

SPECIFICATIONS AND CONTRACT DOCUMENTS

2009-00013

FOR

HYDEN – LESLIE COUNTY WATER DISTRICT

HYDEN, KENTUCKY

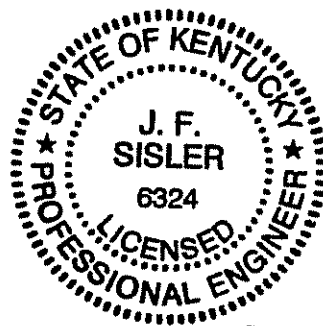
RECEIVED

JAN 15 2009

CONTRACT NO. 9

PUBLIC SERVICE
COMMISSION

WATER STORAGE TANKS



J. F. Sisler

**FOR RE BID
NOVEMBER 2008**

SME PROJECT CODE: 03004

SISLER-MAGGARD ENGINEERING, PLLC

ENGINEERING • SURVEYING
220 EAST REYNOLDS ROAD, SUITE A3
LEXINGTON, KENTUCKY 40517
(859) 271-2978 FAX (859) 271-5670



**HYDEN-LESLIE COUNTY WATER DISTRICT
CONTRACT NO. 9 –WATER STORAGE TANKS**

INDEX

SECTION 1 - ADVERTISEMENT FOR BIDS

SECTION 2 - INSTRUCTIONS TO BIDDERS

SECTION 3 – GENERAL AND SUPPLEMENTAL CONDITIONS

SECTION 4 - WAGE RATES - STATE

SECTION 5 - SPECIAL CONDITIONS

SECTION 6 - TECHNICAL SPECIFICATIONS *(SEE TECHNICAL SPECIFICATIONS FOR TABLE OF CONTENTS)*

SECTION 7 - CONTRACT AND BOND FORMS

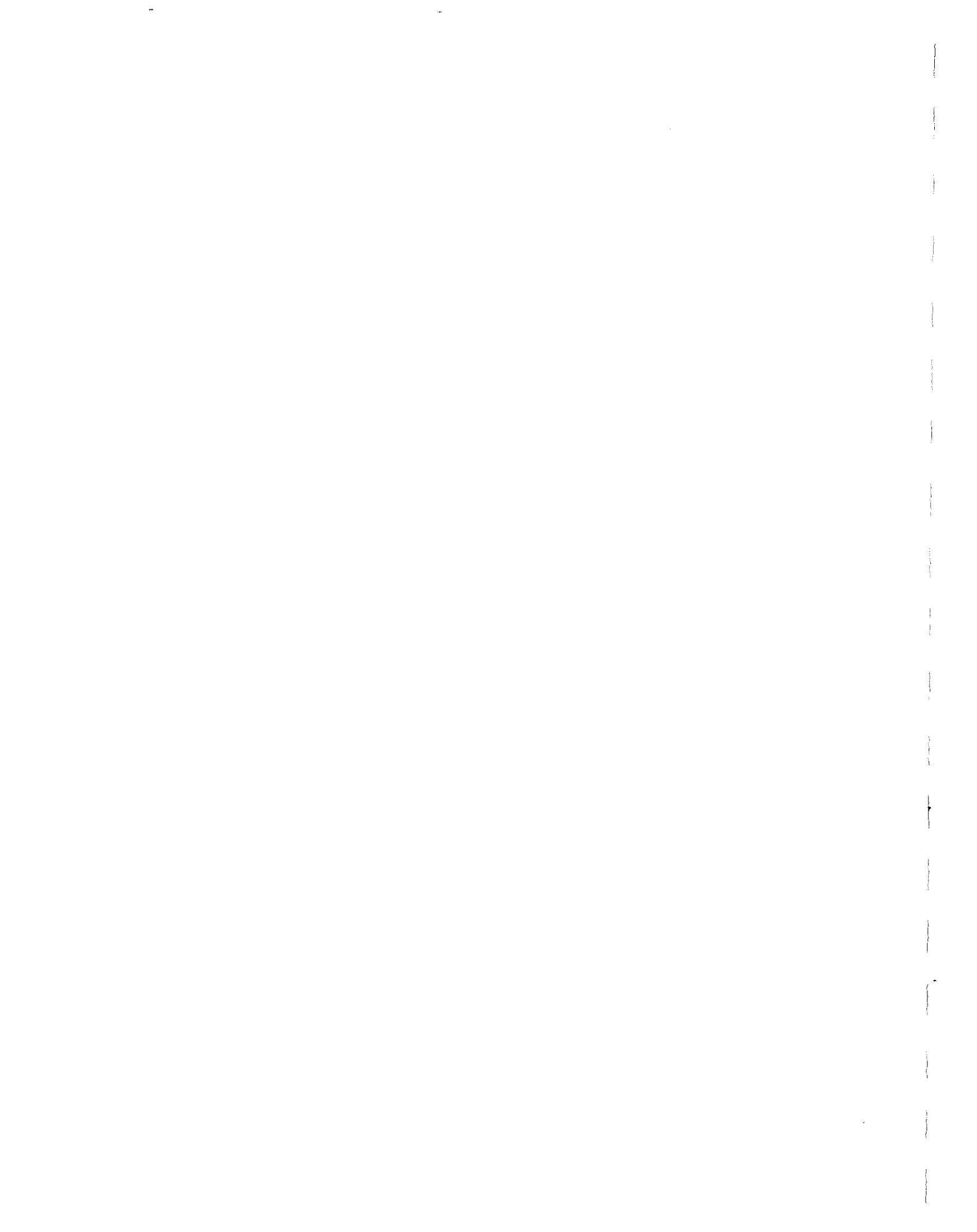
AGREEMENT
PAYMENT BOND
PERFORMANCE BOND
CERTIFICATE OF INSURANCE
NOTICE OF AWARD
NOTICE TO PROCEED
CHANGE ORDER
PARTIAL PAYMENT REQUEST
CERTIFICATE OF SUBSTANTIAL COMPLETION
RELEASE OF LIENS (GENERAL)
RELEASE OF LIENS (SUBCONTRACTOR)

SECTION 8 - BID FORMS AND BID BONDS

BID FORMS INCLUDING SUBCONTRACTORS & MANUFACTURERS LIST
BID BOND WITH POWER OF ATTORNEY
BIDDER'S QUALIFICATIONS STATEMENT



SECTION 1
ADVERTISEMENT FOR BIDS



ADVERTISEMENT FOR BIDS

1. INVITATION: Separate sealed bids for the construction of the following water system improvements will be received at the Hyden-Leslie County Water District, 325 Wendover Rd, HC 61 Box 2590, Hyden, Kentucky 41749 until October 30, 2008 at 4:00 PM for furnishing all labor and materials and performing all work as set forth by this advertisement, conditions (general, supplemental, and special), specifications, and/or the drawings prepared by Sisler-Maggard Engineering, PLLC, 220 East Reynolds Road, Suite A3, Lexington, KY 40517 (859) 271-2978. Bids will be publicly opened and read at above time.

2. PROJECT DESCRIPTION: The project includes but is not limited to the following:

Contract No. 8 – Waterline Extensions

- a.) 6 " PVC Waterline 26,000 L.F.
- b.) 4" PVC Waterline 59,000 L.F.
- c.) 3" PVC Waterline 38,000 L.F.
- d.) 2" PVC Waterline 15,300 L.F.
- e.) Above Ground Booster Station 1 L.S.

Contract No. 9 – Water Storage Tanks

- a.) 50,000 Gal Ground Storage Tank - Leeco 1 L.S.
- b.) 150,000 Gal Ground Storage Tank – Rockhouse 1 L.S.

3. OBTAINING PLANS, SPECIFICATIONS AND BID DOCUMENTS:

Contract documents may be reviewed and obtained at the following location:

Lynn Imaging
328 East Vine Street
Lexington, KY 40507
(859) 255-1021

A non-refundable deposit will be required for each set of documents as follows:

- Contract No. 8 – Waterline Extensions - \$150.00
- Contract No. 9 – Water Storage Tanks - \$150.00

Deposit includes standard UPS shipping. Partial sets of plans or specifications will not be issued.

Contract Documents may also be reviewed at the following locations:

Sisler-Maggard Engineering, PLLC,
220 E. Reynolds Road, Suite A3
Lexington, KY 40517
(859) 271-2978

McGraw-Hill Construction Dodge
950 Contract Street, Suite 100
Lexington, Kentucky 40505
(859) 425-6630

Hyden-Leslie County Water District
Leihman Howard, Jr.
325 Wendover Rd
HC 61 Box 2590
Hyden, KY 41749
(606) 672-2791

4. **METHOD OF RECEIVING BIDS:** Bids will be submitted in the manner and subject to the conditions as set forth and described in the Instructions to Bidders and Contract Documents.
5. **METHOD OF AWARD:** The Contracts will be awarded by the Owner to the low responsive, responsible, best and qualified Bidders.
6. **BID WITHDRAWAL:** No Bidder may withdraw his bid for a period of forty five (45) calendar days after receipt of bids. Errors and omissions will not be the cause for withdrawal of bid without forfeit of bid bond. Bids may be withdrawn in person prior to the closing time for receipt of bids.
7. **WAGE RATES:** State Prevailing wage rates **will** apply.
8. **FUNDING:** This project is being funded with KIA and Coal Severance funds.
9. **BID SECURITY:** Bidders shall furnish (with bid) bid security equal to 5% of bid. A bid bond on Kentucky Resident insurance carrier or certified check is acceptable.
10. **PERFORMANCE AND PAYMENT BOND:** A Performance and Payment Bond each in the amount of 100 percent of the Contract Price issued by a responsible surety will be required of the successful Bidders.
11. **RIGHT TO REJECT:** Owner reserves the right to reject any and all bids and to waive all informalities and/or technicalities should it be in the best interest of the Owner.

"EQUAL EMPLOYMENT OPPORTUNITY"

OWNER: Hyden-Leslie County Water District

By: _____
Fred Ratliff, Chairman

SECTION 2
INSTRUCTIONS TO BIDDERS



INSTRUCTIONS TO BIDDERS

1. Defined Terms: Terms used in these Instructions to Bidders which are defined in General Conditions or Special Conditions of the Construction Contract and have the meanings assigned to them in the said Conditions.
2. Receipt and Openings of Bids: The Hyden-Leslie County Water District, (herein called the "Owner"), invites bids on the forms attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner Hyden-Leslie County Water District, at 325 Wendover Rd, HC 61 Box 2590, Hyden, Kentucky 41749 until 4:00 PM on October 30, 2008 and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to Hyden-Leslie County Water District designated as bid for Contract No. 8 – Waterline Extensions, Contract No. 9 – Water Storage Tanks.

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informality or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within forty five (45) days after the actual date of the opening thereof.

3. Preparation of Bid: Each bid must be submitted on the prescribed forms accompanied by the following items which will constitute the submittal documents necessary for a **complete bid package**:
 - a) Bid Form including subcontractor's list and manufacturers list.
 - b) Bid Bond with Power of Attorney.
 - c) Bidder's Qualifications Statement

All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures, and the foregoing Certifications must be fully completed and executed when submitted.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, their address, and the name of the project with contract name and number for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid forms.

Before submitting their Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to familiarize themselves with local conditions that may in any manner affect performance of the Work, and (c) carefully correlate their observations with the requirements of the CONTRACT DOCUMENTS.

Reference is made to the Special Conditions of the Specifications and Plans for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the Work which have been relied upon by the ENGINEER in preparing the Drawings and Specifications. Before submitting their Bid each Bidder will, at their own expense, make such additional surveys and investigations, as they may deem necessary to determine their Bid price for performance of the work within the terms of the Contract Documents.

The submission of a Bid will constitute an incontrovertible representation by the Bidder that they have complied with every requirement of these instructions.

4. **Bid Form(s)**: The bid Form(s) is included in these Contract Documents; additional copies may be obtained from Owner. The items listed under Paragraph 3 herein shall be submitted.

Bids by corporations must be executed in the corporate name by the President or Vice President (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the Secretary, or an assistant Secretary. The corporate address and state of incorporation shall be shown below the signature.

Bids by partnerships must be executed in the partnership name and signed by a partner, his title must appear under his signature and the official address of the partnership must be shown below the signature.

All names must be typed or printed below the signature with phone and fax numbers.

The bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

5. **Subcontracts**: The bidder is specifically advised that any person, for, or other party to whom it is proposed to award a subcontract under this contract:

- a. Must be acceptable to the Owner and have current eligibility status for federal programs.

Approval of the proposed subcontract award cannot be given by the Owner unless and until the proposed subcontractor has submitted the Certifications and/or other evidence showing that it has fully complied with any reporting requirements to which it is or was subject. Although the bidder is not required to attach such Certifications by proposed subcontractors to their bid, the bidder is hereby advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

6. **Telegraphic/Facsimile Modification**: Any bidder may modify their bid by telegraphic or facsimile communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the telegraphic/facsimile modification over the signature of the bidder was mailed prior to the closing time. The communication should not reveal the bid price but should provide the addition or subtraction or their modifications so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic/facsimile modification.

7. **Method of Bidding**: The Owner invites the following bid(s):

Contract No. 8 – Waterline Extensions
Contract No. 9 – Water Storage Tanks

8. **Qualifications of Bidder:** The Owner may make such investigations as they deem necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

Each prime bidder shall complete, in detail; the form of "Bidder's Qualifications" found in and included as part of the form of Proposal. In lieu of the filling out of the detailed financial statement, the bidder may substitute a current and certified company financial statement.

Corporate Firms: Foreign Corporations are required to be registered with the Secretary of State of the Commonwealth and must be in good standing. Domestic Corporations are required to be in good standing with the requirements and provisions of the Office of the Secretary of State, Commonwealth of Kentucky.

Good Standing with the Public Works Act: Any contractor and/or subcontractors in violation of any wage or work act provisions (KRS 337.510 and 337.550) are prohibited by Statutory Act (KRS 337.990) from bidding or working on any and all public work contracts, either in their name or in the name of any other company, firm or other entity in which he might be interested. No bid from a prime contractor, in violation of the Act can be considered, nor with any subcontractor, in violation of the Act, be approved and/or accepted. The responsibility of the qualifications of the subcontractor is solely that of the prime contractor.

9. **Bid Security:** Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the Bid Form attached hereto, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of 5% of the bid. Such cash, checks or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the contract, or if no award has been made within 15 days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as they have not been notified of the acceptance of their bid.
10. **Liquidated Damages for Failure to Enter into Contract:** The successful bidder, upon their failure or refusal to execute and deliver the contract and bonds required within 10 days after they have received the notice of the acceptance of their bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with their bid.
11. **Time of Completion and Liquidated Damages:** Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the projects as follows:

Contract No. 8 – Waterline Extensions – 240 consecutive calendar days
 Contract No. 9 – Water Storage Tanks – 240 consecutive calendar days

Bidder must agree also to pay as liquidated damages, the sum of **\$500.00** for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

12. **Conditions of Work:** Each bidder must inform themselves fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not

relieve a successful bidder of their obligation to furnish all material and labor necessary to carry out the provisions of their contract. Insofar as possible, the contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

13. Addenda and Interpretations: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally.

Every request for such interpretation on Contract No. 8 and 9 should be in writing addressed to Sisler-Maggard Engineering, PLLC., P.O. Box 23780, Lexington, Kentucky 40523-3780 and to be given consideration must be received at least five days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed by certified mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under their bid as submitted. All addenda so issued shall become part of the contract documents.

14. Security for Faithful Performance: Simultaneously with their delivery of the executed contract, the contractor shall furnish a 100% surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.
15. Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney with Kentucky Resident agent.
16. Notice of Special Conditions: Attention is particularly called to those parts of the contract documents and specifications which deal with the following:
- a. Inspection and testing of materials
 - b. Insurance requirements
 - c. Wage rates
17. Laws and Regulations: The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written in full.
18. Method of Award - Lowest Qualified Bidder: If at the time this contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract will be awarded on the base bid only. If all bids exceed funds available to finance the contract the Owner may negotiate price with the bidder who is lowest at that point.

19. Award of Contract: Owner reserves the right to reject any and all Bids, and waive any and all informalities, and the right to disregard all nonconforming or conditional bids or counter proposals.

In evaluating Bids, Owner shall consider the qualifications of the Bidders, whether or not the bids comply with the prescribed requirements, and alternates and unit prices, if requested in the Bid forms. He may consider the qualifications and experience of the Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for portions of the Work as to which the identity of Subcontractors and other persons or organizations must be submitted as specified in the Special Conditions or Specifications. He may conduct such investigations as he deems necessary to establish the responsibility, qualifications or financial ability of the Bidders, proposed Subcontractors and other persons or organizations to do the work in accordance with the Contract Documents, to Owner's satisfaction within the prescribed time. Owner reserves the right to reject the Bid of any Bidder who reserves the right to reject the bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

If the contract is to be awarded, Owner will give the apparent successful Bidder(s) a Notice of Award within forty five (45) calendar days after the day of the Bid opening.

Simultaneously with delivery of the executed counterparts of the Agreement to Owner, Contractor shall deliver to Owner the required Contract Security.

20. Safety Standards and Accident Prevention: With respect to all work performed under this contract, the contractor shall:
- a. Comply with the safety standards provisions of applicable laws, building and construction codes and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register", Volume 36, No. 75, Saturday, April 17, 1971.
 - b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
 - c. Maintain at their office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor's care.
21. Prevailing Wage Law: State Prevailing Wage Rates applies to Contract 6 of this project and are included herein as SECTION 4.

END OF SECTION



SECTION 3

GENERAL AND SUPPLEMENTAL CONDITIONS



TABLE OF CONTENTS

	Page
Article 1 – Definitions and Terminology	5
1.01 Defined Terms	5
1.02 Terminology	8
Article 2 – Preliminary Matters	9
2.01 Delivery of Bonds and Evidence of Insurance	9
2.02 Copies of Documents	9
2.03 Commencement of Contract Times; Notice to Proceed	10
2.04 Starting the Work	10
2.05 Before Starting Construction	10
2.06 Preconstruction Conference	10
2.07 Initial Acceptance of Schedules	10
Article 3 – Contract Documents: Intent, Amending, Reuse	11
3.01 Intent	11
3.02 Reference Standards	11
3.03 Reporting and Resolving Discrepancies	11
3.04 Amending and Supplementing Contract Documents	12
3.05 Reuse of Documents	12
3.06 Electronic Data	12
Article 4 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions; Reference Points	13
4.01 Availability of Lands	13
4.02 Subsurface and Physical Conditions	13
4.03 Differing Subsurface or Physical Conditions	13
4.04 Underground Facilities	15
4.05 Reference Points	15
4.06 Hazardous Environmental Condition at Site	16
Article 5 – Bonds and Insurance	17
5.01 Performance, Payment, and Other Bonds	17
5.02 Licensed Sureties and Insurers	17
5.03 Certificates of Insurance	18
5.04 Contractor’s Liability Insurance	18
5.05 Owner’s Liability Insurance	19
5.06 Property Insurance	19
5.07 Waiver of Rights	20
5.08 Receipt and Application of Insurance Proceeds	21
5.09 Acceptance of Bonds and Insurance; Option to Replace	21
5.10 Partial Utilization, Acknowledgment of Property Insurer	21
Article 6 – Contractor’s Responsibilities	21
6.01 Supervision and Superintendence	21
6.02 Labor; Working Hours	22
6.03 Services, Materials, and Equipment	22
6.04 Progress Schedule	22
6.05 Substitutes and “Or-Equals”	22
6.06 Concerning Subcontractors, Suppliers, and Others	24
6.07 Patent Fees and Royalties	25
6.08 Permits	26

6.09	Laws and Regulations.....	26
6.10	Taxes.....	26
6.11	Use of Site and Other Areas.....	26
6.12	Record Documents.....	27
6.13	Safety and Protection.....	27
6.14	Safety Representative.....	28
6.15	Hazard Communication Programs.....	28
6.16	Emergencies.....	28
6.17	Shop Drawings and Samples.....	28
6.18	Continuing the Work.....	30
6.19	Contractor's General Warranty and Guarantee.....	30
6.20	Indemnification.....	30
6.21	Delegation of Professional Design Services.....	31
Article 7 – Other Work at the Site.....		31
7.01	Related Work at Site.....	31
7.02	Coordination.....	32
7.03	Legal Relationships.....	32
Article 8 -- Owner's Responsibilities.....		32
8.01	Communications to Contractor.....	32
8.02	Replacement of Engineer.....	33
8.03	Furnish Data.....	33
8.04	Pay When Due.....	33
8.05	Lands and Easements; Reports and Tests.....	33
8.06	Insurance.....	33
8.07	Change Orders.....	33
8.08	Inspections, Tests, and Approvals.....	33
8.09	Limitations on Owner's Responsibilities.....	33
8.10	Undisclosed Hazardous Environmental Condition.....	33
8.11	Evidence of Financial Arrangements.....	33
Article 9 – Engineer's Status During Construction.....		34
9.01	Owner's Representative.....	34
9.02	Visits to Site.....	34
9.03	Project Representative.....	34
9.04	Authorized Variations in Work.....	34
9.05	Rejecting Defective Work.....	34
9.06	Shop Drawings, Change Orders and Payments.....	35
9.07	Determinations for Unit Price Work.....	35
9.08	Decisions on Requirements of Contract Documents and Acceptability of Work.....	35
9.09	Limitations on Engineer's Authority and Responsibilities.....	35
Article 10 – Changes in the Work; Claims.....		36
10.01	Authorized Changes in the Work.....	36
10.02	Unauthorized Changes in the Work.....	36
10.03	Execution of Change Orders.....	36
10.04	Notification to Surety.....	36
10.05	Claims.....	37
Article 11 – Cost of the Work; Allowances; Unit Price Work.....		37
11.01	Cost of the Work.....	37
11.02	Allowances.....	39
11.03	Unit Price Work.....	40

