materials from work area as excavated.
3. Deposit waste materials off site at location approved by Engineer.
4. Keep excess suitable material segregated from unsuitable waste in the waste disposal area.
5. Grade waste areas and leave them free draining and with an orderly and neat appearance.

6. Seed and mulch waste areas after grading. Contractor will be held responsible for any erosion that occurs until a sturdy growth over a minimum of 98% of the area seeded is established.

B. Debris:
   1. Dispose of debris from clearing and grubbing (and demolition) at a location off the Site as arranged for by Contractor at no additional cost to Owner.
   2. Contractor may claim and salvage any timber or other debris which he may consider of value but shall not delay in any manner either this Contract or other work with salvaging operations.

END OF SECTION 31 23 16

SECTION 31 23 33.03 – TRENCHING AND BACKFILLING FOR UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. This Section includes:
   1. Excavation, sheeting, bracing, and all operations necessary for the preparation of trenches for bedding of pipes and pipe appurtenances, conduit, and buried cable.
   2. Pipe embedments and encasements.
   3. Backfilling of trenches.

B. Related Work Specified Elsewhere:
   1. Section 31 20 00 - Site Preparation and Earthwork.
   2. Section 31 23 16 - Excavation and Filling for Structures.
   3. Section 03 30 53 – Miscellaneous Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS:

A. Applicable Standards:
   1. American Association of State Highway and Transportation Officials (AASHTO):
      a. M147 - Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
      b. T99 - The Moisture-Density Relations of Soils Using a 5.5-Pound Rammer and a 12-Inch Drop.
      c. T104 - Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
   2. American Society for Testing and Materials (ASTM):
      a. D4253 - Test Method for Maximum Index Density of Soils Using a Vibratory Table.
      b. D4254 - Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   3. Occupational Safety and Health Administration (OSHA):
      a. Part 1926 - Safety and Health Regulations for Construction.
   4. Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

1.04 SUBMITTALS:

A. Submit as specified in DIVISION 01.

B. Includes, but not limited to, the following:
   1. Concrete Submittals as specified in Section 033053 – Miscellaneous Cast-in-Place Concrete.

C. Where selecting an option for excavation, trenching, and shoring in compliance with local, state, or federal safety regulations such as "OSHA Part 1926" or successor regulations, which require design by a registered professional engineer, submit (for information only and not for Engineer approval) the following:
   1. Copies of design calculations and notes for sloping, benching, support systems, shield systems, and other protective systems prepared by or under the supervision of a professional engineer legally authorized to practice in the jurisdiction where the Project is located.

2. Documents provided with evidence of registered professional engineer's seal, signature, and date in accordance with appropriate state licensing requirements.

1.05 QUALITY ASSURANCE:

A. Sampling and Testing:

1. Tests to determine conformance with all requirements of this Specification for quality and properties of all Contractor-secured materials, including borrow materials (both on or off Site) proposed for use, shall be performed by an independent commercial laboratory retained and compensated by Contractor, and approved by Engineer.
2. When incorporating materials into the Project, quality control testing will be performed during construction by a testing laboratory retained and compensated by Contractor.

PART 2 - PRODUCTS

2.01 GRANULAR PIPE EMBEDMENT:

A. Material:

1. Embedment materials for water and sewer lines shall have a maximum aggregate size of 3/4 inch and be crushed aggregate conforming the requirements of ASTM Class 67 stone.
2. Gravel or crushed stone which shall not have a loss of more than 15% after five cycles when tested for soundness with sodium sulfate as described in AASHTO T104.

2.02 TRENCH STABILIZATION MATERIAL:

A. Material shall:

1. Conform to Type A Aggregate Base Course as specified in the Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

2.03 CONCRETE:

A. Concrete and reinforcing steel shall conform to applicable requirements of Section 03 30 53 – Miscellaneous Cast-in-Place Concrete and Section 32 13 13 – Concrete Pavement.

2.04 TRENCH BACKFILL MATERIALS:

A. Obtain from the following:

1. Trenches and other excavations included in this Contract.
2. Borrow from location off Site.
3. As specified for pipe embedment.
4. Combination of above.

B. Free from organic matter, refuse, ashes, cinders, frozen, gravel, rock or shale greater than 3”, or other unsuitable material.