Article 12 – Change of Contract Price; Change of Contract Times.....	40
12.01 Change of Contract Price.....	40
12.02 Change of Contract Times.....	41
12.03 Delays.....	41
Article 13 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work.....	42
13.01 Notice of Defects.....	42
13.02 Access to Work.....	42
13.03 Tests and Inspections.....	42
13.04 Uncovering Work.....	43
13.05 Owner May Stop the Work.....	43
13.06 Correction or Removal of Defective Work.....	44
13.07 Correction Period.....	44
13.08 Acceptance of Defective Work.....	44
13.09 Owner May Correct Defective Work.....	45
Article 14 – Payments to Contractor and Completion.....	45
14.01 Schedule of Values.....	45
14.02 Progress Payments.....	45
14.03 Contractor’s Warranty of Title.....	48
14.04 Substantial Completion.....	48
14.05 Partial Utilization.....	48
14.06 Final Inspection.....	49
14.07 Final Payment.....	49
14.08 Final Completion Delayed.....	50
14.09 Waiver of Claims.....	50
Article 15 – Suspension of Work and Termination.....	50
15.01 Owner May Suspend Work.....	50
15.02 Owner May Terminate for Cause.....	51
15.03 Owner May Terminate For Convenience.....	51
15.04 Contractor May Stop Work or Terminate.....	52
Article 16 – Dispute Resolution.....	52
16.01 Methods and Procedures.....	52
Article 17 – Miscellaneous.....	53
17.01 Giving Notice.....	53
17.02 Computation of Times.....	53
17.03 Cumulative Remedies.....	53
17.04 Survival of Obligations.....	53
17.05 Controlling Law.....	53
17.06 Headings.....	53
Article 18 – Federal Requirements.....	53
18.01 Agency Not a Party.....	53
18.02 Contract Approval.....	54
18.03 Conflict of Interest.....	54
18.04 Gratuities.....	54
18.05 Audit and Access to Records.....	54
18.06 Small, Minority and Women’s Businesses.....	54
18.07 Anti-Kickback.....	55
18.08 Clean Air and Pollution Control Acts.....	55
18.09 State Energy Policy.....	55
18.10 Equal Opportunity Requirements.....	55

18.11 Restrictions on Lobbying.....55
18.12 Environmental Requirements56

GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda* – Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agency* – The Federal or state agency named as such in the Agreement.
 3. *Agreement* – The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 4. *Application for Payment* – The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 5. *Asbestos* – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 6. *Bid* – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 7. *Bidder* – The individual or entity who submits a Bid directly to Owner.
 8. *Bidding Documents* – The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 9. *Bidding Requirements* – The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.
 10. *Change Order* – A document recommended by Engineer which is signed by Contractor and Owner and Agency and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 11. *Claim* – A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 12. *Contract* – The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 13. *Contract Documents* – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

14. *Contract Price* – The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of *Unit Price Work*).
15. *Contract Times* – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
16. *Contractor* – The individual or entity with whom Owner has entered into the Agreement.
17. *Cost of the Work* – See Paragraph 11.01.A for definition.
18. *Drawings* – That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
19. *Effective Date of the Agreement* – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
20. *Engineer* – The individual or entity named as such in the Agreement.
21. *Field Order* – A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
22. *General Requirements* – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
23. *Hazardous Environmental Condition* – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.
24. *Hazardous Waste* – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
25. *Laws and Regulations; Laws or Regulations* – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens* – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
27. *Milestone* – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
28. *Notice of Award* – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
29. *Notice to Proceed* – A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
30. *Owner* – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

31. *PCBs* – Polychlorinated biphenyls.
32. *Petroleum* – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
33. *Progress Schedule* – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
34. *Project* – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
35. *Project Manual* – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
36. *Radioactive Material* – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
37. *Related Entity* – An officer, director, partner, employee, agent, consultant, or subcontractor.
38. *Resident Project Representative* – The authorized representative of Engineer who may be assigned to the Site or any part thereof.
39. *Samples* – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
40. *Schedule of Submittals* – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
41. *Schedule of Values* – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
42. *Shop Drawings* – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
43. *Site* – Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
44. *Specifications* – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
45. *Subcontractor* – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
46. *Substantial Completion* – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for

which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

47. *Successful Bidder* – The Bidder submitting a responsive Bid to whom Owner makes an award.
48. *Supplementary Conditions* – That part of the Contract Documents which amends or supplements these General Conditions.
49. *Supplier* – A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.
50. *Underground Facilities* – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
51. *Unit Price Work* – Work to be paid for on the basis of unit prices.
52. *Work* – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
53. *Work Change Directive* – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and Agency upon recommendation of the Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents, or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
 - c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

- F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The *Contract Times* will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the *Contract Times* commence to run. No Work shall be done at the Site prior to the date on which the *Contract Times* commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
1. a preliminary Progress Schedule;
 2. a preliminary Schedule of Submittals; and
 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, Agency, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the *Contract Times*. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3) or
 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or
 2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are *limited to the printed copies* (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and
 - 2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

- A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data,
 - b. locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not

limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

- A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. *The policies of insurance required by this Paragraph 5.04 shall:*
 - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 - 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 - 3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment
 - a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (Contractor shall be responsible for any deductible or self-insured retention.). This insurance shall:
 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
 2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.
- B. Contractor shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.07 Waiver of Rights

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Contractor as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:
 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and made payable to Contractor as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Contractor shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof.
- B. Contractor as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Contractor's exercise of this power. If such objection be made, Contractor as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Contractor as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor, Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or

equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

- 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
- 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
- 3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

- 1) there will be no increase in cost to the Owner or increase in Contract Times, and
- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The procedure requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

- a) will perform adequately the functions and achieve the results called for by the general design,
- b) be similar in substance to that specified, and
- c) be suited to the same use as that specified;

2) will state:

- a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;
 - b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
- a) all variations of the proposed substitute item from that specified , and
 - b) available engineering, sales, maintenance, repair, and replacement services;
- 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor
 - 2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or

Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other 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.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*

- a. Submit number of Samples specified in the Specifications.

- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures*

- 1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
 - a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
 - c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and
 - d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
- 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
- 3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

- 1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the 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 means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
- 3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

- B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

- A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 – ENGINEER’S STATUS DURING CONSTRUCTION

9.01 *Owner’s Representative*

- A. Engineer will be Owner’s representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner’s representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor’s executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer’s efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer’s visits and observations are subject to all the limitations on Engineer’s authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer’s visits or observations of Contractor’s Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer’s consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, subject to written approval by Agency at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be

given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part,
 2. approve the Claim, or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of

Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressages, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances

- 1. Contractor agrees that:

- a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
- b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 1. the Bid price of a particular item of Unit Price Work amounts to more than 5 percent of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. **Contractor's Fee:** *The Contractor's fee for overhead and profit shall be determined as follows:*
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors

performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.B.
 - 1. delays caused by or within the control of Contractor; or
- D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and
 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
 - D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
 - E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.
 - F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims,

costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

- 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such

supporting documentation as is required by the Contract Documents. If payment is requested on the basis of *materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing*, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

- c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

- 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. the Contractor's performance or furnishing of the Work is inconsistent with funding Agency requirements;
 - d. there are other items entitling Owner to a set-off against the amount recommended; or
 - e. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
- 2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.
- 3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Agency, Contractor, and Engineer shall make a prefinal inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner, Agency, and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims. The remaining balance of any sum included in the final Application for Payment but held by OWNER for Work not fully completed and accepted will become due when the Work is fully completed and accepted.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 -- DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Owner and Contractor may mutually request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or
 2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or
 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

ARTICLE 18 – FEDERAL REQUIREMENTS

18.01 Agency Not a Party

- A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

18.02 *Contract Approval*

- A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.
- B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

18.03 *Conflict of Interest*

- A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.
- B. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

18.04 *Gratuities*

- A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.
- B. In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

18.05 *Audit and Access to Records*

- A. For all negotiated contracts and negotiated modifications (except those of \$10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.

18.06 *Small, Minority and Women's Businesses*

- A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the

affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

18.07 *Anti-Kickback*

- A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

18.08 *Clean Air and Pollution Control Acts*

- A. If this Contract exceeds \$100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 *et seq.*) and the Federal Water Pollution Control Act as amended (33 USC 1251 *et seq.*). Contractor will report violations to the Agency and the Regional Office of the EPA.

18.09 *State Energy Policy*

- A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

18.10 *Equal Opportunity Requirements*

- A. If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."
- B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.
- C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

18.11 *Restrictions on Lobbying*

- A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and

has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

18.12 *Environmental Requirements*

- A. When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:
1. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.
 2. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.
 3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).
 4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C-710, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

TABLE OF CONTENTS

	Page
SC-1.01.A.15 Contract Times	2
SC-2.03.A Commencement of Contract Times; Notice to Proceed	2
<i>{SC-4.02 Subsurface and Physical Conditions}</i>	2
SC-5.03 Certificates of Insurance	2
SC-5.04 Contractor's Liability Insurance	2
SC-6.06 Concerning Subcontractors, Suppliers, and Others	3
<i>{SC-7.02.A.1 Coordination}</i>	3
SC-9.03 Project Representative	4
SC-14.02.A.3 Applications for Payment	4
SC-14.02.C.1 Payment Becomes Due	4
SC-18.08 Clean Air and Pollution Control Acts	4

SC-1.02.A.15. Delete in its entirety and replace with the following:

Contract Times: The number of days or date stated in the Agreement to achieve substantial completion, based on remaining work, weather and market conditions.

SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

A. The Contract Times will commence on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 10 days after the Effective Date of the Agreement.

{SC-4.02. Add the following new paragraphs immediately after Paragraph 4.02.B:

C. In the preparation of Drawings and Specifications, Engineer relied upon the following reports of exploration and tests of subsurface conditions at the Site:

Contract No. 8 – Waterline Extensions – NONE

Contract No. 9 – Water Storage Tanks – Thelen and Associates, Inc. – Geotechnical report

D. Copies of reports and drawings itemized in SC-4.02.C are included with Bidding Documents. These reports and drawings are part of the Contract Documents. Contractor is not entitled to rely upon other information and data utilized by Engineer in the preparation of the Drawings and Specifications.

SC-5.03. Add the following new paragraph immediately after Paragraph 5.03.B:

C. Failure of the Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of the Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

SC-5.04. Add the following new paragraph immediately after Paragraph 5.04.B:

C. The limits of liability for insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
 - a. State: Statutory
 - b. Applicable Federal (e.g., Longshoremen's) Statutory
 - c. Employer's Liability \$500,000
2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:
 - a. General Aggregate \$2,000,000
 - b. Products – Completed Operations Aggregate \$1,000,000
 - c. Personal and Advertising Injury \$1,000,000
 - d. Each Occurrence (Bodily Injury and property damage) \$1,000,000
 - e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.
 - f. Excess or Umbrella Liability
 - 1.) General Aggregate \$5,000,000
 - 2.) Each Occurrence \$2,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury:		
Each Person		\$1,000,000
Each Accident		\$1,000,000
b. Property Damage		
Each Accident		\$1,000,000
c. Combined Single Limit of		
		\$1,000,000

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:		
Each Person		\$2,000,000
Each Accident		\$2,000,000
b. Property Damage:		
Each Accident		\$2,000,000
Annual Aggregate		\$2,000,000

SC-6.06 Add a new paragraph immediately after Paragraph 6.06.G:

H. The Contractor shall not award work valued at more than (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC-7.02.A.1 Delete paragraphs 7.02.A.1-3 in their entirety and insert the following:

1. All General Contractors shall have the authority and be responsible for coordination of the activities among the other prime contractors and subcontractors on the Site to ensure a safe, efficient working environment. This authority covers scheduling delivery of materials, storage of materials, sequencing of construction involving different crafts, resolving interface issues between crafts, scheduling testing, and all other aspects of the Work that do not impact the design or function of the work.}

SC-9.03A. Add the following language at the end of paragraph 9.03.A:

The Engineer will provide Resident Project Representative Services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-510, 2002 Edition, as amended and executed for this specific project.

SC-14.02.A.3 Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage prior to substantial completion, nor place in escrow any funds that are required for retainage, or invest the retainage for benefit.

SC-14.02.C.1. Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of

Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-18.08 Delete paragraph 18.08.A in its entirety and insert the following in its place:

A. If this Contract exceeds \$100,000, the Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)), Section 508 of the Clean Water Act (33 USC §1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

SECTION 4
STATE WAGE RATES





Steven L. Beshear
Governor

Daniel Mongiardo
Lieutenant Governor

KENTUCKY LABOR CABINET
DEPARTMENT OF WORKPLACE STANDARDS

DIVISION OF EMPLOYMENT STANDARDS,
APPRENTICESHIP & MEDIATION

1047 US Hwy 127 S - Suite 4
Frankfort, Kentucky 40601
Phone: (502) 564-3534
Fax (502) 564-2248
www.labor.ky.gov

J. R. Gray
Secretary

Mark S. Brown
Deputy Secretary

Michael L. Dixon
Commissioner

Michael C. Donta
Director

September 19, 2008

Joseph F. Sisler
Sisler-Maggard Engineering
220 East Reynolds Rd, Ste A-3
Lexington KY 40517

Re: Hyden-Leslie County Water District, Contract 8 & 9 Waterline Extension &
Water Storage Tanks 066-H-00042-07-4

Advertising Date as Shown on Notification: October 1, 2008

Dear Joseph F. Sisler:

This office is in receipt of your written notification on the above project as required by KRS 337.510 (1).

I am enclosing a copy of the current prevailing wage determination number CR-4-031, dated August 17, 2007 for LESLIE County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows: 066-H-00042-07-4, Heavy/Highway

Sincerely,

Robin M. Young
Prevailing Wage Specialist

KENTUCKY DEPARTMENT OF LABOR
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 031

Determination No. CR-4-031

Project No. 066-H-00042-07-4 Type: Heavy/Highway

Date of Determination: August 17, 2007

This schedule of the prevailing rate of wages for Locality No. 031, which includes Bell, Harlan, Leslie and Perry Counties, has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR-4-031.

Apprentices shall be permitted to work as such subject to Administrative Regulations adopted by the Executive Director of the Office of Workplace Standards. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one workday, but not more than ten (10) hours worked in any one workday, if such written agreement is prior to the over eight (8) hours in a workday actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked. Fringe benefit amounts are applicable for all hours worked except when otherwise noted. Welders will receive rate for craft in which welding is incidental.

No laborer, workman or mechanic shall be paid at a rate less than that of the General Laborer except those classified as bona fide apprentices registered with the Kentucky State Apprenticeship Supervisor unless otherwise specified in this schedule of wage rates.

NOTE: The type of construction shall be determined by applying the following definitions.

BUILDING CONSTRUCTION

Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

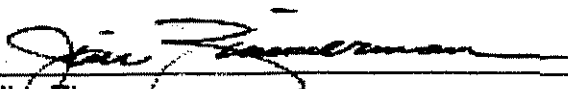
CR-4-031
August 17, 2007

HIGHWAY CONSTRUCTION

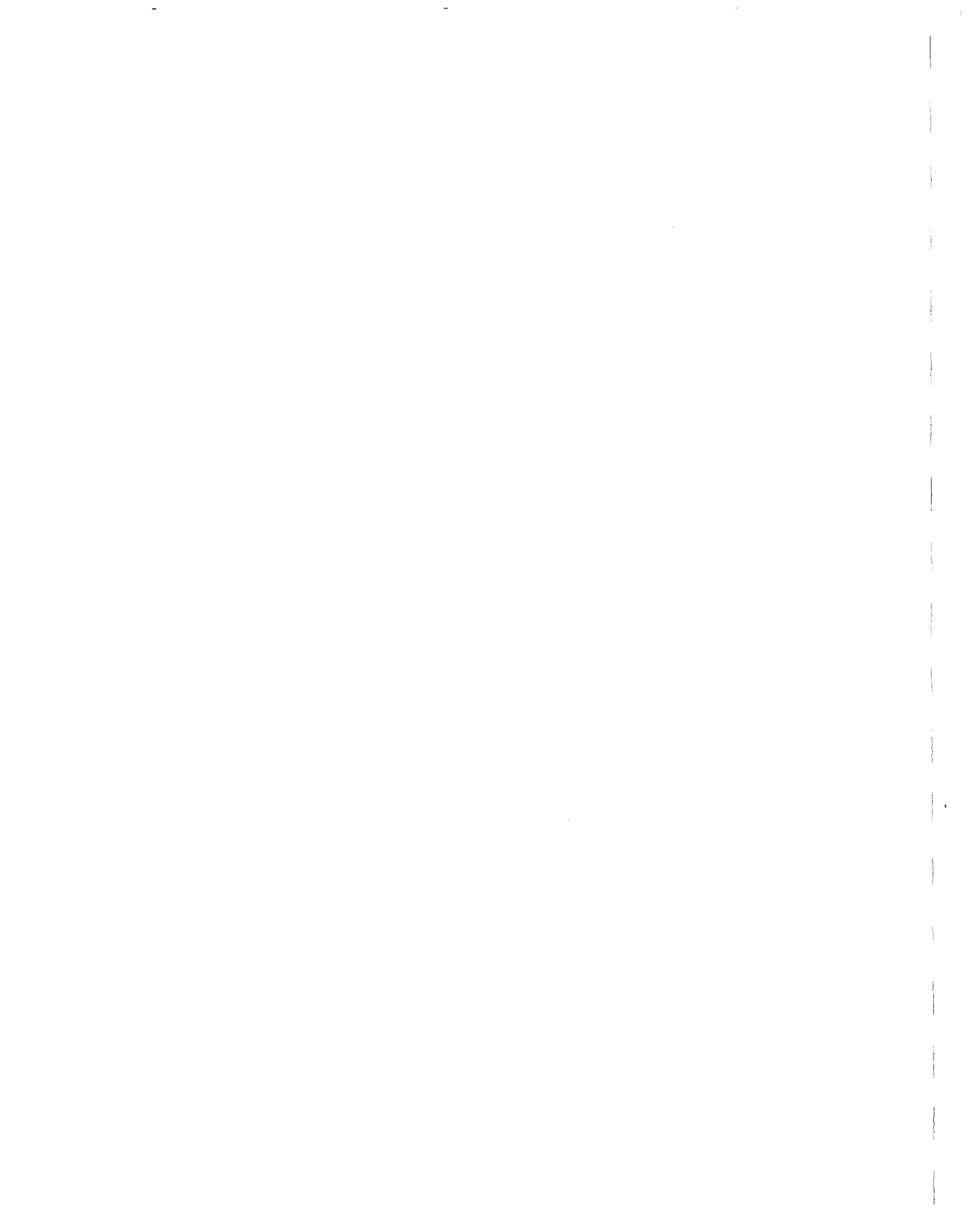
Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Jiro Zimmerman
Office of Workplace Standards
Kentucky Department of Labor



CLASSIFICATIONS **RATE AND FRINGE BENEFITS**

ASBESTOS/INSULATION WORKERS: (Mechanical only) BASE RATE \$12.00

BOILERMAKERS: BASE RATE \$23.95
FRINGE BENEFITS 12.04

BRICKLAYERS: BASE RATE \$12.50

CARPENTERS:

Carpenters: BUILDING BASE RATE \$10.00

Piledrivermen: BUILDING BASE RATE \$18.13
FRINGE BENEFITS 11.32

Carpenters: HEAVY & HIGHWAY BASE RATE \$20.70
FRINGE BENEFITS 5.68

Piledrivermen: HEAVY & HIGHWAY BASE RATE \$20.95
FRINGE BENEFITS 5.68

Divers: HEAVY & HIGHWAY BASE RATE \$31.05
FRINGE BENEFITS 5.68

CEMENT MASONS: BASE RATE \$8.75

ELECTRICIANS: BUILDING BASE RATE \$21.31
FRINGE BENEFITS 5.65

ELECTRICIANS: HEAVY & HIGHWAY *BASE RATE \$23.50
FRINGE BENEFITS 7.73

*When electricians are required to work from Bosum chairs, trusses, stacks, tanks, scaffolds, or catwalks, radio and TV towers, structural steel-open, unprotected, unfloored raw steel, bridges, or similar hazardous locations where workmen are subject to a direct fall (except for work performed using JLG's and bucket trucks up to 75 ft.): 50' to 75' – add 25% above workman's straight time rate; over 75' – add 50% above workman's straight time rate.

ELEVATOR CONSTRUCTORS: BASE RATE \$16.00
FRINGE BENEFITS 3.20

CLASSIFICATIONS RATE AND FRINGE BENEFITS

BELL, HARLAN & PERRY COUNTIES:

GLAZIERS: BASE RATE \$7.39

LESLIE COUNTY:

GLAZIERS: BASE RATE \$9.05

IRONWORKERS: BUILDING BASE RATE \$8.65

Structural: HEAVY & HIGHWAY BASE RATE \$18.45
FRINGE BENEFITS 5.80

Reinforcing: HEAVY & HIGHWAY BASE RATE \$18.25
FRINGE BENEFITS 5.80

LABORERS:

BUILDING GROUP 1:

General laborers, asbestos abatement laborer, toxic waste removal laborer, water boys, tool room checker, carpenter tenders, (civil engineer helper, rodman, grade checkers excluding all field work performed by engineering firms), concrete pouring and curing, concrete form stripping and wrecking, hand digging and backfilling of ditches, clearing of right of ways and building sites, wood sheeting and shoring, signalman for concrete bucket and general cleaning, and environmental laborer - nuclear, radiation, toxic and hazardous waste - Level D:

BUILDING *BASE RATE \$15.48
FRINGE BENEFITS 7.12

BUILDING GROUP 2:

All air tool operators, air track drills, asphalt rakers, tampers, batchers plant and scale man, chain saw, concrete saw, electric hand grinder, all electric bush and chipping hammers, flagmen, forklift operators, form setter (street or highway), metal form setters, heaters, mesh handlers on walkways, streets and roadways outside building, gunnite laborers, hand spiker, introflax burning rod, joint makers, mason tenders, multi-trade tender, pipe layers, plaster tenders, powderman helpers, power driven Georgia buggies, power posthole diggers, railroad laborers, sandblaster laborers, scow man and deck hand, signal man, sweeper and cleaner machines, vibrator operators, walk behind trenching machines, mortar mixer machines, water pumpmen, and environmental laborers-nuclear, radiation, toxic and hazardous waste - Level C:

BUILDING *BASE RATE \$15.88
FRINGE BENEFITS 7.12

BUILDING GROUP 3:

Gunnite nozzleman and gunnite nozzle machine operator, sand blaster nozzleman, concrete or grout pumpman, plaster pumpman:

BUILDING *BASE RATE \$16.08
FRINGE BENEFITS 7.12

CLASSIFICATIONS RATE AND FRINGE BENEFITS

LABORERS: BUILDING (Continued)

BUILDING GROUP 4:

Powderman and blaster, and environmental laborer - nuclear, radiation, toxic and hazardous waste - Level B:

BUILDING	*BASE RATE	\$16.18
	FRINGE BENEFITS	7.12

BUILDING GROUP 5:

Caisson holes (6 ft. and over) pressure and free air including tools, construction specialist, and environmental laborer-nuclear, radiation, toxic and hazardous waste - Level A:

BUILDING	*BASE RATE	\$16.68
	FRINGE BENEFITS	7.12

BUILDING GROUP 6:

Tunnel man and tunnel sand miner, cofferdam (pressure and free air), sand hog or mucker (pressure or free air):

BUILDING	*BASE RATE	\$16.98
	FRINGE BENEFITS	7.12

LABORERS ON BUILDING: *Employees handling chemically treated materials which are harmful to the skin shall receive an additional \$.25 above base rate. Any employee working on high work such as towers or smoke stacks or any type of work putting the employee 50 feet above the ground or a solid floor shall receive an additional \$.50 per hour above the base rate. Any employee working on boilers, kilns, melting tanks, furnaces, or when refractory is done using live fire, drying fires, heatups or any hot work shall receive an additional 25% premium above the base rate.

LABORERS, HEAVY HIGHWAY:

General laborer, flagman, and steam jenny:

HEAVY & HIGHWAY	BASE RATE	\$16.40
	FRINGE BENEFITS	5.80

Hand blade operator, batch truck dumper, deck hand or scow man:

HEAVY & HIGHWAY	BASE RATE	\$16.65
	FRINGE BENEFITS	5.80

Power driven tool operator of following: wagon drill, chain saw, jack hammer, concrete saw, sand blaster concrete chipper, pavement breaker, vibrator, power wheel barrow, power buggy, sewer pipe layer, bottom men, dry cement handler, concrete rubber and mason tender :

HEAVY & HIGHWAY	BASE RATE	\$16.75
	FRINGE BENEFITS	5.80

Asphalt lute & rakerman, side rail setter:

HEAVY & HIGHWAY	BASE RATE	\$16.80
	FRINGE BENEFITS	5.80

CLASSIFICATIONS **RATE AND FRINGE BENEFITS**

LABORERS, HEAVY HIGHWAY: (Continued)

Gunnite nozzle man and gunnite operator:			
	HEAVY & HIGHWAY	BASE RATE	\$16.90
		FRINGE BENEFITS	5.80
Tunnel laborer (Free Air):	HEAVY & HIGHWAY	BASE RATE	\$16.95
		FRINGE BENEFITS	5.80
Tunnel mucker (Free Air):	HEAVY & HIGHWAY	BASE RATE	\$17.00
		FRINGE BENEFITS	5.80
Tunnel miner, blaster & driller (Free Air):			
	HEAVY & HIGHWAY	BASE RATE	\$17.35
		FRINGE BENEFITS	5.80
Caisson Worker:	HEAVY & HIGHWAY	BASE RATE	\$17.90
		FRINGE BENEFITS	5.80
Powderman:	HEAVY & HIGHWAY	BASE RATE	\$18.00
		FRINGE BENEFITS	5.80
Drill operator of percussion type drills which are both powered & propelled by an independent air supply:	HEAVY & HIGHWAY	BASE RATE	\$19.20
		FRINGE BENEFITS	5.80

MARBLE, TILE & TERRAZZO: **BASE RATE** **\$15.63**

MILLWRIGHTS:	BUILDING	BASE RATE	\$7.25
	HEAVY	BASE RATE	\$12.41
		FRINGE BENEFITS	1.15
	HIGHWAY	BASE RATE	\$11.51
		FRINGE BENEFITS	1.15

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

OPERATING ENGINEERS:

Articulating Dump, auto patrol, batcher plant, bituminous paver, cableway, central compressor plant, clamshell, concrete mixer (21 cf or over), concrete pump, crane, crusher plant, derrick, derrick boat, directional boring machine, ditching and trenching machine, all types of loaders, forklift (regardless of lift height), GPS systems (on equipment within the classification), hoe-type machine, hoist (1-drum when used for stack or chimney construction or repair), hoisting engineer (2 or more drums), laser or remote controlled equipment (within the classification), locomotive, motor scrapper, carry-all scoop, bulldozer, heavy duty welder, mechanic, orangepeel bucket, piledriver, power blade, motor grader, roller (bituminous), scarifier, shovel, tractor shovel, truck crane, winch truck, push dozer, highlift, all types of boom cats, core drill, hopto, tow or push boat, a-frame winch truck, concrete paver, gradeall, hoist, hyster, pumpcrete, ross carrier, boom, tail boom, rotary drill, hydro hammer, muchking machine, rock spreader attached to equipment, scoopmobile, KeCal loader, tower cranes (French, German and other types, h6drocrane, backfiller, gurries, subgrader, tunnel mining machines including moles, shields, or similar types of tunnel mining equipment.

BUILDING	*BASE RATE	\$20.50
	FRINGE BENEFITS	9.15

***Crane operators with CCO certification shall receive fifty cents (.50) above wage rate. Operators on cranes with boom one-hundred fifty feet (150') and over including jib, shall receive seventy-five (.75) above wage rate. All cranes with piling leads will receive fifty cents (.50) above wage rate regardless of boom length. Combination rate shall mean fifty cents (.50) per hour above the basic hourly rate of pay.**

All air compressors over 900 cfm, bituminous mixer, joint sealing machine, concrete mixer under 21 cu ft, form grader, roller (rock), tractor (50 HP and over), bull float, finish machine, outboard motor boat, flexplane, firemen, boom type tamping machine, greaser on grease facilities servicing heavy equipment, switchman or brakeman, mechanic helper, whirley oiler, self-propelled compactor, tractair and road widening trencher and farm tractor with attachments (except backhoe, highlift and endloader), elevator (regardless of ownership when used for hoisting any building material), hoisting engineer (1-drum or buck hoist), Firebrick masonry excluded), well points, grout pump, throttle-valve man, tugger, electric vibrator compactor, and caisson drill helper.

BUILDING	BASE RATE	\$17.76
	FRINGE BENEFITS	9.15

Bituminous distributor, cement gun, coveyor, mud jack, paving joint machine, roller (earth), tamping machine, tractors under 50 HP, vibrator oiler, concrete saw, burlap and curing machine, truck crane oiler, hydro-seeder, power form handling equipment, deckhand steersman, hydraulic post driver, and drill helper.

BUILDING	BASE RATE	\$16.99
	FRINGE BENEFITS	9.15

CLASSIFICATIONS **RATE AND FRINGE BENEFITS**

OPERATING ENGINEERS: HEAVY & HIGHWAY BASE RATE \$19.95
FRINGE BENEFITS 5.80

PAINTERS: BUILDING BASE RATE \$11.00

HEAVY & HIGHWAY BASE RATE \$17.30
FRINGE BENEFITS 3.80

BELL, HARLAN & PERRY COUNTIES:

PLASTERERS: BASE RATE \$13.30

LESLIE COUNTY:

PLASTERERS: BASE RATE \$8.25

PLUMBERS & STEAMFITTERS: BASE RATE \$14.00

ROOFERS: (Excluding metal roofs) BASE RATE \$13.00

SHEETMETAL WORKERS: (Including metal roofs) BASE RATE \$10.88
FRINGE BENEFITS .46

SPRINKLER FITTERS: BASE RATE \$27.05
FRINGE BENEFITS 12.90

BUILDING TRUCK DRIVERS:

Truck Drivers: BUILDING BASE RATE \$7.33

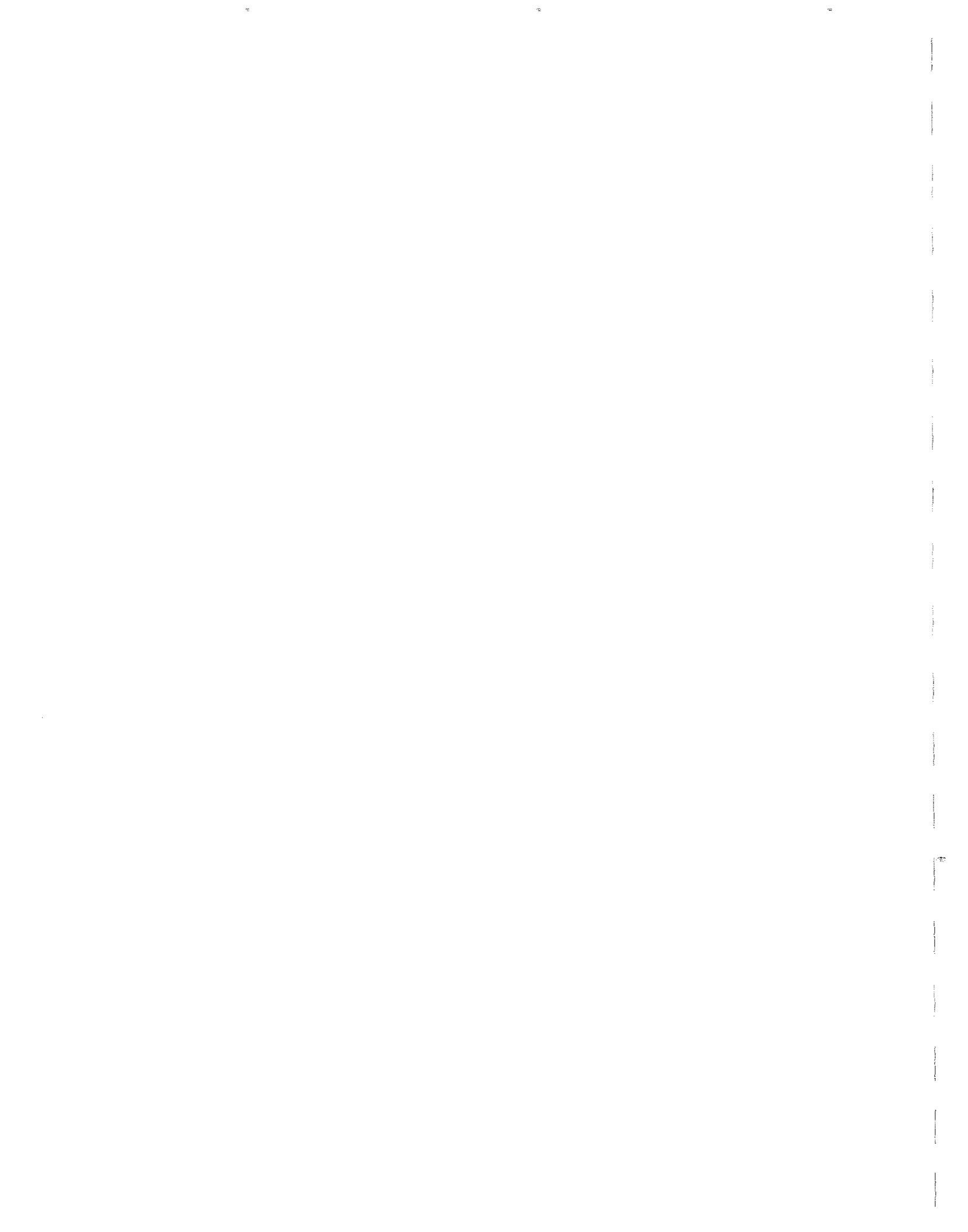
HEAVY & HIGHWAY TRUCK DRIVERS:

Truck helper and warehouseman:
HEAVY & HIGHWAY BASE RATE \$16.65
FRINGE BENEFITS 5.80

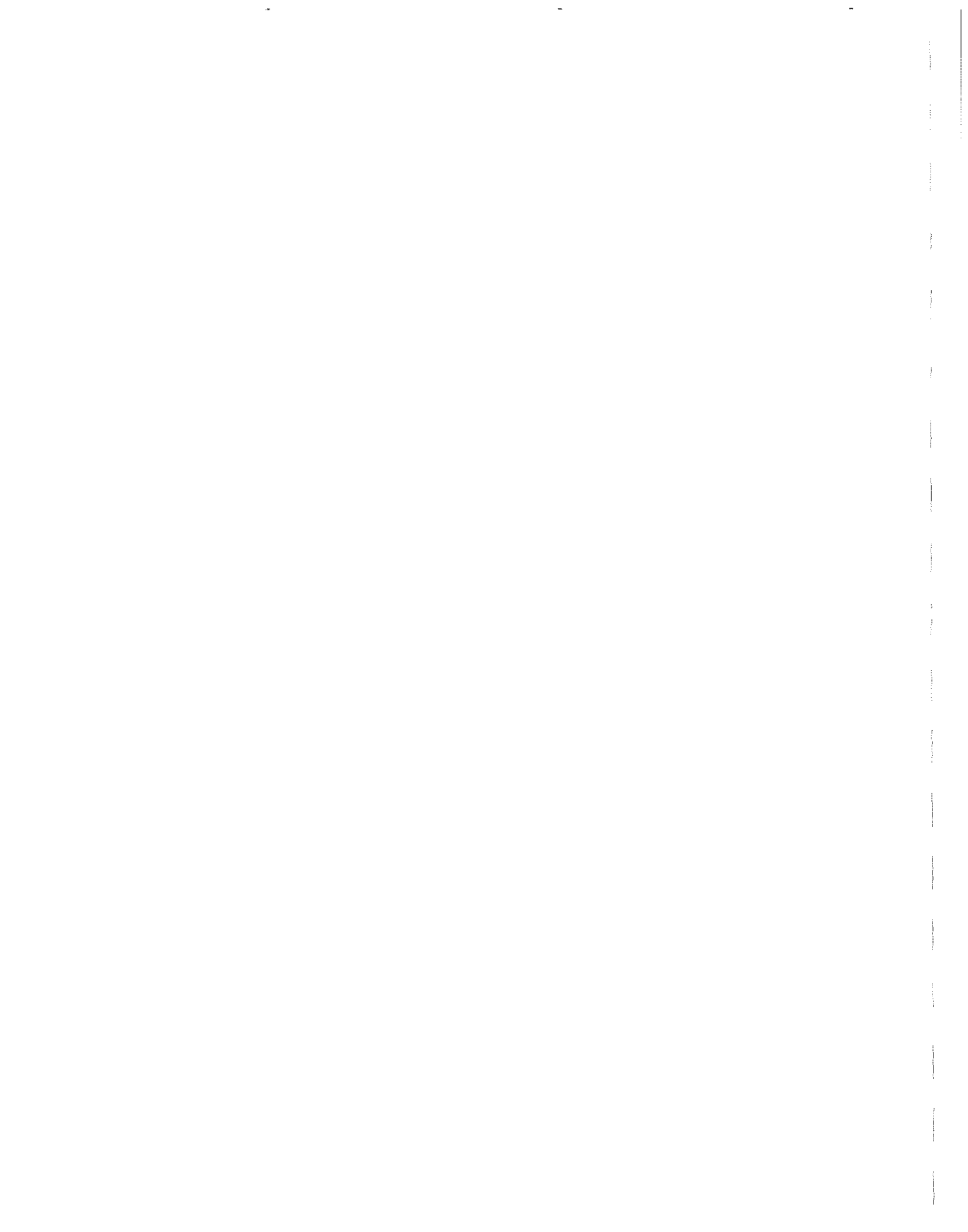
CLASSIFICATIONS RATE AND FRINGE BENEFITS

HEAVY & HIGHWAY TRUCK DRIVERS: (Continued)

Driver, winch truck & A-frame truck when used in transporting material:			
	HEAVY & HIGHWAY	BASE RATE	\$16.75
		FRINGE BENEFITS	5.80
Driver, semi-trailer or pole trailer, dump truck, tandem axle, and driver of distributors:			
	HEAVY & HIGHWAY	BASE RATE	\$16.85
		FRINGE BENEFITS	5.80
Driver on mixer trucks - all types:			
	HEAVY & HIGHWAY	BASE RATE	\$16.90
		FRINGE BENEFITS	5.80
Truck mechanic:			
	HEAVY & HIGHWAY	BASE RATE	\$16.95
		FRINGE BENEFITS	5.80
Driver, 3 tons & under, tire changer & truck mechanic helper:			
	HEAVY & HIGHWAY	BASE RATE	\$16.98
		FRINGE BENEFITS	5.80
Driver of pavement breakers:			
	HEAVY & HIGHWAY	BASE RATE	\$17.00
		FRINGE BENEFITS	5.80
Driver, over 3 tons & truck mounted rotary drill:			
	HEAVY & HIGHWAY	BASE RATE	\$17.19
		FRINGE BENEFITS	5.80
Driver, Euclid & other heavy earth moving equipment & low boy:			
	HEAVY & HIGHWAY	BASE RATE	\$17.76
		FRINGE BENEFITS	5.80
Greaser on greasing facilities:			
	HEAVY & HIGHWAY	BASE RATE	\$17.85
		FRINGE BENEFITS	5.80



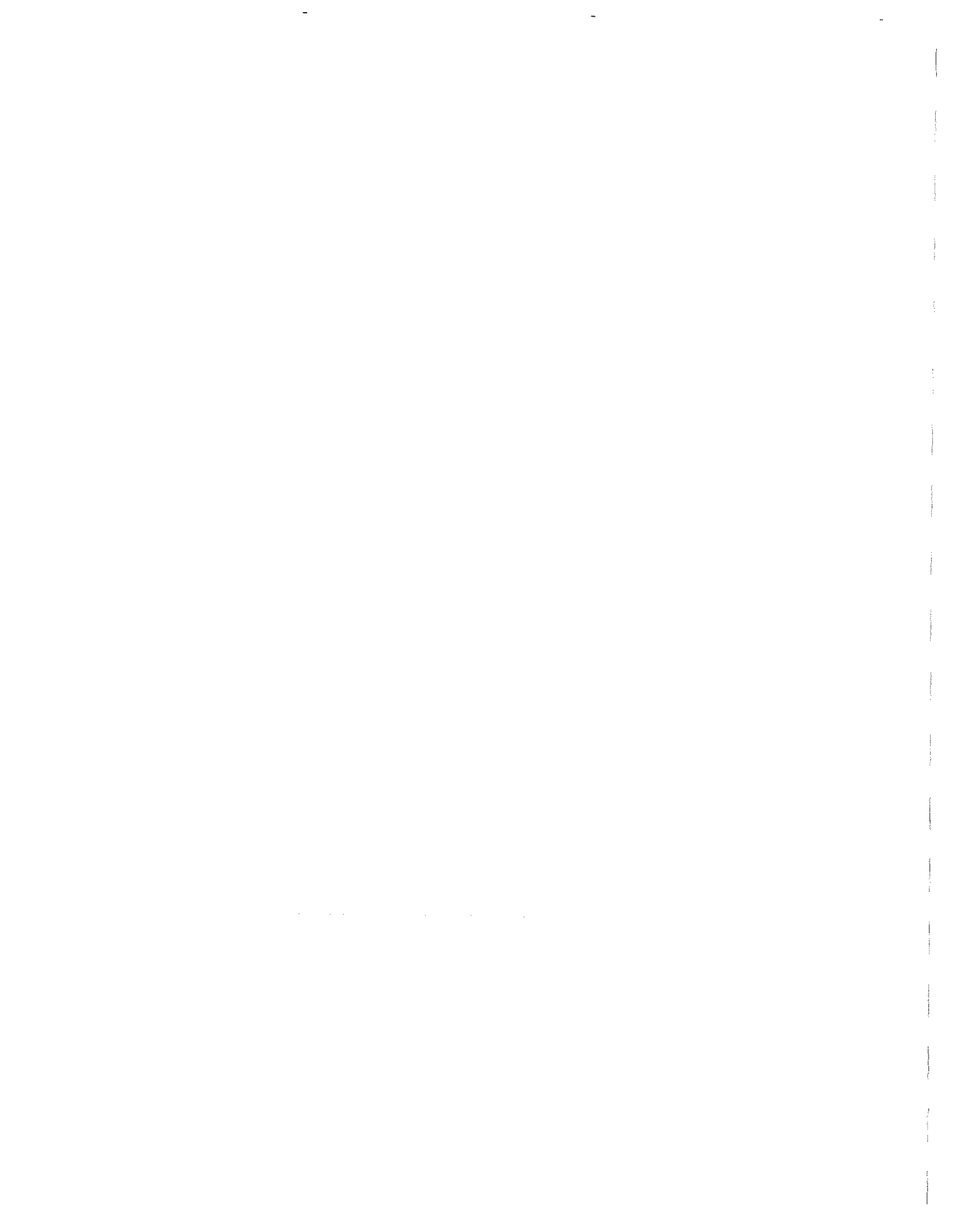
SECTION 5
SPECIAL CONDITIONS



SECTION 5 - SPECIAL CONDITIONS

CONTRACT NO. 9 – WATER STORAGE TANKS

	<u>Page No.</u>
1. Contract Change Order	5-1
2. Pre-Construction Conference	5-1
3. Equal Opportunity	5-1
4. Labor Regulations	5-1
5. Protection of Lives and Property	5-2
6. Conflict of Interest	5-2
7. Partial Payments	5-2
8. Withholding Payments	5-3
9. Sanitary Facilities	5-3
10. Final Inspection	5-3
11. Project Signs	5-3
12. Conflicting Requirements	5-3
13. Owner's Right to Award	5-4
14. Owner's Right to Increase or Decrease Units	5-4
15. Workmen's Compensation and Insurance	5-4
16. Wage Rates	5-4
17. Access to Records	5-4
18. Time of Completion and Liquidated Damages	5-4
19. Contractor's Obligations	5-5
20. Quantities of Estimate	5-5
21. Liens	5-5
22. Work Reasonably Inferred But Not Particularly Delineated or Specified	5-5
23. Limit of Liability of Owner to Contractor for Delays, Extra Cost and Damage	5-6
24. Requirements for Highway and Railroad Crossings and Rights-of-Way	5-6
25. Delays and Cost Due to Errors and/or Changes in Lines and Grades	5-6
26. Licenses and Permits	5-6
27. Conflict With or Damage to Existing Utilities	5-6
28. Shop or Setting Drawings	5-7
29. Work Hours Beyond Regular Hours	5-7
30. Excavation	5-7
31. Air and Water Acts	5-7
32. Subcontracting	5-7
33. Materials, Equipment and Labor; Substitute Material or Equipment	5-8
34. Availability of Lands, Physical & Subsurface Conditions: Reference Point	5-9
35. Substantial Completion	5-9
36. Cleaning Up	5-10
37. Miscellaneous	5-10
38. Safety and Health Regulations	5-10
39. Siltation and Soil Erosion	5-10
40. Permanent Reference Points, Bench Marks, and Property Markers	5-10
41. Existing Utilities	5-11
42. Coordination	5-11
43. Care of Shrubbery	5-11
44. Water for Testing and Disinfecting Purposes	5-12



SPECIAL CONDITIONS

1. Contract Change Order - All changes which affect the cost of the construction of the project must be authorized by means of a CONTRACT CHANGE ORDER. The CONTRACT CHANGE ORDER will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes should be recorded on a CONTRACT CHANGE ORDER as they occur so that they may be included in the partial payment estimate. All CONTRACT CHANGE ORDERS must be approved by the Rural Development.
2. Pre-Construction Conference - Following award of the CONTRACT, the CONTRACTOR will be required to attend a Pre-Construction Conference with OWNER, ENGINEER, and CDBG representatives during which items pertinent to performance and management of the project, will be thoroughly discussed and documented.
3. Equal Opportunity - If this contract exceeds \$10,000 the CONTRACTOR is subject to provisions of the equal opportunity requirements set forth in the Supplemental General Conditions, included herein with forms.
4. Labor Regulations - The CONTRACTOR and each of his subcontractors shall comply with the following statutes (and with regulations issued pursuant thereto which are incorporated herein by reference):

Title 18 U.S.C., Section 876: Kickback from public works employees. Whoever, by force, intimidation, or threat of procuring dismissal from employment, or by any other manner whatsoever induces any person employed in the construction, prosecution, completion or repair of any public building, public work, or building or work financed in whole or in part by loans (made, insured, or guaranteed) or grants from the United States, to give up any part of the compensation to which he is entitled under his contract of employment, shall be fined not more than \$5,000 or imprisoned not more than five years, or both.