C. Contain sufficient fine materials to provide a dense mass free of voids and capable of satisfactory compaction.

D. Have moisture content enabling satisfactory placement and compaction.

E. Blended or otherwise processed to provide required gradation and moisture content.

F. Granular Backfill: Under paved surfaces and where indicated on the Drawings, granular backfill meeting the material and compaction requirements of Type A Aggregate Base Course, as specified by the Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction. ASTM Class 67 stone may be used in leui of Type A Aggregate Base Course to within six inches (6”) of the pavement subgrade.

G. Flowable Fill: Trench backfill shall be flowable fill for all trenches indicated on Contract Documents to a point 2 feet beyond the edge of the public pavement, and for all portions of

trenches running parallel to and within 2 feet of the edge of the public pavement. Flowable Fill shall meet the requirements of Flowable Select Material as specified in the Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

H. Whenever, in the opinion of the Engineer, the material excavated from the trenches is not suitable for backfilling, or there is a deficiency of material suitable for backfilling, the Contractor shall provide suitable material. The Contractor shall remove all excess excavated materials and shall dispose of them at locations provided by the Contractor.

PART 3 - EXECUTION

3.01 TRENCHING:

A. Equipment and Methods:
   1. Types of Equipment and methods may be at Contractor's option, where structures or other facilities are not endangered.
   2. Equipment and methods shall be subject to approval of jurisdictional agency where stability or usefulness of other facilities may be impaired.
   3. Perform by hand methods when required to save or protect trees, culverts, utilities, or other structures above or below ground.
   4. Maximum length of open trench shall be limited to 50 feet in advance and to 30 feet behind pipe installation, except as approved.

B. Side Walls:
   1. Make vertical or slope within specified trench-width limitations below a horizontal plane 12 inches above top of pipe.
   2. Vertical or sloped (stepped) as required for stability, above a horizontal plane 12 inches above top of pipe.
   3. Sheet and brace where necessary. Conform to applicable requirements of Section 31 23 16 - Excavation and Filling for Structures.
   4. Excavate without undercutting.

C. Trench Depth:
   1. Depth shall be sufficient to provide the minimum bedding requirements for the pipe being placed.
   2. Do not exceed the indicated depth where conditions of bottom are satisfactory.
   3. Increase depth as necessary to remove unsuitable supporting materials.
   4. Minimum depth to top of pipe shall be:
      a. 36-inch for 6 and 8-inch diameter water lines
      b. 48-inch for 12-inch diamter water lines.

D. Trench Bottom:
   1. Protect and maintain when suitable natural materials are encountered.
   2. Remove rock fragments and materials disturbed during excavation or raveled from trench walls.
   3. Restore to proper subgrade with trench-stabilization material or timber mat topped with trench-stabilization material when overexcavated:
      a. Payment shall be in accordance with the Unit Price stipulated in the Agreement for authorized replacement of unsuitable materials.
      b. Correct, at no additional cost to Owner, when trench is overexcavated without authority or to stabilize bottom rendered unsuitable through negligence or improper operations.
      c. Placement of Trench Stabilization Material:
         (1) Compact in lifts not exceeding 6-inch loose thickness:

(a) With pneumatic or vibratory equipment.
(b) To density specified for granular pipe embedment.

E. Trench Width:
1. Excavate trench to a width which will permit satisfactory jointing of the pipe and thorough tamping of the bedding.
2. Minimum Trench Width:
a. Above Centerline of Pipe:

Nominal Pipe Size	Min. Trench Width
For pipe sizes 12” and less	Outside Diameter (OD) +12”

b. Below Centerline of Pipe:

Nominal Pipe Size	Min. Clearance from Pipe Walls
For pipe sizes 12” and less	6”

3. Maximum Trench Width:
a. Below a plane 12 inches above top of pipe (or as defined by top of pipe embedment).

Nominal Pipe Size	Max. Trench Width
For pipe sizes 12” and less	Outside Diameter (OD) + 24”

b. Above plane defined in "a", no maximum limit.
c. Maximum trench-width limitations shall apply beginning 3 feet from manhole or structure walls.
d. Maximum trench-width shall be as near the minimum specified as can be controlled by construction equipment and methods used.
e. Correct when overexcavated at no additional cost to Owner:
(1) Use stronger pipe or higher class embedment.
(2) Obtain approval of Engineer before proceeding.