Title 40 U.S.C., Section 276c: Regulations Governing Contractors and Subcontractors. The Secretary of Labor shall make reasonable regulations for Contractors and Subcontractors engaged in the construction, prosecution, completion or repair of public buildings, public works, or buildings or work financed in whole or in part by loans (made, insured, or guaranteed) or grant from the United States, including a provision that each Contractor and Subcontractor shall furnish weekly a statement with respect to the wages paid each employee during the preceding week.

The CONTRACTOR shall also comply with all Labor regulations set out in General Conditions.

The OWNER shall report all suspected or reported violations to the funding agencies.

5. Protection of Lives and Property - In order to protect the lives and health of his employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from

work, arising out of and in the course of employment or work under the CONTRACT.

The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

6. Conflict of Interest - No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this CONTRACT or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this CONTRACT if made with a corporation for its general benefit.

No official of the OWNER who is authorized in such capacity and on behalf of the OWNER to negotiate, make, accept or approve, or to take part in negotiating, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in the CONTRACT or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the OWNER who is authorized in such capacity and on behalf of the OWNER who is in any legislative, executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this CONTRACT or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

7. Partial Payments - Partial Payment estimate forms prepared by the ENGINEER shall be used when estimating periodic payments due the CONTRACTOR.

Computation of quantities that will be the basis for payment estimates, both monthly and final, will be made by the ENGINEER. All payment estimates may be checked and approved by the funding agencies before payment.

Where the computation of areas or volumes by exact geometric methods is unduly laborious or refined, the plan meter shall be held an instrument of precision and may be used in the determination of quantities upon which payments are based.

The measurements of the ENGINEER as to the amount of work done shall be final and conclusive.

Payments shall be made upon the work done within the lines prescribed by the drawings or specifications and in accordance with the unit prices for the items under which the work is done.

To insure the proper performance of the Contract, the OWNER shall retain an amount of each estimate as specified in the General Conditions and/or Supplemental General Conditions.

Additionally, on waterline contracts, clean up and seeding shall be calculated as ten percent (10%) of the unit price for pipe in place. Testing and sterilization as 5% of the unit price for pipe in place.

8. Withholding Payments - The OWNER may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the OWNER from loss on account of:

- (a) Defective work not remedied.
- (b) Claims filed or reasonable evidence indicating probable filing of claims.
- (c) Failure of CONTRACTOR to make payments properly to Subcontractors or for material or labor.
- (d) A reasonable doubt that the work can be completed for the balance then unpaid.
- (e) Damage to another CONTRACTOR or the OWNER'S facilities.
- (f) Performance of work in violation of the terms of the CONTRACT DOCUMENTS.
- (g) Where work on unit price items are substantially complete but lack cleanup and/or corrections ordered by the ENGINEER, amounts shall be deducted from unit prices in partial payment estimates to amply cover such clean-up and/or corrections.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

9. Sanitary Facilities - All necessary temporary sanitary facilities shall be provided for by the Prime Contractor(s) and shall meet with current requirements of the State Environmental Protection Agency. After the completion of the work, all temporary sanitary facilities shall be properly disposed of by the Prime Contractor(s).
10. Final Inspection - Final inspection of the work shall be made for the OWNER by the ENGINEER in collaboration with the Representatives for the funding agencies. Such inspection shall be made as soon as practicable after the CONTRACTOR has notified the OWNER in writing that the work is ready for such inspection.
11. Project Signs - Contract No. 9 – Water Storage Tanks shall furnish signs as set out in Section 01580 of each Contract Technical Specifications. Location is to be determined by the Engineer at Pre-Construction Conference.
12. Conflicting Requirements - Should conflicting conditions exist within the Specifications, Contract Documents, or Construction Drawings, priorities shall be established as follows:
 - a) Written Contract
 - b) Written Proposal
 - c) Advertisement for Bids
 - d) Instruction to Bidders
 - e) Special Conditions
 - f) Written Technical Specifications
 - g) Standard Details
 - h) Large Scale Details on Drawings
 - i) General Arrangement Details on Drawings
13. Owner's Right to Award - The OWNER shall retain the right to award or not award any or all of the Contracts covered by these Contract Documents and Specifications.
14. Owner's Right to Increase or Decrease Units - The OWNER shall retain the right to increase or decrease or eliminate up to 20% of any of the units listed in the BID submitted by the CONTRACTOR as may be required to complete the work at any time concurrent with or following the award of the Contract.

Unit prices previously approved in original bid are acceptable for pricing changes of original bid items. However, when changes in quantities exceed 20 percent of the original bid quantity and the total dollar change of that bid item is significant, the unit price may be reviewed by the OWNER to determine if a new unit price should be negotiated for added work performed after the original contract completion date.

15. Workmen's Compensation and Insurance - Workmen's Compensation: As required by State Statutes
- a) Public Liability and Property Damage Including Vehicular Liability: As listed in General Conditions
 - b) Builder's Risk or Installation Floater: Full amount of Contract Price.
16. Wage Rates - All Contractors for this project shall comply with State codes as they apply to wages and hours - public works projects.

The State Prevailing Wage Determinations are located in Section 4 of these Specifications.

17. Access to Records - Representatives of the funding agencies and the State D.O.W. shall have access to work whenever it is in preparation or progress. The Comptroller General of the United States, or any authorized representative, shall have access to any books, documents, papers, and records which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcriptions thereof.
18. Time of Completion and Liquidated Damages -

Contract No. 9 - Water Storage Tanks shall be completed within 240 calendar days from date of Notice to Proceed.

Liquidated Damages shall be \$500.00 for each calendar day any Contract remains incomplete after the Time of Contract Completion.

19. Contractor's Obligations - The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract, within the time herein specified, in accordance with the provisions of this Contract and said Specifications and in accordance with the plans and drawings covered by this Contract and any and all supplemental plans and drawings, and in accordance with the directions of the ENGINEER as given from time to time during the progress of the work. He shall furnish, erect, maintain, and remove such construction plants and such temporary works as may be required. The CONTRACTOR shall observe, comply with, and be subject to all the terms, conditions, requirements, and limitations of the Contract and Specifications, and shall do, carry on, and complete the entire work to the satisfaction of the ENGINEER and the OWNER.
20. Quantities of Estimate - Whenever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the BID, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be

deemed reasonably necessary or desirable by the OWNER to complete the work contemplated by this Contract, and such increase or diminution shall not give cause for claims or liability for damages.

21. Liens - Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the OWNER, a complete release of all liens arising out of this Contract or receipt in full in lien thereof, and if required in either case, an affidavit that insofar as he has knowledge or information, the releases and receipts include all the labor and materials for which a lien could be filed; but the Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the OWNER all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.
22. Work Reasonably Inferred But Not Particularly Delineated or Specified - The Contractor shall make a thorough examination of the site and study all drawings and specifications and all conditions relating to the erection of the work, and if any materials or labor are evidently necessary for the proper and complete execution of the work which are not specifically mentioned and included in the drawings and specifications, although reasonably inferred therefrom, unless eliminated by special mention, or if any error or inconsistency appears therein, or in the event of any doubts arising as to the true intent and meaning of the drawings or specifications, he shall report it to the ENGINEER at least five (5) days in advance of receiving the proposals. The ENGINEER will then issue an addendum containing the proper information to all Contractors not later than three (3) days prior to the time for opening of bids, to assure fair competition.
- In case the Contractor fails to make such report and the ENGINEER is not otherwise advised of such doubtful matters, the Contractor is hereby made responsible for the furnishing of the necessary labor and material reasonably inferred for any additional work involved in the correction of apparent errors or inconsistencies and in executing the true intent and meaning of the drawings and specifications as interpreted by the ENGINEER, and all such labor and material shall be provided at the Contractor's expense and under no condition will any such labor and material be allowed as an extra.
23. Limit of Liability of Owner to Contractor for Delays, Extra Cost and Damage - If, through no wrongful act or neglect of the OWNER, the Contractor is delayed, stopped, or caused extra cost or damage by injunction, court orders, judgment, or requirements of some other authority or acts beyond the control of the OWNER, he shall not be liable to the Contractor except for extension of time and payments only as reflected in application of quantities, prices, and extra work set forth in these specifications and contract. If sufficient work is otherwise available for application of Contractor's forces, the Owner will not be required to grant extension of time.
24. Requirements for Highway and Railroad Crossings and Rights-of-Way - The specifications herein concerning trenching, pipe laying, jacket pipe crossings, backfilling, maintenance during construction, protection of public, maintaining traffic, tunneling, and re-paving are subject to revision to conform to such requirements as set forth by highway and railroad specifications and such crossings and rights-of-way.
25. Delays and Cost Due to Errors and/or Changes in Lines and Grades - When the

OWNER'S engineering forces make errors or changes in lines and grades that cause items of construction to be removed and replaced, the extra cost of such removal and replacement over that of correct construction shall be chargeable as an extra per terms of Article 12 of the General Conditions.

Where the Contractor's forces are delayed only due to ENGINEER'S errors or changes in not more than five in fifty cases of location of points on the whole project, errors and changes will not be above normal to be expected in the execution of the work, and no claims for extra cost due to such delay will be granted. Layout work is considered a normal portion of a construction operation in which it is considered impractical to prevent delays of some of the required labor and equipment while others are performing their portion of the operation. Excessive delay due to such causes shall be chargeable as extra work per terms of Article 12 of the General Conditions. However, to be allowable, time, labor, and equipment delayed must be reported to and approved by the ENGINEER within 24 hours. Labor and equipment must have been applied at the time of stoppage and could not have been applied to other incomplete work during the stoppage.

26. Licenses and Permits - The Owner will secure and pay for permits required for permanent structures and State Highway Encroachment Bonds. The Contractor shall obtain and pay for all other necessary licenses and permits and shall faithfully comply with all laws, ordinances and regulations, Federal, State, or local, which may be applicable to the operations to be conducted hereunder.
27. Conflict With or Damage to Existing Utilities - Insofar as location data is available to the ENGINEER, existing underground utilities (such as water lines, sewer lines, natural gas lines, and underground telephone and electrical conduits) are located on the drawings. However, due to the approximate nature of such data and information, the locations of any particular utility cannot be certified as being correct. In general, locations and elevations are approximate only. The Contractor shall obtain the services of representatives of each of the utilities involved during construction to assist in the location of existing utilities. Lines and grades of lines have been established to minimize interference with utilities as far as possible. However, it shall be the responsibility of the Contractor to determine any relocations necessary for his performance of the contract, and to pay any fees associated therewith, with no additional cost or liabilities to the OWNER.
28. Shop or Setting Drawings - See Section 01300 of Technical Specifications for further detail. Submittals **must** meet all submittal requirements set out therein or they will be returned to Contractor.
29. Work Hours Beyond Regular Hours - The Contractor shall notify the ENGINEER in writing of any scheduled work beyond regular and normal working hours at least 48 hours in advance of the work. Work performed after regular working hours and without notice to the ENGINEER, shall be considered not in conformance with the Plans and Specifications and may be removed or not paid for.
30. Excavation - All excavation shall be considered unclassified. **Rock excavation is not a separate pay item**, and shall not be cause for claim of additional compensation due to the Contractor.
31. Air and Water Acts - If the contract exceeds \$100,000 the Contractor agrees to comply

with all the requirements of Section 114 of the Air Act (41 U.S.C., Section 1857 C-9) and Section 308 of the Water Act (33 U.S.C., Section 1318) relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 of the Air Act and Section 308 of the Water Act and all regulations (40CFR 15.4) and guidelines issued thereunder after the award of the contract. In so doing, the Contractor further agrees to:

- a) As a condition for the Award of Contract, to notify the OWNER of the receipt of any communication from the Environmental Protection Agency (EPA) indicating that a facility to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities. Prompt notification is required prior to contract award.
- b) The Contractor will include, or cause to be included, the above criteria and requirements in every nonexempt subcontract and that he will take such action as the Government may direct as a means of enforcing such provisions.
- c) To certify that any facility to be utilized in the performance of any nonexempt contractor is not listed on the EPA List of Violating Facilities pursuant to 40 CFR 15.20 as of the date of contract award.

32. Subcontracting - The following is in addition to and in conjunction with Article 6 of the General Conditions.

Prior to the execution and delivery of the Agreement, the successful Bidder will submit to the OWNER and the ENGINEER for acceptance a list of the names of Subcontractors and such other persons and organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for those portions of the Work as to which the identity of the Subcontractors and other persons and organizations must be submitted as specified in the Contract Documents. Prior to the execution and delivery of the Agreement, the ENGINEER will notify the successful Bidder in writing if either the OWNER or the ENGINEER, after due investigation, has reasonable objection to any Subcontractor, person or organization on such list. The failure of the OWNER or the ENGINEER to make objection to any Subcontractor, person or organization on the list prior to the execution and delivery of the Agreement shall constitute an acceptance of such Subcontractor, person or organization. Acceptance of any such Subcontractor, person or organization shall not constitute a waiver of any right of the OWNER or the ENGINEER to reject defective Work, material or equipment, not in conformance with the requirements of the Contract Documents.

If, prior to the execution and delivery of the Agreement, the OWNER or the ENGINEER has reasonable objection to and refuses to accept any Subcontractor, person or organization on such list, the successful Bidder may, prior to such execution and delivery, either (a) submit an acceptable substitute without an increase in his Bid Price or (b) withdraw his Bid and forfeit his Bid security. If, after the execution and delivery of the Agreement, the OWNER or the ENGINEER refuses to accept any Subcontractor, person or organization on such list, the CONTRACTOR will submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution and appropriate Change Order shall be issued; however, no such increase in the Contract Price shall be allowed in respect of any substitutions unless the CONTRACTOR has acted promptly and reasonably in submitting a name with respect thereto prior to the execution and delivery of the Agreement.

The CONTRACTOR will not employ any Subcontractor (whether initially or as a substitute) against whom the OWNER or the ENGINEER may have reasonable objection, nor will the CONTRACTOR be required to employ any Subcontractor against whom he has reasonable objection. The CONTRACTOR will not make any substitution for any Subcontractor who has been accepted by the OWNER and the ENGINEER, unless the ENGINEER determines that there is good cause for doing so.

The divisions and sections of the Specifications and the identifications of any drawings shall not control the Contractor in dividing the Work among Subcontractors or delineating the Work to be performed by any trade.

The CONTRACTOR agrees to specifically bind every Subcontractor to all of the applicable terms and conditions of the Contract Documents. Every Subcontractor, by undertaking to perform any of the Work, will thereby automatically be deemed to be bound by such terms and conditions.

All Work performed for the CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and the Subcontractor which shall contain provisions that waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by insurance provided in accordance with the General Conditions; except such rights as they may have to the proceeds of such insurance held by the OWNER as trustee under the General Conditions. The CONTRACTOR will pay each Subcontractor a just share of any insurance moneys received by the CONTRACTOR under the General Conditions.

33. Materials, Equipment and Labor; Substitute Material or Equipment - The following is in addition to and in conjunction with Article 6 of the General Conditions.

All materials and equipment will be new. If required by the ENGINEER, the CONTRACTOR will furnish satisfactory evidence as to the kind and quality of materials and equipment.

If it is indicated in the Specifications that the CONTRACTOR may furnish or use a substitute that is equal to any material or equipment specified, and if the CONTRACTOR wishes to furnish or use a proposed substitute, he will, promptly after the award of the contract, make written application to the ENGINEER for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the duties imposed by the general design, be similar and of equal substance to that specified by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified. No substitute shall be ordered or installed without the written approval of the ENGINEER who shall be the judge of equality.

34. Availability of Lands, Physical and Subsurface Conditions; Reference Points - The following is in addition to and in conjunction with Article 4 of the General Conditions.

The OWNER will provide, as indicated in the Contract Documents and not later than the date when needed by the CONTRACTOR, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the OWNER, unless otherwise

specified in the Contract Documents. If the CONTRACTOR believes that any delay in the OWNER'S furnishing these lands or providing such easements entitles him to an extension of the Contract Time, he may make a claim therefore as provided in the General Conditions. The CONTRACTOR will provide all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

The OWNER will, upon request, furnish to the CONTRACTOR copies of all available boundary surveys and subsurface tests.

The CONTRACTOR will promptly notify the OWNER and ENGINEER in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. The ENGINEER will promptly investigate those conditions and advise the OWNER in writing if further surveys or subsurface tests are necessary. Promptly thereafter, the OWNER will obtain the necessary additional surveys and tests and furnish copies to the ENGINEER and the CONTRACTOR. If the ENGINEER finds that the results of such surveys or tests indicate subsurface or latent physical conditions differing significantly from those indicated in the Contract Documents, a Change Order shall be issued incorporating the necessary revisions.

The OWNER will establish such general reference points as in his judgment will enable the CONTRACTOR to proceed with the Work. The CONTRACTOR will be responsible for the layout of the Work and will protect and preserve the established reference points and will make no changes or relocations without the prior written approval of the OWNER. He will report to the ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations. The CONTRACTOR will replace and accurately relocate all reference points so lost, destroyed or moved.

35. Substantial Completion - Prior to final payment, the CONTRACTOR shall, in writing to the OWNER and the ENGINEER, certify that the entire Project is substantially complete and request that the ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, the OWNER, CONTRACTOR AND ENGINEER will make an inspection of the Project to determine the status of completion. If the ENGINEER considers the Project substantially complete, he will prepare and deliver to the OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion and the responsibilities between the OWNER and the CONTRACTOR for maintenance, heat and utilities. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment, and the certificate shall fix the time within which such items shall be completed or corrected, said time to be within the Contract Time. The OWNER shall have seven days after receipt of the tentative certificate during which he shall make written objection to the ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, the ENGINEER concludes that the Project is not substantially complete, he shall notify the CONTRACTOR in writing, stating his reasons therefore. If, after said seven days and after consideration of the OWNER'S objections, the ENGINEER considers the Project substantially complete, he will execute and deliver to the OWNER and the CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as he believes justified after consideration of any objections from the OWNER.

The OWNER shall have the right to exclude the CONTRACTOR from the Project after the date of Substantial Completion, but the OWNER may allow the CONTRACTOR reasonable access to complete or correct items on the tentative list.

36. Cleaning Up - The CONTRACTOR will keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work, and at the completion of the Work he will remove all waste materials, rubbish and debris from and about the premises as well as tools, construction equipment and machinery, and surplus materials, and will leave the site clean and ready for occupancy by the OWNER. The CONTRACTOR will restore to their original condition those portions of the site not designated for alteration by the Contract Documents. Also see paragraph 7 of these Special Conditions pertaining to clean-up.
37. Miscellaneous - Whenever any provisions of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to him who gives the notice.

The duties and obligations imposed by the General Conditions and the rights and remedies available hereunder, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon the CONTRACTOR and the rights and remedies available to the OWNER and ENGINEER thereunder, shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the Contract Documents.

Should the OWNER or the CONTRACTOR suffer injury or damage to its person or property because of any error, omission or act of the other or of any of his employees or agents or others for whose acts he is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage.

The Contract Documents shall be governed by the law of the place of the Project.

38. Safety and Health Regulations - The Contractor shall comply with the Department of Labor Safety and Health Act of 1970 (P.L. 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (P.L. 91-54).
39. Siltation and Soil Erosion - The Contractor shall make every effort possible to assure a minimum amount of siltation and erosion will occur on the job site during construction.
40. Permanent Reference Points, Bench Marks, and Property Markers - The CONTRACTOR alone will be responsible for the protection and preservation of all permanent reference points, permanent bench marks, property corners, and property line points. The CONTRACTOR will make no changes or relocations without the written approval from the OWNER. The CONTRACTOR will report to the ENGINEER whenever any reference point, etc., is lost, damaged or destroyed or requires relocation and/or establishment of temporary points for relocation of said permanent point. The CONTRACTOR will have a registered land surveyor replace and accurately relocate all permanent points so lost, damaged, destroyed, or moved. The re-establishment of any said point shall be considered incidental to the cost of construction and therefore at no additional cost to

the OWNER.

41. Existing Utilities - Also see Technical Specifications, Section 02220.

Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies.

The available information concerning the location of existing underground utilities is shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the Construction Work. The purpose of the conference, or conferences, shall be to notify said companies, agencies, or departments of the proposed construction schedule, verify the location of and possible interference with the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and Owner have no objection to the Contractor arranging for the said utility companies, agencies, or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost for locating and avoiding, or repairing damage to said existing utilities.

Where existing utilities or appurtenant structures, either underground or above-ground, are encountered, they shall not be displaced or disturbed unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. Relocation and/or replacement of all utilities and appurtenant structures to accommodate the construction work shall be at the Contractor's expense, unless such relocation and/or replacement is by statute or agreement the responsibility of the owner of the utility.

Where a sewer line is to be installed within 18 inches vertically or 10 feet horizontally of a water line, that section of the sewer line shall be encased in concrete, according to the requirements of Paragraph 3.10 B, Section 02700.

A list of the utility companies which service the project area are on the cover sheet of the drawings. The utilities are not limited to those on said list.

42. Coordination - All Contractors are advised that various Contracts will be awarded simultaneously with their Contracts. It is imperative that the various Contractors coordinate its activities and cooperate with the other Contractors to assure expedient completion of the Project. Any conflicts should be brought to the attention of the Engineer.

43. Care of Shrubbery - Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

44. Water for Testing and Disinfecting Purposes - Where water is required for testing and disinfecting water lines and storage tanks or testing and flushing sewer lines, the Contractor shall be responsible for all costs of said water. In the case where test water is to be purchased, the Contractor shall arrange for the purchase and shall pay all costs associated with the purchase including tap fee if applicable.

Note: The Owner will furnish water to Contractors for testing and sterilization at a cost not to exceed \$2.00/1,000 gallons. Contractors are responsible for all charges for water losses caused by leaks which occur during the one year warranty period.

Water volume used for testing and sterilization shall be computed as the difference in the master readings and the average of the readings recorded during the six months prior to construction.

SECTION 6
TECHNICAL SPECIFICATIONS



SECTION 6
 TECHNICAL SPECIFICATIONS
 CONTRACT NO. 9 – WATER STORAGE TANKS
 TABLE OF CONTENTS

<u>DIVISION 01 – GENERAL REQUIREMENTS</u>	<u>PAGE NO.</u>
SECTION 01010 - GENERAL REQUIREMENTS	01010-1 THRU 5
SECTION 01030 - LABOR PROVISIONS	01030-1 THRU 2
SECTION 01040 - COORDINATION	01040-1 THRU 1
SECTION 01050 - FIELD ENGINEERING	01050-1 THRU 3
SECTION 01060 - REGULATORY REQUIREMENTS	01060-1 THRU 1
SECTION 01070 - ABBREVIATIONS AND SYMBOLS	01070-1 THRU 3
SECTION 01090 - REFERENCE STANDARDS	01090-1 THRU 3
SECTION 01300 - SUBMITTALS	01300-1 THRU 4
SECTION 01410 - TESTING LABORATORY SERVICES	01410-1 THRU 3
SECTION 01420 - INSPECTION SERVICES	01420-1 THRU 2
SECTION 01440 - CONTRACTOR QUALITY CONTROL	01440-1 THRU 5
SECTION 01530 - BARRIERS	01530-1 THRU 1
SECTION 01540 - SECURITY	01540-1 THRU 1
SECTION 01550 - ACCESS ROADS AND PARKING AREAS	01550-1 THRU 2
SECTION 01580 - PROJECT IDENTIFICATION AND SIGNS	01580-1 THRU 2
SECTION 01600 - MATERIAL AND EQUIPMENT	01600-1 THRU 1
SECTION 01610 - TRANSPORTATION AND HANDLING	01610-1 THRU 1
SECTION 01650 - STARTING OF SYSTEMS	01650-1 THRU 2
SECTION 01700 – PROJECT CLOSEOUT	01700-1 THRU 3
SECTION 01710 - CLEANING	01710-1 THRU 3
SECTION 01720 - PROJECT RECORD DOCUMENTS	01720-1 THRU 2
SECTION 01731 – GEOTECHNICAL INFORMATION	01731-1 THRU 1
SECTION 01740 - BASIS FOR PAYMENT CONTRACT NO. 5	01740-1 THRU 1
 <u>DIVISION 02 – SITE WORK</u>	
SECTION 02110 - CLEARING AND GRUBBING	02110-1 THRU 2
SECTION 02202 - ROCK REMOVAL	02202-1 THRU 3
SECTION 02221 - EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS	02221-1 THRU 6
SECTION 02270 - EROSION CONTROL, SEDIMENTATION AND CONTAINMENT OF CONSTRUCTION MATERIALS	02270-1 THRU 3
SECTION 02480 - SEEDING, FERTILIZING AND MULCHING	02480-1 THRU 6
SECTION 02722 - DUCTILE IRON PIPE	02722-1 THRU 7
SECTION 02831 - CHAINLINK FENCES AND GATES	02831-1 THRU 4
SECTION 02940 - TEMPORARY SILT AND EROSION CONTROL	02940-1 THRU 1

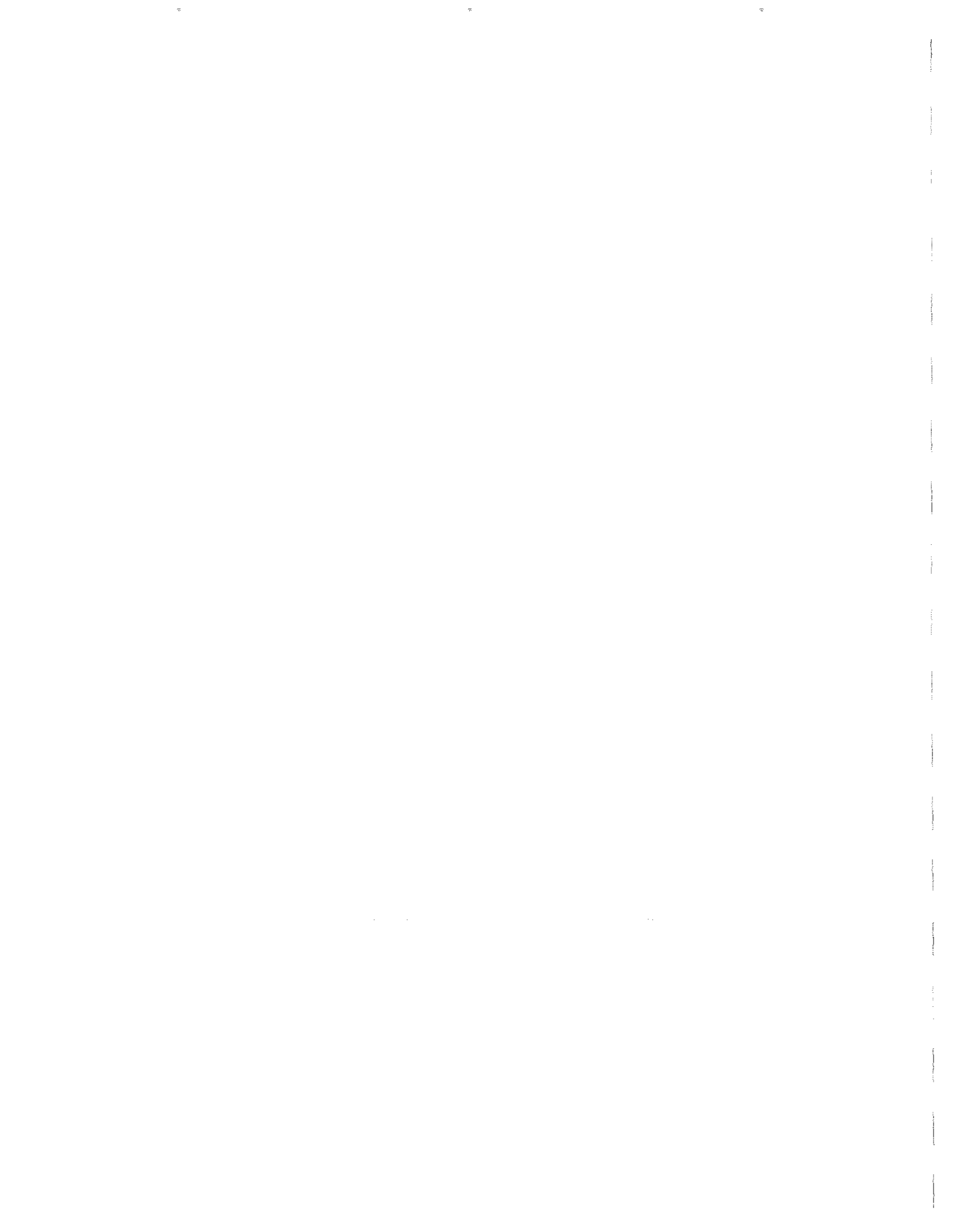


TABLE OF CONTENTS CONTINUEDPAGE NO.DIVISION 03 – CONCRETE

SECTION 03100 - CONCRETE FORMWORK	03100-1 THRU 5
SECTION 03200 - CONCRETE REINFORCEMENT	03200-1 THRU 5
SECTION 03250 - EXPANSION JOINTS, CONTRACTION JOINTS AND WATER STOPS	03250-1 THRU 4
SECTION 03300 - CONCRETE	03300-1 THRU 21

DIVISION 05 – METALS

SECTION 05540 – CASTINGS	05540-1 THRU 2
--------------------------	----------------

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION 13500 – GLASS COATED, BOLTED STEEL STANDPIPE WATER TANK	13500-1 THRU 10
---	-----------------

DIVISION 15 – MECHANICAL

SECTION 15020 – GATE VALVES	15020-1 THRU 3
SECTION 15030 – MECHANICAL CHECK VALVES	15030-1 THRU 3
SECTION 15040 – BUTTERFLY VALVES	15040-1 THRU 2
SECTION 15100 – FLUSHING HYDRANT	15100-1 THRU 1

DIVISION 16 – ELECTRICAL

SECTION 16010 – BASIC ELECTRIC REQUIREMENT	16010-1 THRU 3
SECTION 16111 – CONDUIT	16111-1 THRU 6
SECTION 16123 – BUILDING WIRE AND CABLE	16123-1 THRU 5
SECTION 16130 – BOXES	16130-1 THRU 4
SECTION 16141 – WIRING DEVICES	16141-1 THRU 2
SECTION 16195 – ELECTRICAL IDENTIFICATION	16195-1 THRU 3
SECTION 16440 -- DISCONNECT SWITCHES	16440-1 THRU 2
SECTION 16470 – PANEL BOARDS	16470-1 THRU 4
SECTION 16577 – OBSTRUCTION LIGHTS	16577-1 THRU 2

SECTION 01010

GENERAL REQUIREMENTS

SUMMARY OF WORK

PART 1 - GENERAL

1.0 WORK COVERED BY CONTRACT DOCUMENTS

1.1 SCOPE

Division 1 - General Requirements shall apply to all Divisions of the Specifications. Any conflict shall be called to the attention of the Engineer for clarification and ruling.

1.2 GENERAL DESCRIPTION

- A. These specifications and drawings accompanying them describe the work to be done and the materials to be furnished for installation of all specified work, on **Contract No. 9 – Water Storage Tanks**
- B. By submission of his bid, the Contractor acknowledges that he has acquainted himself with all conditions which may affect the work as would be evident from a thorough investigation of the job site, and these specifications covering the work for the purpose of coordinating his work and cost, and agrees that the Owner will not be held liable for any additional costs incurred by the Contractor for causes or conditions which could or should have been determined by such an investigation.

1.3 MANAGER'S NAME AND PHONE NUMBER

Leihman Howard, Jr.
Hyden-Leslie County Water District
HC 61 Box 2590
325 Wendover Road
Hyden, Kentucky 41749
(606) 672-2791

1.4 The Drawings and Specifications are intended to be fully explanatory, however, should anything be shown, indicated or specified on one and not the other, it shall be done the same as if shown, indicated or specified in both.

1.5 It shall be the responsibility of all Contractors and subcontractors to carefully examine all Drawings, Specifications and Contract Documents pertaining to all phases of the construction in order that Contractor and Subcontractors may

foresee all requirements for coordination of their work. Submission of a bid shall be construed as evidence that such an examination has been made. Claims based on unforeseen requirements will not be considered.

- 1.6 Should any error or inconsistency appear in Drawings or Specifications, the Contractor, before proceeding with the work, must make mention of the same to the Engineer for proper adjustment, and in no case proceed with the work in uncertainty or with insufficient drawings.
- 1.7 Contractors shall follow sizes in specifications or figures on drawings, in preference to scale measurements and follow detail drawings in preference to general drawings.
- 1.8 Where it is obvious that a drawing illustrates only a part of a given work or of a number of items, the remainder shall be deemed repetitious and so constructed.

PART 2 - SCOPE OF WORK

2.1 WORK COVERED BY CONTRACT DOCUMENTS

2.2 GENERAL

- A. The work to be performed consists of furnishing all materials, labor, equipment and the execution of all operations necessary for the completion of Contract No. 9 for the **Hyden-Leslie County Water District**.

The major items of work include but are not limited to:

1. Construction of **Contract No. 9 – Water Storage Tanks** and appurtenances. All miscellaneous items of work shown by the drawings and/or described in the specifications.
2. Construction of grading and access road.

2.3 CONTRACTS

2.4 NOTICE AND SERVICE THEREOF

- A. Any notice to the Contractor from the Owner relative to any part of this Contract, shall be in writing and considered delivered and the service thereof completed, when such notice is posted, by mail, to the Contractor at his last given address, or delivered in person to the Contractor or his authorized representative on the work site.

2.5 DIVISION OF SPECIFICATIONS

Division of specifications into sections is done for convenience of reference and

is not intended to control Contractors in dividing work among subcontractors or to limit scope of work performed by any trade under any given section.

2.6 CONFLICTS

- A. If and when doubt exists in the mind of the Bidder as to the true meaning of any part of the Bidding Documents, the Bidder shall request interpretation thereof in accordance with the Instructions to Bidders. Alleged "answers by telephone" will not be adjudged as legitimate interpretations of conflicting information. Official interpretations shall be by Addendum only, within the time frame indicated in the Instructions to Bidders and/or the individual sections of the Specifications.
- B. If a conflict occurs in or between bidding documents regarding methods of performing the work or the material required, and the Bidder does not obtain a written decision (official Addendum) with respect thereto prior to submitting his proposal, he shall be deemed to have bid upon the more expensive way of doing the work and the better quality of material. If the Owner and/or Engineer later elects to use the less expensive method, less expensive quality or less quantity of material the Owner shall receive a suitable credit.
- C. Refer to the General Conditions and Special Conditions for Contract requirements.
- D. The intent of the contract documents is to include all items necessary for the proper execution and completion of the work. Anything called for in the specifications and not shown on the drawings or shown on the drawings and not called for in the specifications, shall be included in the Contractor's work, the same as if included in both. In the event of a doubt arising as to the true intent and meaning of the drawings and specifications, the Contractor shall report it at once to the Engineer. The Engineer shall furnish, with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, true developments thereof and reasonably inferable therefrom. The work shall be executed in conformity therewith and the Contractor shall do no work without proper drawings and instructions. In case of conflicts between the various contract documents, the order of precedence will be set out in Special Conditions at paragraph 12.
- E. The Contractor shall make a thorough examination of the site and study all drawings and specifications and all conditions relating to the erection of the work. Materials or labor evidently necessary for the proper and complete execution of the work, which are not specifically mentioned although reasonably inferred there from, shall be included in the work.

2.7 BENEFICIAL USAGE (SUBSTANTIAL COMPLETION)

- A. The date of beneficial usage of the project, or a designated portion thereof, is the date where construction is sufficiently completed on the project for the use for which it is intended.
- B. Corrective work and the replacement of defective equipment or materials and the adjustment of control apparatus shall not delay the determination of beneficial usage.
- C. When the majority of the work is complete and ready for operation, but cannot be certified as substantially complete because of incomplete items impossible to complete due to weather conditions, payments will be authorized for the amount of work completed, withholding reasonable amounts to cover the incomplete work. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims, and shall not terminate the contract.
- D. When the Owner begins to use the facilities or any portion thereof, prior to contract completion, the operation, maintenance, utilities and insurance become the responsibility of the Owner.

2.8 LIQUIDATED DAMAGES

Should the Contractor fail to complete the work under his Contract and make the Project available for Beneficial Usage on or before the date stipulated for Beneficial Usage (or such later date as may result from extensions in the Contract Time granted by the Owner), the Contractor agrees that the Owner is entitled to, and shall pay the Owner, as liquidated damages, the sum of Five Hundred Dollars (\$500.00) for each consecutive calendar day until Beneficial Usage (Substantial Completion) is reached as described herein.

2.9 SUBSTITUTION - MATERIALS AND EQUIPMENT

- A. *Substitution of major equipment and materials previously submitted by the Contractor and reviewed by the Engineer will be considered only for the following reasons:*
 - 1. Unavailability of the material or equipment due to conditions beyond the control of the supplier.
 - 2. Inability of the supplier to meet contract schedule.
 - 3. Technical noncompliance to specifications.
- B. Substitution of other equipment and materials named in the

specifications will be considered, provided the proposed substitution will perform adequately the functions called for by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function of that specified. The burden for proving equality is that of the Contractor.

- C. Inclusion of a certain make or type of materials or equipment in the Contractor's estimate shall not obligate the Owner to accept such material or equipment if it does not meet the requirements of the plans and specifications.
- D. Also, see Section 01600.

PART 3 - CONTRACTOR USE OF PREMISES

3.1 RELEASE OF SITE

- A. All access to the site shall be as defined by the Owner.
- B. Contractor shall insure that no hazardous situations exist at the site during working hours or are left during non-working hours.

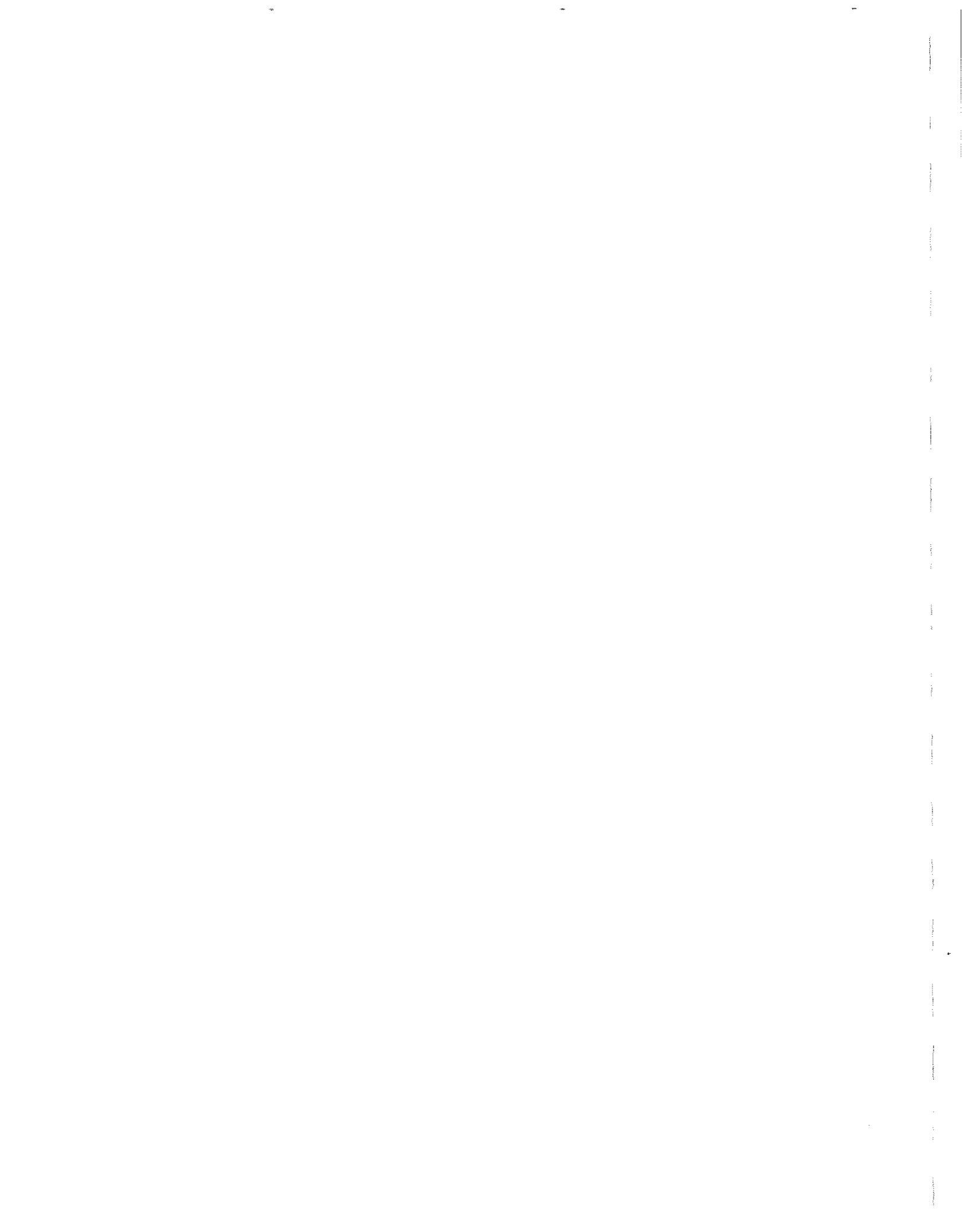
3.2 SCHEDULING OF WORK

- A. The work shall be scheduled so the project can be put into service at the earliest possible date.
- B. All work shall be completed within time limits established in other portions of the Contract Documents.