F. Trenching in Fill Areas: Perform trenching in fill areas only after compacted fill has reached an elevation of not less than 1 foot above the top of the pipe.

G. Test Pits:
1. Excavate test pits sufficiently in advance of trenching to enable adequate planning of construction procedure.
2. Locate as follows:
a. Where unstable material is suspected that may require special protective measures.
b. Where groundwater may require special handling methods.
c. Where indicated or otherwise approved.
d. Where interference or conflict with other utilities or structures could affect alignment of pipe.
3. With lateral dimension not less than minimum trench width specified for location excavated.
4. To depth required to obtain information desired.

3.02 PIPE EMBEDMENTS AND ENCASEMENTS:

A. Granular Pipe Embedment:
1. Place granular embedment as follows:
a. Level bottom layer at proper grade to receive and uniformly support pipe barrel throughout its length.

b. Form depression under each joint so that no part of bell or coupling is in contact with trench when pipe is placed in position.
c. Add second layer simultaneously to both sides of the pipe with care to avoid displacement.
d. Complete promptly after completion of jointing operations and approval to proceed.
e. Substitute for any part of earth backfill to within 2 feet of final grade at Contractor's option.

2. Compact granular bedding as follows:
a. In lifts not exceeding 12 inches in compacted depth.
b. Rod, spade, or use pneumatic or vibratory equipment:
(1) As required to obtain not less than 90% relative density as determined by ASTM Method D4253 and D4254.
(2) Throughout depth of embedment.

B. Cut-Off Walls or Impervious Trench Checks: Include impervious clay cut-off walls as indicated.
1. Compact to 95% of maximum density at optimum moisture content as determined by AASHTO T99.

C. Earth Pipe Embedment:
1. Include earth pipe embedment as indicated.
2. Use at impervious trench checks.
3. Shape trench bottom to fit the pipe and backfill throughout depth of trench with compacted impervious materials.

3.03 BACKFILLING:

A. Placement:
1. Complete promptly after approval to proceed:
a. Upon completion of pipe embedment.
2. Use hand methods to a horizontal plane 12 inches above top of pipe-bell.
3. Use approved mechanical methods where hand backfill is not required.
4. Place in layers of thickness within compacting ability of equipment used.
5. Until compacted depth over pipe exceeds 3 feet, do not drop fill material over 5 feet. Then distance may be increased 2 feet for each additional 1 foot of cover. Backfill pipe trenches in layers of 6 to 12 inches.

B. Compaction:
1. Perform at moisture content necessary to achieve required results with equipment used.
2. Perform with spreading equipment supplemented by hand-operated equipment and rollers as required to obtain density specified.
3. Accomplish without inundation or flooding.
4. Achieve following densities:
a. Unless otherwise specified, adequate to prevent future settlement.
b. Under driveways, streets, alley-ways, parking lots or other traveled corridors:

	AASHTO T99
Top 12 inches	98%
Remainder of depth	95%

5. Backfill failing to meet required densities shall be removed or scarified and recompacted as necessary to achieve specified results.

3.04 CHANNEL EXCAVATION:

A. Conform to applicable requirements of Section 312000 - Site Preparation and Earthwork.
B. Maintain area drainage during construction.
C. Complete channel protection expeditiously following excavation.

3.05 FIELD QUALITY CONTROL:

A. Compaction: Contractor will, through services of an independent laboratory, test all trench-stabilization material, granular pipe embedment, earth-pipe embedment, clay cut-off walls, and trench backfill to determine conformance with specified moisture- density relationships:
    1. Method of test will be as specified in Section 312000 - Site Preparation and Earthwork, PART 3.

END OF SECTION 31 23 33.03

SECTION 32 15 00 – AGGREGATE SURFACE COURSE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. This Section includes requirements for aggregate surfacing for roads, streets, parking areas, and other surfaces requiring aggregate surfacing.
B. Related Work Specified Elsewhere:
   1. Section 31 20 00 - Site Preparation and Earthwork.