3.3 TRAFFIC MAINTENANCE

- A. All traffic must be maintained at all times on public streets and roadways. No road or street shall be closed without special written permission from the Owner.
- B. Traffic must be maintained on State maintained roads in accordance with the Standard Drawings, details and specification Section 01570. Contractor will be required to adhere to all provisions of the Kentucky Transportation Cabinet Permit for the project.

END OF SECTION



SECTION 01030
LABOR PROVISIONS

PART 1 - GENERAL

1.1 FUNDING SOURCES

This project is being funded by KIA and Coal Severance funds.

1.2 WORK INCLUDED

The Contractor shall conform to all provisions of the Kentucky Department of Labor and Revised Statutes as they may apply to the work to be accomplished under these specifications. The Contractor shall also conform to all provisions of Federal Labor Laws and Regulations that govern the work that supplement or supplant the Kentucky Department of Labor regulations.

1.3 WAGE RATES

The Applicable State and Federal Wage Decisions are provided herein at Section 4. These schedules of wages shall govern the work. The Contractor shall post at appropriate, conspicuous points at the project site, copies of these wage decisions. The Contractor will utilize, when feasible, local labor and will pay them wages commensurate with these prevailing wages. Two (2) copies of all payroll records shall be submitted to the OWNER within one week after each pay period. In case of conflict between State and Federal Prevailing Wage Rates, the Contractor shall pay the highest prevailing rate of the two.

1.4 HOURS OF WORK

Hours of work shall be as set by the latest State and Federal Wage Laws and Regulations. Overtime shall be determined and paid pursuant to the latest State Wage Laws.

Whenever overtime work is scheduled, the Contractor shall give prior notice to the Owner & Engineer.

1.5 NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246 AND 41 CFR PART 60-41)

The following Notice shall be included in, and shall be a part of all solicitations for offers and bids in all Federal and federally assisted construction contracts or subcontracts in excess of \$10,000.00.

The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the Standard Federal Equal Employment Opportunity Construction Contract

Specifications set forth herein.

The goals and timetables for minority and female participation expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, area as follows:

TIMETABLES

Goals for minority participation for each trade	Goals for female participation for each trade
7.0%	6.9%

These goals are applicable to all Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer to minority or female employees or trainees from purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed. The Contractor shall provide written notification to the appropriate Regional Office of the Office of Federal Contract Compliance Programs within 10 working days of award of any work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number, estimated dollar amount of the subcontract, estimated starting and completion dates of the subcontract, estimated starting and completion dates of the subcontract and the geographical area in which the contract is to be performed.

As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is Leslie County.

- END OF SECTION -

SECTION 01040

COORDINATION

PART 1 - GENERAL

1.1. COORDINATION OF THE WORK

- A. The Contractor shall coordinate the work of all the crafts, trades, subcontractors engaged on the Work, and he shall have final responsibility as regards the schedule, workmanship, and completeness of each and all parts of the Work.
- B. All crafts, trades, and subcontractors shall be made to cooperate with each other and with others as they may be involved in the installation of work, which adjoins, incorporates, proceeds, or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to the execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade, and subcontractor shall be made responsible to the Owner, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing, and cleaning as required to satisfactorily perform the Work.
- C. The Contractor shall be responsible for all cutting, digging, and other action of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations, and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to the Owner.
- D. Each subcontractor is expected to be familiar with the General requirements and all sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work and to the end that complete coordination between trades will be affected. Each Contractor shall consult with the Engineer if conflicts exist on the Drawings.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

SECTION 01050
FIELD ENGINEERING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Contractor's Responsibility

1. It shall be the Contractors' responsibility to establish all lines, elevations, reference marks, batter boards needed by the Contractor during the progress of the Work. The Engineer shall have final approval of location of all facilities.
2. The Engineer shall be permitted at all times to check the lines, elevations, reference marks, and batter boards, set by the Contractor, who shall correct any errors in lines, elevations, reference marks, batter boards, etc., disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve or diminish in any way the responsibility of the Contractor for the accurate and satisfactory construction and completion of the entire Work.
3. The Contractor shall make, check, and be responsible for all measurements and dimensions necessary for the proper construction of and the prevention of misfittings in the Work.

B. Work to Conform

1. During the progress and on its completion, the work shall conform truly to the lines, levels, and grades indicated on the Drawings or given by the Engineer and shall be built in a thoroughly substantial and workmanlike manner, in strict accordance with the Drawings, Specifications, and other Contract Documents and the directions given by the Engineer.
2. All work done without instructions having been given by the Engineer, without proper lines or levels, or performed during the absence of the Engineer, will not be estimated or paid for except when such work is authorized by the Engineer in writing. Work so done may be ordered uncovered or taken down, removed, and replaced at the Contractor's expense.

C. Pipe Location:

1. Exterior pipelines will be located substantially as indicated on the Drawings, but the right is reserved by the Owner, acting through the Engineer, to make such modifications in location as may be necessary. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

D. Limits of Normal Excavation:

1. In determining the quantities of excavation to which unit prices shall apply, the limits of normal width and depth of excavation shall be as described below, unless other limits are indicated on the Drawings or specified.
2. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe, but unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider than 2'6" plus the nominal diameters of the pipe at the level of or below the top of the pipe. Trenches cut in roads and streets shall not exceed a maximum width of 2'6" plus the nominal diameters of the pipe at the level of the road or street surface. The normal depth shall be measured to a distance of 0.2 feet below the bottom of the pipe in earth and 0.5 feet in rock, unless there is a cradle underneath the pipe, in which case the normal depth shall be measured to the underside of the cradle. The width of trench for the cradle shall be assumed to be that specified above for pipes in trench.
3. For concrete placed directly against the undisturbed earth, the normal width and depth of the excavation for such concrete shall be measured to the neat lines of the concrete as indicated on the Drawings or as ordered.
4. For concrete placed against rock surfaces resulting from rock excavation, the normal width and depth of the excavation shall be measured to 4 inches outside the neat lines of the concrete as indicated on the Drawings or as ordered.
5. For other structures, except manholes as noted below, the normal width shall be measured between vertical planes one foot outside the neat lines of the several parts of the structure, except that the width at any elevation shall be measured as not less than the width at a lower elevation. The normal depth shall be measured to the underside of that part of the structure for which the excavation is made.
6. No additional width or depth of trenches excavated in earth or rock shall be allowed at standard circular manholes.
7. Wherever bell holes are required for jointing pipe, they shall be provided without additional compensation over and above that resulting from measurements as above described.
8. Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of acceptable design. Where indicated on the Drawings, specifications or as required, anchor bolts shall be provided with square plates at least 4 inches by 4 inches by 3/8 inch or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done by the Contractor. Care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise drilling and caulking.

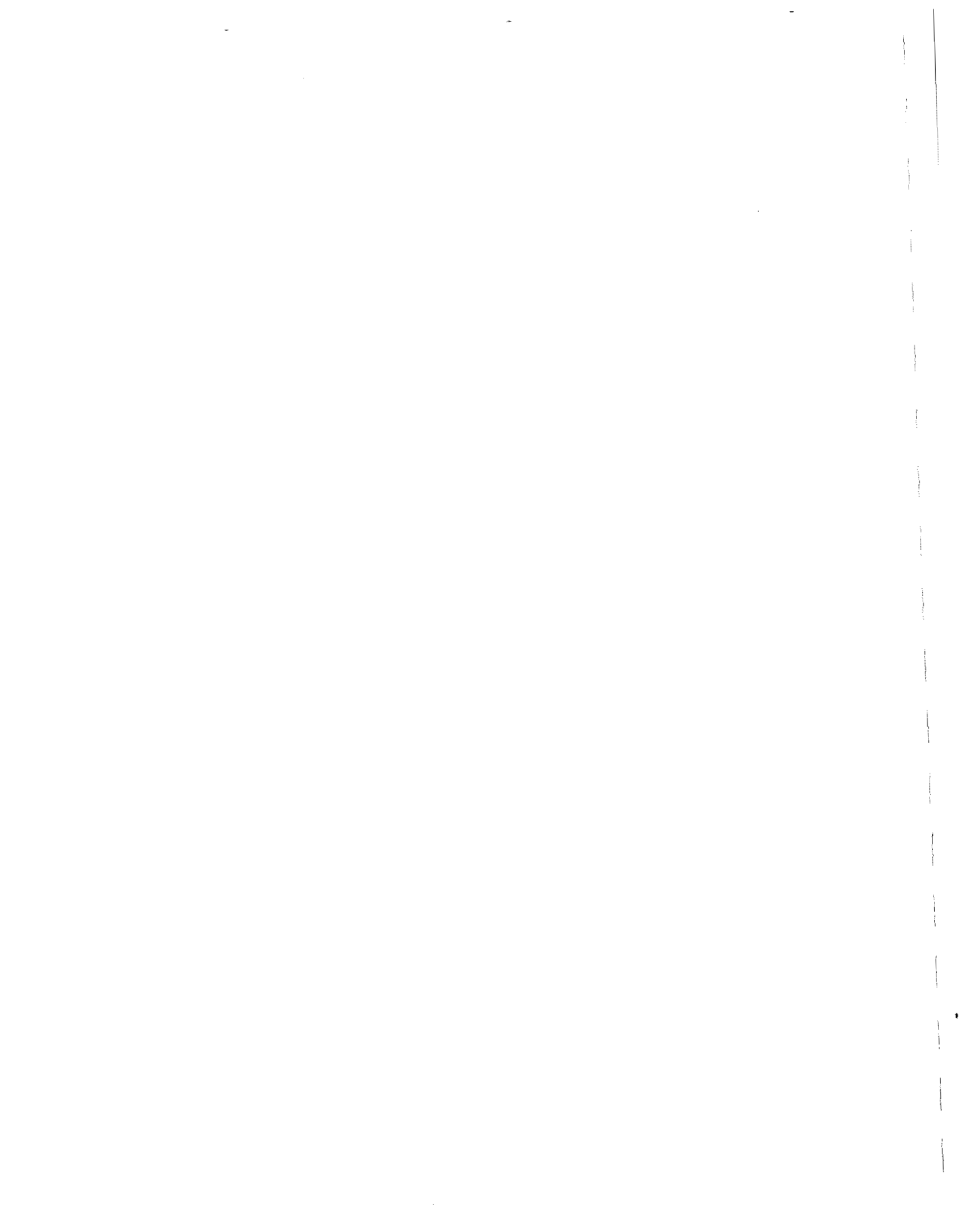
PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION



SECTION 01070

ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.1. REQUIREMENTS INCLUDED

Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth as follows.

1.2. QUALITY ASSURANCE

- A. For the products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.
- C. When required by individual Specifications section, obtain a copy of standard. Maintain a copy at job site during submittals, planning and progress of the specific work, until Substantial Completion.

1.3. SCHEDULE OF REFERENCES

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
IEEE	Institute of Electrical and Electronic Engineers, Inc.
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANS	American National Standards Institute
API	American Petroleum Institute

ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CS	Commercial Standard
IBR	Institute of Boiler and Radiator Manufacturers
IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
KDOH	Kentucky Department of Highways
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
Fed.	Federal Specifications issued by the Federal Supply Spec. Service of the General Services Administration, Washington, D.C.
	125-lb ANS American National Standard for Cast-Iron Pipe
	150-lb ANS Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class
AWG	American or Brown and Sharpe Wire Gage
NPT	National Pipe Thread
OS&Y	Outside screw and yoke

Stl.Wg	U. S. Steel Wire, Washburn and Moen, American Steel and Wire or Roebling Gage
UL	Underwriters' Laboratories
USS	United States Standard Gage
WOG	Water, Oil, Gas
WSP	Working Steam Pressure

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.1. QUALITY ASSURANCE

- A. For Products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Material shall bear Underwriters' Laboratories label where such a standard has been established and listed by Underwriters' Laboratories, Inc. All materials, equipment and appliances shall conform to requirements of standards referenced here.
- C. Conform to reference standard by date of issue current on date of Contract Documents.
- D. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.2. SCHEDULE OF REFERENCES

ACI American Concrete Institute
Box 19150
Reford Station
Detroit, MI 48219

AGC Associated General Contractors of America
1957 E Street, N.W.
Washington, DC 20006

AITC American Institute of Timber Construction
333 W. Hampden Avenue
Englewood, CO 80110

ANSI American National Standards Institute
1430 Broadway
New York, NY 10018

ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

CDA Copper Development Association
57th Floor, Chrysler Building
405 Lexington Avenue
New York, NY 10174

CRSI Concrete Reinforcing Steel Institute
933 Plum Grove Road
Schaumburg, IL 60195

FCC Federal Communications Commission
DOT, M443.2
Utilization and Storage Section
Washington, DC 20590

FM Factory Mutual System
1151 Boston-Providence Turnpike
Norwood, MA 02062

IEEE Institute of Electrical and Electronics Engineers
345 East 47th Street
New York, NY 10017

NEMA National Electrical Manufacturers' Association
2101 L Street, N.W.
Washington, DC 20037

NFPA National Fire Protection Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077

REA Rural Electrification Administration
USDA-REA-ASD
Room 0180
ATTN: Publications
14th and Independence Avenue, S.W.
Washington, DC 20250

UL Underwriters' Laboratories, Inc.
 333 Pfingston Road
 Northbrook, IL 60062

PART 2 - REFERENCED STANDARDS

All work performed in connection with this contract shall be in accordance with the latest version of the following standards:

Occupational Safety and Health Administration (OSHA)

Applicable Telecommunications Standards

National Fire Protection Association

National Electrical Code (NEC)

National Electrical Safety Code (NESC)

Federal Communications Commission

National Telecommunications and Information Administration

Electronics Industries Association (EIA)

American National Standards Institute

Rural Electrification Administration

PART 3 - EXECUTION

NOT USED.

END OF SECTION



SECTION 01300**SUBMITTALS****PART 1 - GENERAL****1.1. WORK INCLUDED**

Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished as set out in paragraph 1.5 hereinafter and shall be checked and reviewed and stamped and signed as approved by the Contractor before submission to the Engineer. The review of the Drawings by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such drawings will not relieve the Contractor of the responsibility for any errors, which may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

1.2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. General Conditions.
- B. Section 01720 - Project Record Documents (As Built).

1.3. DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

1.4. GENERAL CONDITIONS

Review by the Engineer of shop drawings or submittals of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quality, quantity, materials, and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from the responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents.

Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

1.5. GENERAL REQUIREMENTS FOR SUBMITTALS

A. Shop Drawings

1. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Drawings. Where applicable, show fabrication, layout, setting, and erection details.
 2. Shop drawings are defined as *original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract*. Shop drawings illustrate some portion of the work and show fabrication, layout, setting, or erection details of equipment, materials, and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for contractor distribution plus three (3), which will be retained by the Engineer. Shop drawings shall be folded to an approximate size of 8-1/2" x 11" and in such manner that the title block will be located in the lower right-hand corner of the exposed surface.
- B. Project data shall include manufacturer's standard schematic drawings modified to delete information, which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.
- C. Where samples are required, they shall be adequate to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.
- D. All submittals shall be referenced to the applicable item, section, and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s). All submittals shall bear the Engineer's project code as noted in the upper right corner of this sheet.

- E. The Contractor shall review and check submittals. Including those of any sub-contractor(s) and shall indicate his review and approval by placing and executing the following on all shop drawings:

This shop drawing has been reviewed by [*Name of Contractor*] and approved with respect to the mean, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incidental thereto. [*Name of Contractor*] also warrants that this shop drawing complies with contract documents and comprises no variation thereto.

By _____
Date _____

- F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefore. All changes shall be clearly marked on the submittal with a bold red mark. Any additional costs for modifications shall be borne by the Contractor.
- G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineers, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted items.
- H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- I. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing leads, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers, and fabricators; the Contractor shall be responsible for ensuring the compatibility of such coatings with the field-applied paint products and systems.

- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturers' brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions, and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

1.6. CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers, and similar data.
- B. Coordinate each submittal with requirements of Work and of Contract Documents.
- C. Notify Engineer, in writing at time of submission, of deviation in submittals from requirement of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which require submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1. REQUIREMENTS

- A. The Contractor shall employ and pay for the services of a certified independent testing laboratory to perform specified services and testing.
- B. It is the Contractors responsibility to verify that the laboratory meets the required standards and qualifications.

1.2. RELATED REQUIREMENTS

- A. CONDITIONS OF THE CONTRACT
- B. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- C. Testing laboratory inspection, sampling and testing is required for the following sections and as specified:

Section 03300: Concrete For Building Construction

1.3. QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification": published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."
- C. Authorized to operate in the state in which the project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection with memorandum of remedies of any deficiencies reported by the inspection.
- E. Test Equipment
 - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
 - a. National Bureau of Standards.

- b. Accepted values of natural physical constants.

1.4. LABORATORY DUTIES.

- A. Cooperate with Owner, Engineer and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards.
 - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit written report of each test and inspection; one copy each to Engineer, Owner, Contractor, and one copy to Record Documents File. Submittal schedule for each time of test shall be approved by Engineer prior to construction of any item that requires testing. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in the project.
 - 10. Type of inspection or test.
 - 11. Results of tests and compliance with Contract Documents.
 - 12. Interpretation of test results, when requested by Engineer or owner.
- E. Perform additional tests required by Engineer or the Owner.

1.5. LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

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

1.6. CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and provide access to work as required.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested.
 - 2. To obtain and handle samples at the project site or at the source of the product to be tested.
 - 3. To facilities inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests of inspections cannot be performed after such notice, reimburse laboratory personnel for expenses incurred due to negligence.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required.
 - 1. For convenience.
 - 2. When initial tests indicate work does not comply with Contract Documents.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED.

SME: 03004

END OF SECTION

01410-4

SECTION 01420

INSPECTION SERVICES

PART 1 - TEST AND INSPECTION

1.1. GENERAL

- A. The Engineer shall be notified forty-eight (48) hours in advance when equipment is to be subjected to tests before any work is concealed and before trenches are backfilled. Failing to comply with the above-mentioned notice, this Contractor shall uncover the work for the Engineer's observation, and repair any damages to other Contractor's work. This Contractor shall provide these services without charge.
- B. Periodic inspection shall be scheduled by the Contractor for rough as well as finished work. The rough-in inspections shall be divided into as many inspections as may become necessary to cover all roughing-in.
- C. Before requesting a final inspection, this Contractor shall inspect the installation to assure that the job is complete in every detail and that all requirements of the Contract Documents have been fulfilled.
- D. A punch list inspection shall be scheduled by this Contractor with the Engineer or his representative present. The punch list inspection shall be made with junction box covers removed.
- E. The Contractor shall be responsible and shall pay all costs for the preparation, job curing (if required) and transportation of materials and equipment to the laboratory or inspection agency retained by the Owner except where these documents say specifically the Owner will pay these costs.
- F. The Contractor will be responsible for the procurement, administration and payment of all specified inspection and testing procedures. Only qualified licensed/ certified firms for the designated services will be approved. The Contractor shall submit the names of the firms for approval by the Owner prior to administering of the inspection or testing services.

1.2. ELECTRICAL INSPECTION

- A. Electrical inspections will be performed throughout the course of construction by a certified electrical inspector from the State Fire Marshal's Office.
- B. All cost of the electrical inspections shall be borne by the Contractor.

- C. Acceptance by the electrical inspector, however, does not relieve the Contractor from the responsibility of the requirements set forth in these Plans and Specifications. All work under this Contract is subject to the observation of the Engineer. When it is the opinion of the Engineer that the Contractor has failed to properly coordinate his work or provide materials and installation, or to meet the intent of these specifications, the codes and standards, then the Contractor shall remove the work and replace the work to meet the intent of the Specifications, Codes, and Standards without reimbursement.

1.3 CERTIFICATES

The Contractor shall furnish the Owner with Certificates of Inspections and Approval where required.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01440

CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The General Contractor shall set forth for immediate execution a detailed and well organized quality control plan and implementation program.

1.2. CODES, STANDARDS AND INDUSTRY SPECIFICATIONS

- A. Material or operations specified by reference to published specifications of a manufacturer, testing agency, society, association or other published standards shall comply with requirements in latest revisions thereof and amendments or supplements thereto in effect on date of (Advertisement for Bids).
- B. Discrepancies between referenced codes, standards, specifications and Contract Documents shall be governed by the latter unless written interpretation is obtained from Engineer.
- C. Material or work specified by reference to conform to a standard, code, law or regulation shall be governed by Contract Documents when they exceed requirements of such references; referenced standards shall govern when they exceed Contract Documents.
- D. Proof of Compliance

Whenever Contract Documents require that a project be in accordance with Federal Specification, ASTM designation, ANSI specification, or other association standard, at Engineer request, Contractor shall present an affidavit from manufacturer certifying that product complies therewith. *Where requested or specified, submit supporting test data to substantiate.*

E. PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices and/or lump-sum prices contained in the Bidding Schedule.

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith

shall be included in the applicable unit prices and/or lump-sum prices contained in the Bidding Schedule.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1. GENERAL

The General Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2. QUALITY CONTROL PLAN

A. General

The General Contractor shall furnish for review by the Engineer and Owner not later than 30 days after receipt of notice to proceed, a Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Engineer will consider an interim plan for the first 30 days of operation.

B. Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Engineer/Owner reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.3. SUBMITTALS

Submittals shall be as specified in Section 01300 SUBMITTAL. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.4. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence.

3.5. TESTS

A. Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. Testing includes operation and/or acceptance tests when specified. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

1. Verify that testing procedures comply with contract requirements.
2. Verify that facilities and testing equipment are available and comply with testing standards.
3. Check test instrument calibration data against certified standards.
4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
5. Results of all tests taken, both passing and failing tests, will be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Engineer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Engineer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

B. Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor.

3.6. COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time, the Contractor shall conduct an inspection of the work and develop a "punch list" of items, which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, and shall include the estimated date by which the deficiencies will be corrected. The Contractor shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Engineer. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.7. DOCUMENTATION

The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

- A. Contractor/subcontractor and their area of responsibility.
- B. Operating plant/equipment with hours worked, idle, or down for repair.
- C. Work performed today, giving location, description, and by whom.
- D. Test and/or control activities performed with results and references to specifications/plan requirements.
- E. Material received with statement as to its acceptability and storage.
- F. Identify submittals reviewed, with contract reference, by whom, and action taken.
- G. Off-site surveillance activities, including actions taken.
- H. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- I. List instructions given/received and conflicts in plans and/or specifications.
- J. Contractor's verification statement.

- K. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Engineer weekly within 20 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the Contractor. The report from the Contractor shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.8. SAMPLE FORMS

Sample forms for Daily Construction Quality Control Report and Deficiency shall be provided by the General Contractor and submitted to Engineer for acceptance.

3.9. LINES AND GRADES

- A. Be responsible for properly laying out work, and for lines and measurements for the work executed under Contract Documents. Verify figures indicated on Drawings before laying out work, and report errors or inaccuracies in writing to the Engineer before commencing work.
- B. All trades shall be responsible for layout of their work, based on reference lines and measurements established by the General Contractor.
- C. Establish and maintain permanent hubs and other control points throughout construction.

END OF SECTION



SECTION 01530

BARRIERS

PART 1 - GENERAL

1.1. DESCRIPTION

- A. Temporary Railing: Temporary railing shall be provided around open pits and other locations where needed, to prevent accidents or injury to workers and/or public.
- B. Temporary Barriers: Temporary barriers shall be provided for safety for traffic control purposes.

1.2. COST

- A. The Contractor shall pay all costs for barriers and railings used on this project

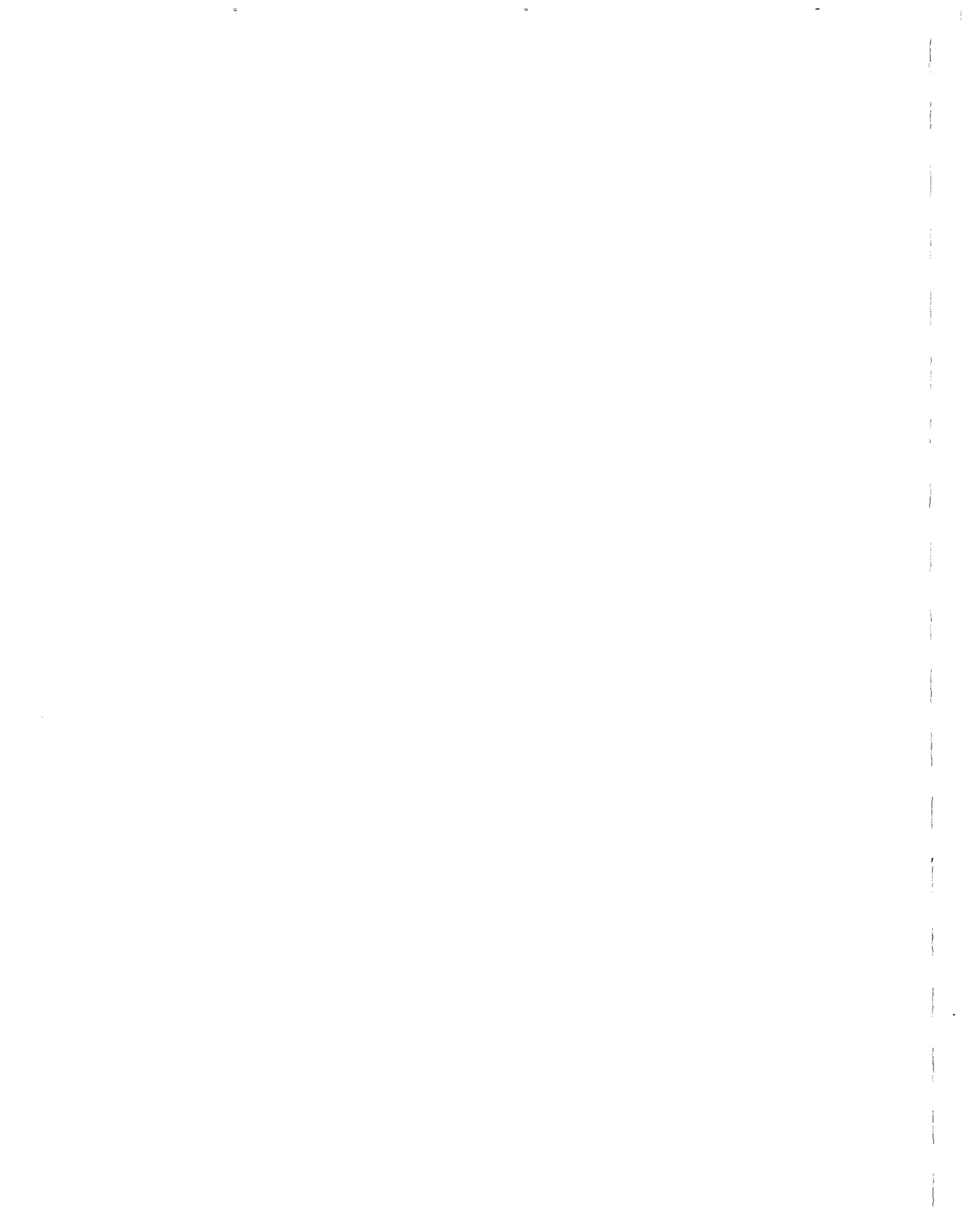
PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION



SECTION 01540

SECURITY

PART I - GENERAL

1.1. WORK INCLUDED

- A. Provide barricades, lanterns, and other signs and signals as may be necessary to warn of the dangers in connection with open excavation and obstructions.
- B. Temporary Railing: Temporary railing shall be provided around open pits and other locations where needed, to prevent accidents or injury to workers and/or public.
- C. Perimeter of the site shall be secured with a 6' chain link fence at all times when Owner or Contractor personnel are not present.

1.2. COSTS

- A. Contractor shall pay all costs for protection and security systems.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION



SECTION 01550

ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Access Roads
- B. Parking Areas
- C. Graveled Areas

2.2. REFERENCES

- A. Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Latest Edition.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate shall be size No. 57, Size No. 610, or Size No. 710 and shall meet the requirements of Section 805 of the KDOH Specifications.
- B. Filter fabric as set out in Standard Details in Drawings.

PART 3 – EXECUTION

3.1. GENERAL

- A. Access Roads and areas shall be constructed of one or more courses of coarse aggregate uniformly spread on a prepared subgrade to the width and depth specified.
- B. Compaction will be accomplished by traffic maintenance.

3.2. PLACING AGGREGATES

- A. Distribution of aggregate, in general, shall proceed from the point on the project nearest the source of supply so that as much compaction as possible may be gained from the passage of hauling equipment over the pre-

viously laid aggregate. Hauling equipment shall be routed uniformly over all portions of the previously laid courses of the base. The procedure for distribution of the aggregate may be revised with permission or as directed.

- B. The aggregate shall be spread in the number of courses and at the rate of application indicated in the contract, unless otherwise directed. The Contractor shall hold in reserve a quantity of the aggregate for the purpose of strengthening weakened areas that may develop during construction operation.
- C. The material applied each day shall be shaped by means of a grader, as directed. In addition, the Contractor shall be required to make one complete round trip with the grader at least twice each week, and more often when deemed necessary, by the Engineer until the work is accepted as completed.

3.3. DRAINAGE

- A. Ditches and drainage elements shall be constructed and/or maintained as shown on the Contract Drawings and Details.

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGN

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The Contractor shall provide signs required by these specifications near the sites of the work. The signs shall set forth the description of the work and the names of the Owner, Engineer and Contractor as shown hereinafter in these Specifications.
- B. The Contractor for **Contract No. 9 – Water Storage Tanks** shall furnish and install one (1) project sign at each tank location as described in previous paragraph and as detailed hereafter.

PART 2 - PRODUCTS

2.1. SIGN.

- A. The sign shall be constructed of 3/4" thick APA A-B Exterior grade or marine plywood. Posts shall be 4" x 4" of fencing type material. Prime all wood with white primer.

PART 3 - EXECUTION

3.1. MAINTENANCE

- A. The sign shall be maintained in good condition until completion of the Project. The signs shall be removed at completion of project.

3.2. LOCATION OF SIGN.

The sign called for in these Specifications shall be placed at the location selected by the Engineer.

WHITE BACKGROUND

CONTRACT NO. 9

WATER STORAGE TANK

HYDEN-LESLIE COUNTY WATER DISTRICT
325 WENDOVER ROAD, HYDEN, KENTUCKY

SISLER-MAGGARD ENGINEERING, PLLC.
220 E. Reynolds Rd. Ste. A3 Lexington Kentucky
CONTRACTOR



COLOR LOGO PROVIDED BY S.M.E.

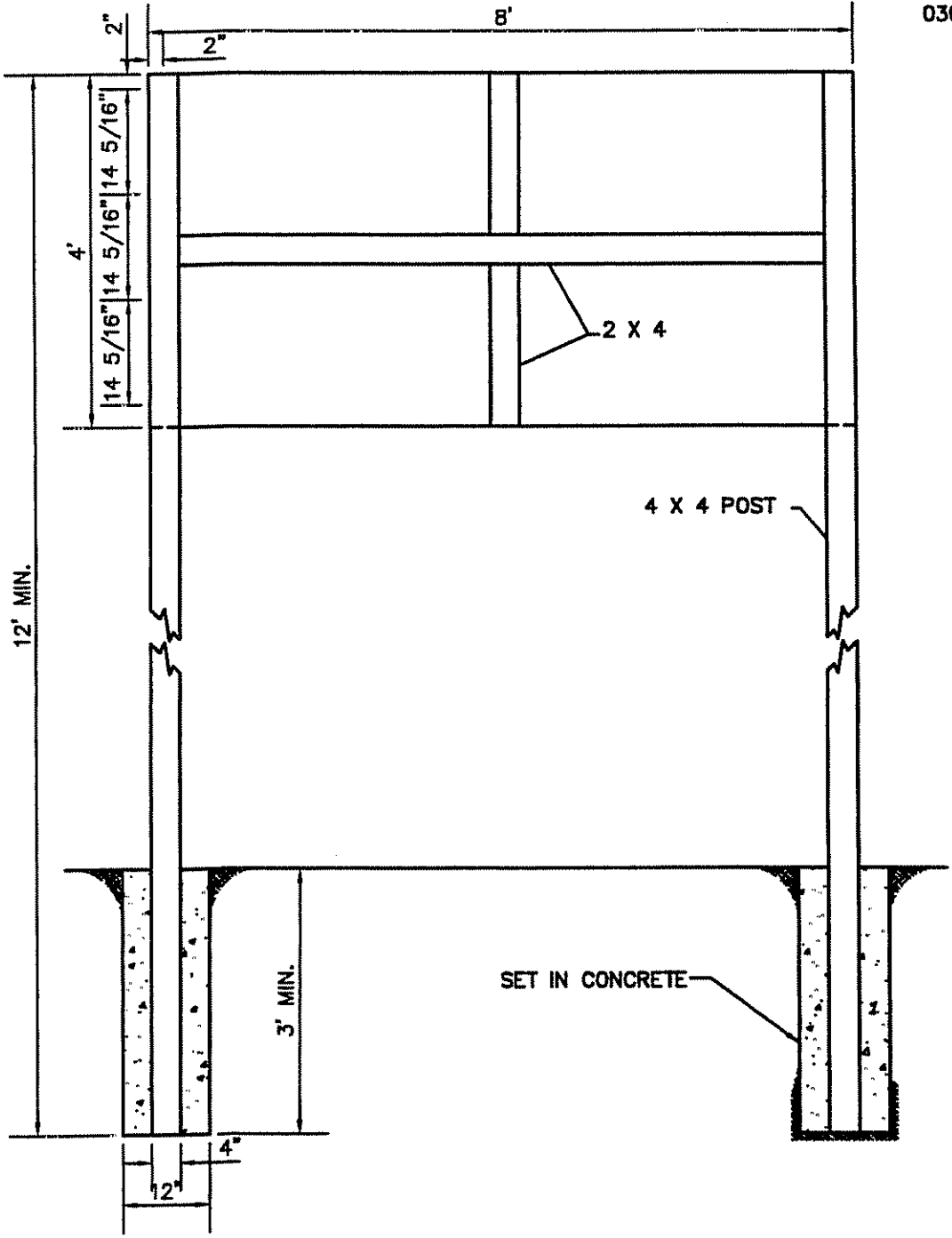
Funding By Kentucky Infrastructure Authority - Coal Development Fund

BLACK LETTERING

SIGN DIMENSIONS: 1200mm X 2400mm X 19mm (approx. 4' X 8' X 3/4")
PLYWOOD PANEL (APA RATED A-B GRADE - EXTERIOR)

03004

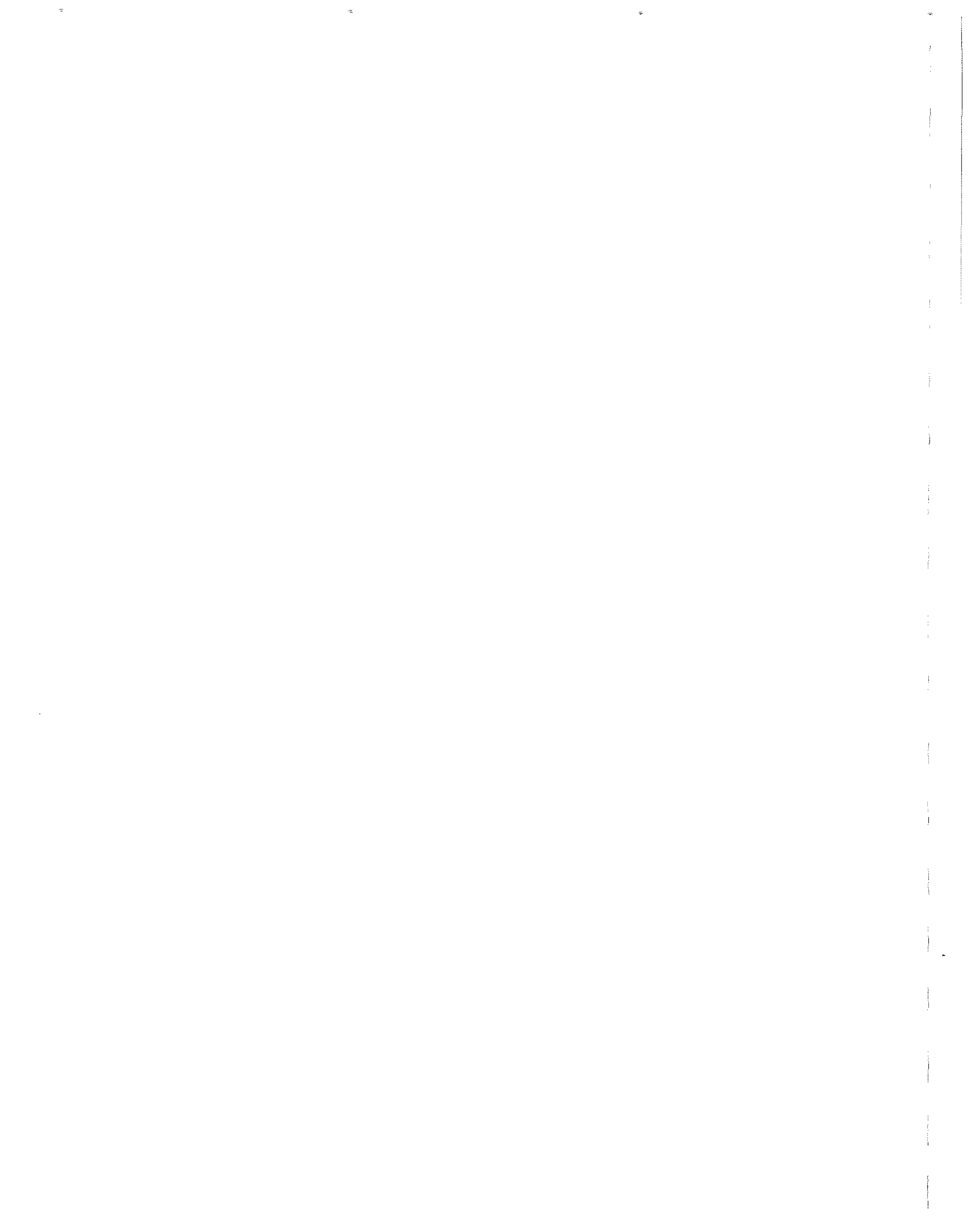
03004



ASSEMBLY OF PLYWOOD SIGN

NOT TO SCALE

END OF SECTION
01580-3



SECTION 01600

SPECIAL PROVISIONS FOR MATERIALS AND EQUIPMENT

1.01 SERVICES OF MANUFACTURERS' REPRESENTATIVE AND OPERATING MANUALS

- A. Bid prices for equipment furnished under Divisions 11, 13, 15 and 16, shall include the cost of written operation and maintenance instructions and the cost of a competent representative of the manufacturers of all equipment to supervise the installation, adjustment, and testing of the equipment and to instruct the OWNER'S operating personnel and the ENGINEER'S representative on operation and maintenance. This supervision and instruction may be divided into two or more time periods as required by the installation program, and shall be scheduled at the convenience of the OWNER.
- B. Unless otherwise specified with the equipment, equipment manufacturers shall provide a minimum of 2 separate repeated training sessions for the OWNER'S staff. Each session shall be at least 2 hours in length, but not more than 4 hours. Manufacturer's agenda and schedule for the training shall be submitted to and approved by the OWNER prior to conducting the training. No training will be scheduled until the equipment has been installed, satisfactorily tested, and is ready for operation.
- C. The manufacturer's representative shall have complete knowledge of the proper installation, lubrication, operation and maintenance of the equipment provided and shall be capable of instructing the representatives of the OWNER and ENGINEER on proper start-up, shut-down, on-line operations, lubrication and preventive maintenance of the equipment. Outlines of lesson plans and proposed training schedule shall be submitted to the ENGINEER for review 30 days prior to the desired instructional period. Specific requirements for furnishing the services of manufacturer's representatives are indicated under detailed Specifications. This work may be conducted in conjunction with Inspection and Testing, whenever possible, as provided under Part 3 of EXECUTION of detailed specification. Should difficulties in operation of the equipment arise due to the manufacturer's design or fabrication, additional services shall be provided at no cost to the OWNER.
- D. A certificate from the manufacturer stating that the installation of the equipment is satisfactory, that the unit has been satisfactorily tested, is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication, and care of the unit shall be submitted to the ENGINEER.
- E. For equipment furnished under other Divisions, the CONTRACTOR, unless otherwise specified, shall furnish the services of accredited representatives of the manufacturer only when some evident malfunction or over-heating makes such services necessary.
- F. Four complete sets of operation and maintenance instructions covering all equipment furnished under Divisions 11, 13, 15 and 16, shall be delivered directly to the ENGINEER.

1. The manual for each piece of equipment shall be a separate document with the following specific requirements:
 - a. Contents:
 - Table of contents and index
 - Brief description of each system and components
 - Starting and stopping procedures
 - Special operating instructions
 - Routine maintenance procedures
 - Manufacturer's printed operating and maintenance instructions, parts list, illustrations, and diagrams. These shall be specific to the material supplied under the Contract, and not a manufacturer general brochure.
 - One copy of each wiring diagram
 - One final accepted copy of each shop drawing and each CONTRACTOR'S coordination and layout drawing
 - List of spare parts, manufacturer's price, and recommended quantity
 - Manufacturer's name, address, and telephone number
 - Name, address, and telephone number of manufacturer's local representative
 - b. Material:
 - Loose leaf on punched paper. Holes reinforced with plastic, cloth or metal. 8-1/2" x 11" paper size.
 - Diagrams and illustrations, attached foldouts as required of original quality, reproducible by dry copy method
 - Covers: oil, moisture, and wear resistant 9" x 12" size
 - c. Submittals to the ENGINEER:
 - (1) Three preliminary copies of manuals, no later than 15 days following final review of the shop drawings for each piece of equipment and 4 final copies of complete manuals prior to Field Tests.

1.02 INSTALLATION OF EQUIPMENT

- A. Special care shall be taken to ensure proper alignment of all equipment with particular reference to the pumps, blowers and electric drives. The units shall be

carefully aligned on their foundations by qualified millwrights after their sole plates have been shimmed to true alignment at the anchor bolts. The anchor bolts shall be set in place and the nuts tightened against the shims. After the foundation alignments have been reviewed by the ENGINEER, the bedplates or wing feet of the equipment shall be securely bolted in place. The alignment of equipment shall be further checked after securing to the foundations, and after conformation of all alignments, the sole plates shall be finally grouted in place. The CONTRACTOR shall be responsible for the exact alignment of equipment with associated piping, and under no circumstances, will "pipe springing" be allowed.

- B. All wedges, shims, filling pieces, keys, packing, red or white lead grout, or other materials necessary to properly align, level, and secure apparatus in place shall be furnished by the CONTRACTOR. All parts intended to be plumb or level must be proven exactly so. Any grinding necessary to bring parts to proper bearing after erection shall be done at the expense of the CONTRACTOR.

1.03 GREASE, OIL AND FUEL

- A. All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The OWNER shall be furnished with a one year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied under Divisions 11, 13, 15 and 16.
- B. All lubricants and fuels shall be properly labeled, using an indelible marker and writing on the lubricant container or drum, specifying the type and brand name of the lubricant supplied. A Master Lubrication list must be submitted to the ENGINEER for approval clearly stating which lubricants are to be used in the various pieces of plant equipment and the quantity supplied for one years' use by each unit.

1.04 TOOLS AND SPARE PARTS

- A. Any special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, and maintenance of any equipment shall be furnished with the respective equipment.
- B. All spare parts shall be properly protected for long periods of storage (contained in plastic bags or cardboard containers) and labeled for easy identification without opening.