1.03 REFERENCE STANDARDS:

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to within the text by the basic designation only.
   1. Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.
   2. American Society for Testing and Material (ASTM): Equivalent AASHTO Standards may be substituted as approved:
      a. ASTM C88 - Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate.
      b. ASTM C117 - Standard Test Method for Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing.
      c. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
      d. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
      e. ASTM D75/D75M - Standard Practice for Sampling Aggregates.
      f. ASTM D422 - Particle-Size Analysis of Soils.
      g. ASTM D698 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3)
      h. ASTM D1556 - Density and Unit Weight of Soil in Place by the Sand-Cone Method.
      i. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3).
      j. ASTM D2167 - Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
      k. ASTM D3740 - Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
      l. ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
      m. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
      n. ASTM E11 - Wire Cloth and Sieves for Testing Purposes.

1.04 SUBMITTALS:

A. Submit the following in accordance with DIVISION 01:

1. Product Data:
   a. Equipment.
2. Test Reports:
   a. Sampling and Testing.
   b. Density Tests.

1.05 QUALITY ASSURANCE:

A. Sampling and testing are the responsibility of the Contractor and performed by an independent testing laboratory approved by the Engineer. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. Test the materials to establish compliance with the specified requirements; perform testing at the specified frequency. The Engineer may specify the time and location of the tests. Furnish copies of test results to the Engineer within 24 hours of completion of the tests.

B. Sampling:
   1. Take samples for material gradation, liquid limit, and plastic limit tests in conformance with ASTM D75.

C. Testing:
   1. Gradation:
      a. Aggregate gradation shall be in conformance with ASTM C117, ASTM C136, and ASTM D422. Sieves shall conform to ASTM E11.
   2. Liquid Limit and Plasticity Index:
      a. Determine liquid limit and plasticity index in accordance with ASTM D4318.

D. Approval of Materials:
   1. Select the source of the material to be used for producing aggregates 30 days prior to the time the material will be required in the Work. Tentative approval of materials will be based on appropriate test results on the aggregate source. Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and compacted surface course.

E. Equipment:
   1. Submit a list of proposed equipment to be used in performance of construction work including descriptive data. All plant, equipment, and tools used in the performance of the Work covered by this Section will be subject to approval by the Engineer before the Work is started and shall be always maintained in satisfactory working condition. The equipment shall be adequate and shall have the capability of producing the required compaction, and meeting the grade controls, thickness controls, and smoothness requirements set forth herein.

1.06 WEATHER LIMITATIONS:

A. Aggregate surface courses shall not be constructed when the ambient temperature is below 35ºF or on subgrades that are frozen or contain frost. Surfaces damaged by freeze, rainfall, or other weather conditions shall be brought to a satisfactory condition by the Contractor.

PART 2 - PRODUCTS

2.01 AGGREGATES:

A. Aggregates shall consist of clean, sound, durable particles of crushed stone, or crushed gravel, and shall be free from coatings of clay, silt, vegetable matter, and other objectionable materials

and shall contain no clay balls. All aggregate materials shall comply with the Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction, Sections 303 and 703.

PART 3 - EXECUTION

3.01 STOCKPILING MATERIALS:

A. Prior to stockpiling the material, clear and level the storage areas. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Stockpile aggregates in such a manner that will prevent segregation. Aggregates and binders obtained from different sources shall be stockpiled separately.

3.02 PREPARATION OF UNDERLYING COURSE SUBGRADE:

A. Clean of all foreign substances from the subgrade. At the time of surface course construction, the subgrade shall contain no frozen material. Ruts or soft yielding spots in the subgrade areas having inadequate compaction and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade and recompacting to density requirements specified. The completed subgrade shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the surface course is placed.

3.03 MIXING AND PLACING MATERIALS:

A. The materials shall be mixed and placed to obtain uniformity of the material and a uniform optimum water content for compaction. Adjust in mixing, placing procedures, or in equipment to obtain the true grades, to minimize segregation and degradation, to obtain the desired water content, and to ensure a satisfactory surface course.

3.04 LAYER THICKNESS:

A. Place the aggregate material on the subgrade in layers of uniform thickness. When a compacted layer of 6 inches or less is specified, the material may be placed in a single layer; when a compacted thickness of more than 6 inches is required, no layer shall exceed 6 inches nor be less than 3 inches when compacted.

3.05 COMPACTION:

A. Immediately upon completion of the spreading operations, the crushed aggregate shall be thoroughly compacted to the lines and grades shown on the Drawings. The number, type, and weight of rollers shall be sufficient to compact the material, as determined by AASHTO T 310, Direct Transmission, of not less than 98% of the maximum laboratory density determined in the laboratory by AASHTO T 180, Method D. Aggregate base course placed in areas outside of the normal traveled way, such as driveways, islands, gore areas, other incidental construction, and restricted width areas outside of the normal traveled way which cannot accommodate a full width roller shall be compacted to a density, as determined by AASHTO T 310, Direct Transmission, of not less than 95% of the maximum laboratory density. Shoulders, driveways, and parking areas are considered to be within the normal traveled way. The aggregate shall be compacted across the full width of application.

B. The moisture content of the material during placing operations shall not be below, or more than 2 percentage points above, the optimum moisture content as determined by ASTM D698.

3.06 EDGES OF AGGREGATE-SURFACED ROAD:

A. Approved material shall be placed along the edges of the aggregate surface course in such quantity as to compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least 1 foot of shoulder width shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the surface course.

3.07 GRADE CONTROL:

A. During construction, the lines and grades including crown and cross slope indicated for the aggregate surface course shall be maintained by means of line and grade stakes placed by the Contractor.

3.08 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY:

A. Quality control and acceptance testing shall be according to the provisions of the Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

3.09 THICKNESS CONTROL:

A. The completed thickness of the aggregate surface course shall be within ±1/2 inch of the original thickness. The thickness of the aggregate surface course shall be measured at intervals in such manner that there will be a thickness measurement for at least each 500 square yards of the aggregate surface course. The thickness measurement shall be made by test holes at least 3 inches in diameter through the aggregate surface course. When the measured thickness of the aggregate surface course is more than 1/2 inch deficient in thickness, correct such areas by scarifying, adding mixture of proper gradation, reblading, and recompacting, as directed, at no additional expense to the Owner. Where the measured thickness of the aggregate surface course is more than 1/2 inch thicker than that indicated, it shall be considered as conforming with the specified thickness requirements +1/2 inch. The average job thickness shall be the average of the job measurements determined as specified above but shall be within 1/4 inch of the thickness indicated. When the average job thickness fails to meet this criterion, make corrections by scarifying, adding, or removing mixture of proper gradation, and reblading and recompacting, as directed, at no additional expense to the Owner.

3.10 SMOOTHNESS TEST:

A. The surface of each layer shall not show any deviations more than 1/2 inch when tested with a 16-foot straightedge applied both parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding this amount shall be corrected by removing material, replacing with new material, or reworking existing material and compacting, as directed.

3.11 MAINTENANCE:

A. Maintain the aggregate surface course in a condition that will meet all specification requirements until accepted.

END OF SECTION 32 15 00

SECTION 32 91 00 – RIGHT-OF-WAY RESTORATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY: This Section covers restoration of the right-of-way and any other areas disturbed by the Contractor in the performance of their work.

1.03 SUBMITTALS:

A. Submit as specified in Division 01.
B. Compliance Submittals:
   1. Include, but not limited to, the following:
      a. Certification from vendor that seed meets requirements of these Specifications.
      b. Seed mix showing purity and germination of each seed type and total pounds of seed required per acre.

PART 2 - PRODUCTS

2.01 SEED, SOD, MULCH, AND JUTE NETTING: As specified in section 32 92 00 - Seeding and Sodding.

PART 3 - EXECUTION

3.01 RIGHT-OF-WAY RESTORATION: Following line construction activities, remove construction roads and restore right-of-way as follows:

A. All ruts in existing roads shall be filled and compacted in 6-inch lifts and the roads graded to approximately the original contours.
B. Construction roads and ruts in agricultural and forest land shall be plowed and disked to remove any hard compacted areas and shall be graded to approximately the original contours.
C. The area within all disturbed areas shall be finish graded to the original ground contours. Dockets, swales, and high points shall be graded, using hand methods where necessary, to provide an unconcentrated flow of runoff around foundations and through structures.
D. Topsoil:
   1. Place topsoil over areas disturbed by construction and all other activities associated with the Project.
   2. Distribute over required areas without compaction other than that obtained with spreading equipment.
   3. Place to the extent material is available within the following limits:
      a. Not less than 4 inches in depth.
      b. Do not exceed 6 inches in depth.
E. Shape and grade to match contours of adjacent areas and permit good natural drainage.
F. Remove all rocks greater than 2” in diameter from the surface.
G. Maintenance and Repair:
   1. Maintenance: Protect newly topsoiled areas from actions of the elements.
   2. Correction of Settlement: Contractor is responsible for correcting settlement more than 12 inches and damages created thereby within one year after acceptance of the Work.
   3. Make repairs within 10 days from and after due notification by Owner of embankment or backfill settlement and resulting damage.

4. Make own arrangements for access to the Site for purposes of repair.

END OF SECTION 32 91 00

SECTION 32 92 00 – SEEDING AND SODDING

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section includes seedbed preparation, seeding, sodding, mulching, and fertilizing of areas indicated and/or disturbed by Contractor's construction activities.

1.02 REFERENCES:

A. Applicable Standards:
   1. Oklahoma Department of Transportation 2019 Standard Specifications for Highway Construction.

1.03 SUBMITTALS:

A. Certificates: Includes, but not limited to, the following:
   1. Seed shall be accompanied by certificate from vendor that seed meets requirements of these Specifications.
   2. Fertilizer shall be accompanied by certificate from vendor that fertilizer meets requirements of these Specifications.

PART 2 - PRODUCTS

2.01 FERTILIZER:

A. Fertilizer shall be an inorganic commercial grade.
   1. Uniform in composition.
   2. Free flowing and suitable for application with approved equipment.
B. Deliver to Site in labeled bags or containers.

2.02 SEED:

A. Seed shall conform to all applicable laws of the State of Oklahoma.
B. Seed shall be labeled according to the U.S. Department of Agriculture (USDA) Federal Seed Act and shall be furnished in containers with tags showing seed mixture, purity, germination, weed content, name of seller, and date on which seed was tested.
   1. Seed mixture shall be applied at the following rate (in lbs/acre) and shall have a minimum of 98% pure seed and 85% germination by weight, and shall contain no more than 1% weed seeds.

March 15 - June 15		
Bermuda Grass (Common) unhulled	5	5
Bermuda Grass (Common) hulled	10	10
Lespedeza (Korean)	10	10
Wildflower Mix	4.0	4.6
June 16 - August 31		
Bermuda Grass (Common) unhulled	5	5
Bermuda Grass (Common) hulled	10	10
Wildflower Mix	4.0	4.6
September 1 - March 14		
Annual Rye Grass or other Cereal Grasses	10	10
Crimson Clover (Dixie)	10	10
Bermuda Grass (Common) unhulled	20	20
Wildflower Mix	4.0	4.6

2. Moldy seed or seed that has been damaged in storage shall not be used.

2.03 MULCH:

A. Vegetative Mulch: Mulch shall be straw from stalks of wheat, rye, oats, or hay from fields of timothy, redtop, bromegrass, or other approved materials, and shall be partially decomposed. Mulch shall be free of noxious and undesirable seed and material.

B. Tackifiers:
   1. Asphalt Emulsion: Conform to ASTM D977, Type SS-1.
   2. Organic Glue: Hydrobond as manufactured by Erosion Control Products or approved equal.

C. Wood Cellulose Fiber:
   1. Fiber shall be produced from nonrecycled wood such as wood chips or similar wood materials and shall be of such character that the fiber will disperse into a uniform slurry when mixed with water. Fiber shall not be produced from sawdust or from paper, cardboard, or other recycled materials.
   2. Mulch shall not contain germination or growth inhibiting ingredients.
   3. Mulch shall be dyed an appropriate color to aid in visual inspection.
   4. Mulch material shall be easily and evenly dispersed when agitated in water.
   5. Supply in packages of not more than 100 pounds gross weight, and be marked by the manufacturer to show the air dry weight content of the wood cellulose fiber.
   6. Mulch shall not be water-soluble and shall comply with the following properties:
      a. Moisture content, 15% maximum.
      b. Organic matter - wood fiber (oven-dried basis), 90% maximum.
      c. pH: 4.3 to 8.5.
      d. Water holding capacity (grams of water/100 grams fiber), minimum: 1,000.
   7. Submit wood cellulose fiber material and application rates for approval by Engineer.

2.04 EROSION-CONTROL BLANKETS:

A. Jute Netting:
   1. Netting shall consist of a uniform, open, plain weave mesh of smolder-resistant, unbleached single jute yarn.

2. Yarn shall be of loosely twisted construction and shall not vary in thickness by more than one-half its normal diameter.
3. Jute mesh shall be furnished in rolled strips and shall be as follows:
   a. Minimum width of 42 inches.
   b. 76 warp ends per width (tolerance +3).
   c. 41 weft ends per yard (tolerance +3).
   d. Weigh not less than 0.9-pound per square yard.
4. Staples shall be of No. 11 gage, or heavier, steel wire, "U" shaped and not less than 6 inches in length with a crown of 1 inch.
5. Submit jute netting material sample and installation instructions for approval by Engineer.

B. Erosion-Control Fabric:
1. Fabric shall be "Hold Gro" erosion-control fabric as manufactured by Gulf States Paper Corporation or Engineer approved equal.
2. Fabric shall be furnished in rolled strips with a 4-foot minimum width and an area of 200 square yards.
3. Approximate weight of fabric shall be 0.2-pound per square yard.
4. Staples shall be of No. 11 gage or heavier steel wire, "U"-shaped and not less than 6 inches in length with a 1-inch crown.

2.05 SOD:

A. Sod shall be densely rooted Bermuda sod, live, fresh, and uninjured.
B. Sod shall be relatively free of weeds or other undesirable plants.
C. Cut sod in strips of uniform thickness with a minimum thickness of one and 1/2-inch.
1. Each strip shall contain at least one-half (1/2) but not more than one square yard.
2. Strips shall be not less than 12 inches in width.
D. At the time of sodlifting, the top growth shall not exceed 3 inches in length.
E. Moisten sod to depth at which it is to be cut when stripped during dry periods.

PART 3 - EXECUTION

3.01 SEEDBED AND SODBED PREPARATION:

A. Dispose of any growth, rocks, or other obstructions which might interfere with tilling, seeding, sodding, or later maintenance operations.
B. Thoroughly loosen and pulverize topsoil to a depth of at least 3 inches. Minimum depth of topsoil at seeded areas shall be 4 inches.
C. Maintain tilled areas until seeded and mulched, or sodded to provide a smooth area with no gullies or depressions.

3.02 APPLICATION - FERTILIZER:

A. Apply fertilizer at the rate of 800 pounds per acre to properly prepared seedbeds and areas that are to receive sod.
B. Incorporate fertilizer into the soil to a depth of at least 2 inches by discing, harrowing or raking. Fertilizer may be applied hydraulically on slopes 2 horizontal to 1 vertical or steeper. If fertilizer is applied hydraulically to these slopes, incorporation into the soil will not be required.

3.03 APPLICATION - SEED:

A. Dry Seeding: Accomplish sowing by use of approved equipment, having drills no more than 4 inches apart.
   1. Drill seed to an average depth of 1/2-inch.
   2. Overlap successive seed strips to provide uniform coverage. Repeat where skipped areas appear after a show of green.
   3. Cover seed with soil to an average depth of 1/4-inch by raking or other approved methods.

B. Hydraulic Seeding: Mix seed with water and constantly agitate. Do not add seed to water more than 4 hours before application.
   1. On slopes flatter than 2 horizontal to 1 vertical, apply seed separately from fertilizer. Mechanically incorporate fertilizer into the soil prior to seeding activities. Cover seed with either hydraulic mulch or soil. If hydraulic mulching is not used, cover seed with soil to an average depth of 1/4-inch by raking or other approved methods.
   2. On slopes 2 horizontal to 1 vertical and steeper, seed and fertilizer may be applied in a single operation. Incorporation into the soil will not be required. Hydraulic mulching will be required.

3.04 APPLICATION - MULCH:

A. Mulch cover shall consist of straw from threshed rice, oats, wheat, barley, or rye; of wood excelsior; or of hay obtained from various legumes or grasses, such as lespedeza, clover, vetch, soybeans, bermuda, carpet sedge, bahia, fescue, or other legumes or grasses; or a combination thereof. Mulch shall be dry and reasonably free from Johnson grass or other undesireable plants, and shall not be excessively brittle or in an advanced state of decomposition.

B. Apply a mulch covering to all seeded areas within 24 hours after seeding. Mulch not required on areas that are to be covered by an excelsior blanket or by an erosion-control fabric. Jute netting alone will not be considered an erosion-control fabric.

C. Apply mulch at the rate of 2 tons per acre by means of a mechanical spreader or other approved methods.

D. Immediately following the application of the mulch, water the seeded area in one watering, at a rate of 20.4 M gallons per acre. Perform so as not to cause erosion or damage to the seeded surface.

E. After the initial watering, water such that, in conjunction with rainfall, the seeded areas receive a minimum of 20.4 M gallons per acre per week for a minimum of four weeks.

3.05 APPLICATION - EROSION CONTROL:

A. Install netting erosion-control fabric where indicated. Install erosion-control fabric immediately following seeding operations.

B. Roll erosion-control fabric loosely over the required areas. Lifting and stretching of the material will not be permitted.

C. Secure erosion-control fabric by staples spaced as per manufacturer's recommendations.

D. Lap joints in the direction of water flow with at least a 4-inch overlap.

E. Any seeded or mulched areas disturbed by the installation of the erosion-control fabric shall be repaired at the Contractor's expense.

3.06 APPLICATION - SOD:

A. Prior to placing sod, the soil surface shall be worked until it is relatively free from debris, washes, gullies, clods, and stones. Surface shall be worked to a depth of not less than 3 inches with a disk, tiller, or other equipment approved by the Engineer.

B. Fertilizer shall be placed prior to placement of sod.
C. Handle sod with care to prevent loss of native soil from roots.
D. Do not use frozen sod.
E. Do not place sod during a drought ,except as authorized by Engineer.
F. Do not place sod on frozen ground.
G. Sod shall be moist at the time it is placed.
H. Lay sod strips along contour lines, by hand, commencing at the base of the area to be sodded and working upward.
    1. Carefully lay sod to produce tight joints.
    2. Stagger transverse joints of sod strips.
I. Firm, water, and refirm sod immediately after it is placed.
    1. Accomplish firming by application of a smooth-wheel roller weighing not less than 60 or more than 90 pounds per linear foot of roller.
    2. Immediately following the installation of the sod, water the area in one watering, at a rate of 20.4 M gallons per acre, and do so weekly for a period of three weeks. Perform so as not to cause erosion or damage to the sodded area.
J. On slopes of 3 horizontal to 1 vertical and steeper, anchor sod by wooden pegs after sod has been firmed.
    1. Pegs shall be 1/2-inch by 12 inches, driven into the ground on about 2-foot centers.
    2. Top of peg after driving shall be not less than 1/2-inch but not more than 1 inch above top of sod.

3.07 MAINTENANCE:

A. Mow grass to a height of 2 inches whenever average height of grass exceeds 5 inches.
B. Remove weeds by approved chemical treatment.
C. Erect and maintain signs or barricades to exclude traffic from seeded or sodded areas.
D. Seeded Areas: Perform maintenance for a period of three months after planting unless the desired cover is obtained in a shorter time and the shortening of the period of Contractor's responsibility is authorized.
    1. Water as required by good practice during the three-month maintenance period or until accepted by Engineer.
    2. Prior to acceptance, repair at Contractor's expense any portion of the seeded surface which becomes gullied or otherwise damaged, or destroyed.
    3. To be acceptable, seeded areas shall have a good, uniform color and sturdy growth with no bare soil spots, over a minimum of 98 percent of the area seeded.
E. Sodded Areas: Perform maintenance for a period of three months after planting unless the desired cover is obtained in a shorter time and the shorter period of Contractor's responsibility is authorized by Engineer.
    1. Thoroughly water sodded areas daily for a period of 15 days after placing.
    2. Maintain sod in good live condition. Prior to acceptance, replace any sod not in good growing condition with fresh live sod.
    3. Water thoroughly whenever sod shows evidence of excessive drying until sod is accepted.
    4. To be acceptable, sodded areas shall have a good, uniform color and sturdy growth with no bare soil spots, over a minimum of 98 percent of the area sodded.

END OF SECTION 32 92 00

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