1.05 MAINTENANCE AND LUBRICATION SCHEDULES

- A. The CONTRACTOR'S attention is directed to the General Conditions and Section 01300 for all requirements relative to the submission of shop drawings for the mechanical equipment. For all mechanical and electrical equipment furnished, the CONTRACTOR shall provide a list including the equipment name, and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained. In

addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted along with shop drawings. Submission shall be in 4 copies.

1.06 STORAGE AND HANDLING OF EQUIPMENT

- A. Special attention shall be given to the storage and handling of equipment. As a minimum, the procedure outlined below shall be followed:
1. Equipment shall not be shipped until all pertinent shop drawings are reviewed by the ENGINEER.
 2. All equipment having moving parts such as gears, electric motors, etc., and/or instruments shall be properly stored until such time as the equipment is to be installed.
 3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
 4. Manufacturer's storage instructions shall be carefully studied by the CONTRACTOR and reviewed with the ENGINEER. These instructions shall be followed and a written record of this kept by the CONTRACTOR.
 5. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding." Upon installation of the equipment, the CONTRACTOR shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
 6. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
 7. Prior to acceptance of the equipment, the CONTRACTOR shall have the manufacturer inspect the equipment and certify in writing that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a written certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the CONTRACTOR'S expense.
- B. The OWNER reserves the right to withhold payment for any materials improperly stored and maintained.

1.07 PARTIAL UTILIZATION

- A. During the course of construction partial occupation and utilization of completed portions of the work may be required.
- B. When deemed necessary, the OWNER or the CONTRACTOR may request use of completed work.

1.08 EQUIPMENT WARRANTY

- A. The CONTRACTOR shall provide the OWNER a minimum 1 year warranty on all equipment, or a warranty of the length as is specified in the specific equipment section of the Specifications, in accordance with the General Conditions. The warranty period for each item of equipment shall be a minimum of 1 year, or as specified otherwise, from the date of the OWNER'S acceptance of the equipment item.

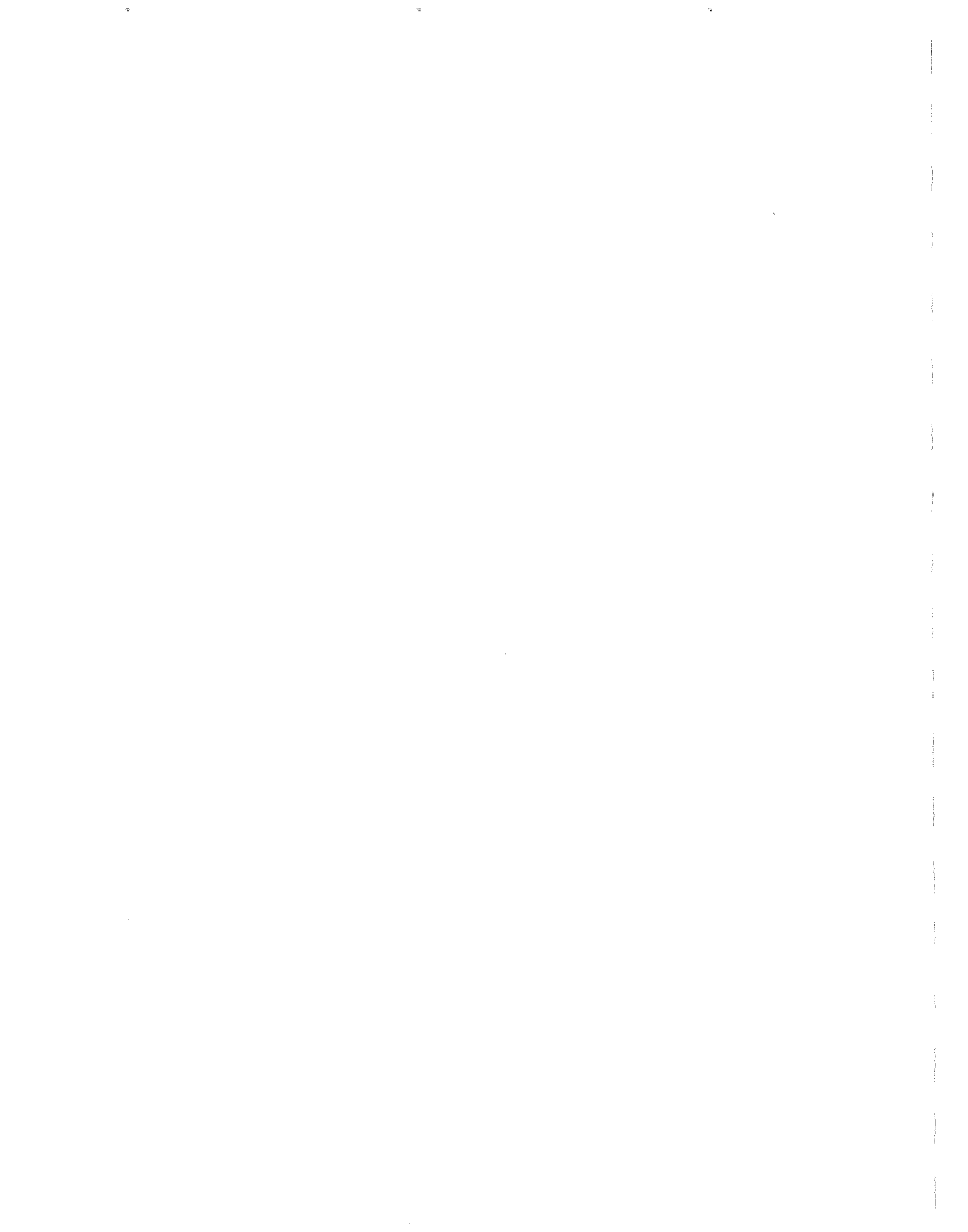
1.09 ADJUSTMENTS AND CORRECTIONS OF EQUIPMENT AND APPURTENANCES DURING OPERATION

- A. Some items of functional nature included in this Contract cannot be tested as to performance and quality at the time of completion of their installation. They must wait for necessary testing and proper performance until such functions are possible during later portions of this Contract. Such testing, specified performance and proper instructions to the OWNER's operators (as to their maintenance and operation) is deemed a portion of this Contract, and payment shall be retained by the OWNER for equipment delivered to the site and for Work completed to cover such service. Such service replacements and performance shall take precedence over expiration of the one year guarantee period.
- B. The CONTRACTOR shall expedite the completion of such service by all Suppliers and Subcontractors and shall render competent supervision of such service. The CONTRACTOR shall also expedite the replacement of defective and unaccepted parts and equipment. Unnecessary delay in delivery and installation of corrective parts and equipment may constitute damage to the OWNER for which the CONTRACTOR can be held liable.

1.10 INSTALLING NEW EQUIPMENT IN EXISTING STRUCTURES

- A. Where new equipment is planned and/or specified as being installed in existing structures, the CONTRACTOR shall verify all dimensions and locations of existing facilities prior to ordering the new equipment. Existing anchor bolts shall be used when possible, and new equipment shall be fabricated to conform to the existing dimensions, shapes, and locations as required.

END OF SECTION



SECTION 01610

TRANSPORTATION AND HANDLING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. Handling and Distribution:

1. The Contractor shall handle, haul, and distribute all materials and all surplus materials on the different portions of the work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the work.
2. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

B. Storage of Materials and Equipment

1. All excavated materials and equipment to be incorporated in the work shall be placed so as not to injure any part of the work or existing facilities and so that free access can be had at all times to all parts of the work and to all public utility installations in the vicinity of the work.
2. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants, and occupants.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01650
STARTING OF SYSTEMS

PART 1 - GENERAL

1.1. WORK INCLUDED:

- A. Starting systems
- B. Demonstration and instructions
- C. Testing, adjusting, and balancing

1.2. RELATED SECTIONS

- A. Section 01420 - Inspection Services: Certificates.
- B. Section 01700 - Project Closeout: System operation and maintenance data and extra materials.

1.3. STARTING SYSTEMS

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

- H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.4. DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Liquidated Damages: BID PROPOSAL, AGREEMENT AND GENERAL CONDITIONS.
- B. Cleaning: Section 01710.
- C. Project Record Documents: Section 01720

1.2 SUBSTANTIAL COMPLETION

- A. Contractor:
 - 1. Submit written certification to Engineer that Project is substantially complete.
 - 2. Submit list of items to be completed or corrected.
- B. Engineer will make an inspection within seven days after receipt of certification, together with Owner's and Contractor's Representatives.
- C. Should Engineer consider the project substantially complete:
 - 1. Contractor shall prepare and submit to Engineer a list of items to be completed or corrected, as determined by the inspection.
 - 2. Engineer will prepare and issue a Certificate of Substantial Completion containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items to be completed or corrected, verified and/or amended by Engineer.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Time and date Owner will assume possession of project or designated portion thereof.
 - e. Responsibilities of Owner and Contractor for:
 - (1) Insurance
 - (2) Utilities
 - (3) Operation of mechanical, electrical, and other systems
 - (4) Maintenance and cleaning
 - (5) Security

f. Signatures of:

- (1) Contractor
- (2) Engineer
- (3) Owner

3. Owner occupancy of Project or Designated Portion of Project:

a. Contractor shall:

- (1) Obtain certificate of occupancy.
- (2) Perform final cleaning in accordance with Section 01710.

b. *Owner will occupy Project under provisions stated in Certificate of Substantial Completion.*

4. Contractor: Complete work listed for completion or correction, within designated time.

D. Should Engineer consider that work is not substantially complete:

1. He shall immediately notify Contractor, in writing, stating reasons.
2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project, or designated portion of Project is substantially complete.
3. Engineer and Owner will re-inspect work.

1.3 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract Documents have been reviewed.
2. Project has been inspected for compliance with Contract Documents.
3. *Work has been completed in accordance with Contract Documents.*
4. Equipment and systems have been tested in presence of Engineer and Owner's Representative and are operational.
5. Project is completed and ready for final inspection.

B. Engineer will make final inspection within seven (7) days after receipt of certification.

C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.

D. Should Engineer consider that work is not finally complete:

1. He shall notify Contractor, in writing, stating reasons.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
3. Engineer and Owner will re-inspect work.

1.4 FINAL CLEANING UP

The Work will not be considered as completed and final payment made until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer and Owner. See Section 01710 for detailed requirements.

1.5 CLOSEOUT SUBMITTALS

Project Record Documents: See requirements of Section 01720.

1.6 FINAL APPLICATION FOR PAYMENT

Contractor shall submit final applications for payment in accordance with requirements of GENERAL CONDITIONS (Section 19).

1.7 FINAL CERTIFICATE FOR PAYMENT

- A. Engineer will issue final certificate in accordance with provisions of GENERAL CONDITIONS.
- B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Semi-Final Certificate for Payment.

END OF SECTION



SECTION 01710

CLEANING

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. During its progress, the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
- B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the project. The ditches, channels, drains, pipes, structures, and any other work shall, upon completion of the work, be left in a clean and neat condition.
- C. On or before the completion of the project, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic in, under, and around privies, hoses and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.
- D. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors, and on completion of the project shall deliver it undamaged and in fresh and new appearing conditions.
- E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

1.2. DESCRIPTION

A. Related Requirements Specified Elsewhere:

Project Closeout: Section 01700.

- B. On a continuous basis, maintain premises free from accumulations of waste, debris, and rubbish caused by operations.
- C. At completion of project, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

1.3. SAFETY REQUIREMENTS.

A. Hazards Control:

- 1. Store volatile wastes in covered metal containers, and remove from premises daily.
- 2. Prevent accumulation of wastes which create hazardous conditions.
- 3. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

- 1. Do not burn or bury rubbish and waste materials on Project site without written permission from the Owner.
- 2. Do not dispose of volatile wastes such as mineral spirits, oil, or fuel in open drainage ditches or storm or sanitary drains.
- 3. Do not dispose of wastes in streams or waterways.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials *only on surfaces recommended by cleaning material manufacturer.*

PART 3 - EXECUTION

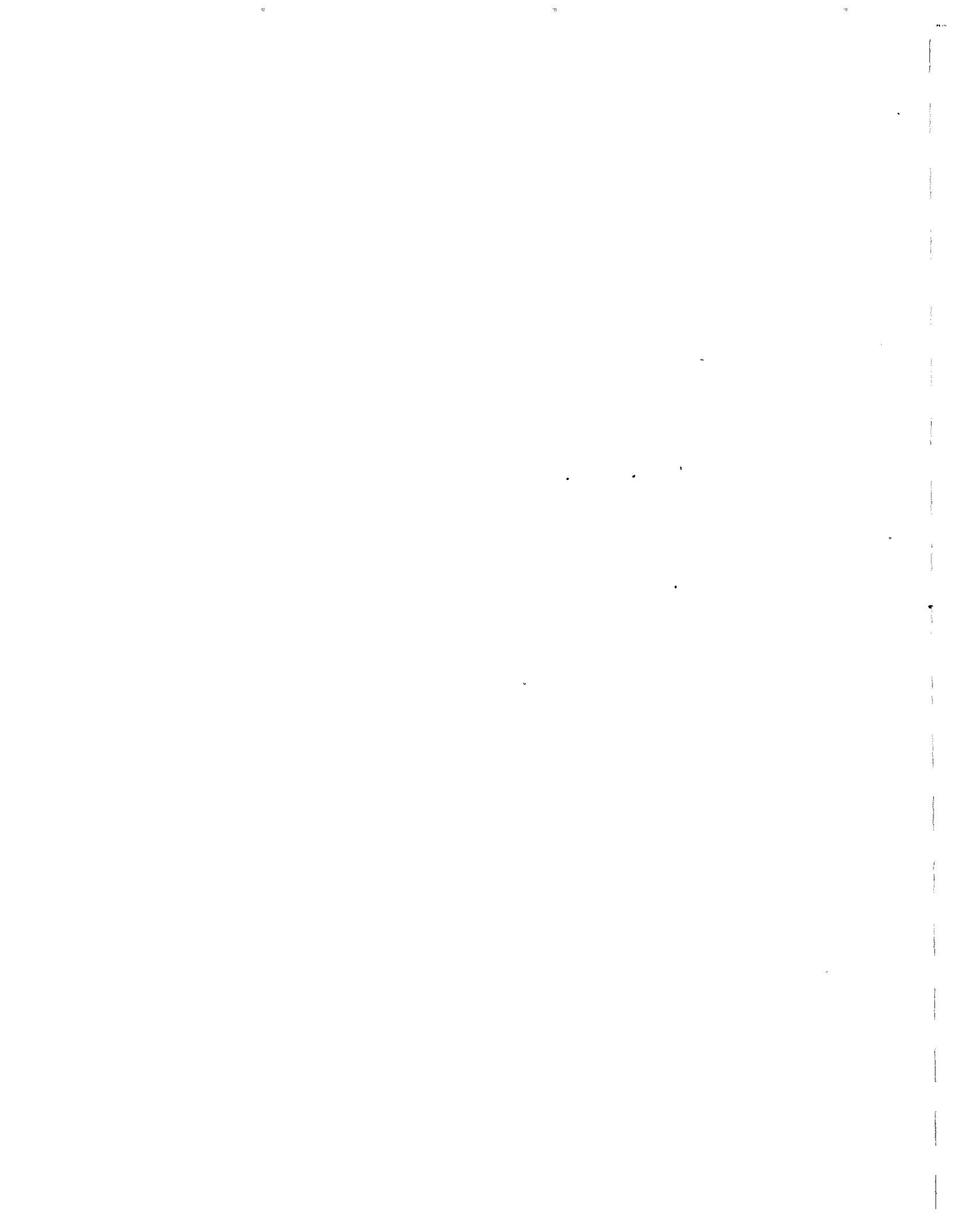
3.1. DURING CONSTRUCTION

- A. Execute cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.**
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.**
- C. At reasonable intervals during progress of Work, clean site and public properties, and properly dispose of waste materials, debris, and rubbish.**
- D. Provide on-site containers for collection of waste materials, debris, and rubbish.**
- E. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.**
- F. The Contractor shall thoroughly clean all materials and equipment installed.**

3.2. FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning.**
- B. The Contractor shall restore or replace existing property or structures as promptly and practicable as work progresses.**

END OF SECTION



SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1. WORK INCLUDED

The contractor shall obtain from the Engineer one (1) set of blueline prints of the Contract Drawings. These prints shall be kept and maintained in good condition at the project site and qualified representative of the Contractor shall enter upon these prints, from day-to-day, the actual "as built" record of the construction progress. Entries and notations shall be made in a neat and legible manner and these prints shall be delivered to the Engineer upon completion of the construction. APPROVAL FOR FINAL PAYMENT WILL BE CONTINGENT UPON COMPLIANCE WITH THIS PROVISION.

1.2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- A. Maintain at job site, one copy of:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Reviewed Shop Drawings
 - 5. Change Orders
 - 6. Other Modifications to Contract.
- B. Store documents in approved location, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry, legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Engineer and Owner.

1.3. MARKING DEVICES

Provide colored pencil or felt-tip pen for all marking.

1.4. RECORDING

- A. Label each document "PROJECT RECORD" in 2-inch high printed letters.

- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.

- D. Contract Drawings: Legibly mark to record actual construction:
 - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 3. Field changes of dimension and detail.
 - 4. Changes made by Change Order or Field Order.
 - 5. Details not on original Contract Drawings.

- E. Specifications and Addenda: Legibly mark up each Section to record:
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2. Changes made by Change Order or Field Order.
 - 3. Other matters not originally specified.

- F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

1.5. SUBMITTAL

- A. At completion of project, deliver record documents to Engineer.

- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date Project Title and Number Contractor's Name and Address
 - 2. Title and Number of each Record Document
 - 3. Certification that each Document as Submitted is Complete and Accurate
 - 4. Signature of Contractor or his authorized Representative.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01731

GEOTECHNICAL INFORMATION

PART 1 GENERAL

1.1. WORK INCLUDED

A. Contract No. 9 – Water Storage Tanks

1. Borings have been taken at the water tank site located at the tank site by Thelen Associates, Inc.
2. The Contractor may use the information as given but no warranty is extended by the Engineer. The Contractor may make any further investigations they deem necessary to protect their interest at their own cost and liability.
3. As stated in Section 02202 of these specifications, excavation is unclassified and rock removal is not a pay item.

B. The drawings of boring logs is included with the plans.

C. The Geotechnical Report is included in this Section.

PART 2 PRODUCTS

NOT USED.

PART 3 EXCAVATION

NOT USED.

GEOTECHNICAL EXPLORATION
SISLER-MAGGARD CONTRACT NO. 3
50,000 GALLON PROPOSED WATER TANK
LEECO ROAD AND KY S.R. 80
LESLIE COUNTY, KENTUCKY

Prepared for: **Sisler-Maggard Engineering, PLLC**

Thelen Project No.: **080357E**



THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

✓ 1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408
○ 2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
www.thelenassoc.com



THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

☎ 1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408
○ 2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
www.thelenassoc.com

© Copyright by Thelen Associates, Inc.
June 18, 2008

Sisler-Maggard Engineering, PLLC
220 East Reynolds Road
Suite A3
Lexington, Kentucky 40517

Attn: Mr. Michael Maggard, P.E.

Re: Geotechnical Exploration
Sisler-Maggard Contract No. 3
50,000 Gallon Proposed Water Tank
Leeco Road
Leslie County, Kentucky

Ladies and Gentlemen:

Presented in this report are the results of the geotechnical exploration made for the proposed 50,000 Gallon Water Tank to be located 2.84 miles south of KY S.R. 80 along Leeco Road in Leslie County, Kentucky. Our services were requested by Mr. Michael Maggard of Sisler-Maggard Engineering, PLLC (SME) in a telephone conversation with our Mr. Mark Hushebeck, P.G., Senior Engineering Geologist, in late April of 2008.

1.0 SCOPE

The purpose of this exploration was to determine the general subsurface profile at the site and to relate the engineering properties of the soils and bedrock, that is, their classification, strength and compressibility characteristics, to the proposed water tank foundation design and to site development. The geotechnical work included test borings, engineering analyses and the preparation of this report.

2.0 PROJECT CHARACTERISTICS

The tank site will be located on a very small mountain top east of a bend in Leeco Road. The mountain top, as shown on the site drawing prepared by SME, File No. 03004 dated April 8, 2008, consists of a small pinnacle-shaped hilltop where the circular water tank will be located. The geologic reconnaissance of this tank site revealed that much of the southern and western flanks of the ridgetop had been altered in the past by cutting due to past mining activities in the area. The topography of the site, depicted on the aforementioned plan, generally shows slopes on the order of 1.5 horizontal to 1 vertical (1.5:1) along the northern and eastern flanks of the pinnacle. The slope gradients change from approximately 2:1 to 4:1 proceeding from the higher elevations to the lower elevations along the southern and western flanks of the pinnacle. Mr. Hushebeck met with Mr. Maggard and an SME survey crew at the site and discussed where the approximate location of the tank side would be on the pinnacle. It is our understanding that access to the tank site will occur up the southern flank of the pinnacle. It is our understanding that this tank will hold at least 50,000 gallons of water with an approximate diameter of 20 feet and a height of 40 feet. The proposed floor elevation of the tank is unknown, but it is understood that the tank will be supported on a ring foundation at 4 to 6 feet below the proposed floor elevation. The average elevation of the existing topography of proposed tank site is El. 1607.0. Said grading in the vicinity of the tank foundation is expected to consist primarily of cutting off the hilltop. It is expected that the cut embankment will be hauled away from the site. It is assumed that the waterline that will service this tank will be constructed within the proposed access road up to the tank. An evaluation of the planned alignment of this waterline is outside of the scope of this exploration.

3.0 SUBSURFACE EXPLORATION

The fieldwork phase of this exploration was carried out during the first week of May, 2008. Three (3) test borings were drilled at the locations shown on the Boring Plan, Drawing No. 080357E-1, included in the Appendix to this report. The test boring locations were staked during our reconnaissance and then located and level surveyed

in the field by an SME survey crew. The base map for the Boring Plan is the site drawing provided by SME, drawing dated April 8, 2008.

The test borings were made with a track-mounted drill rig utilizing continuous flight augers. Split spoon sampling was accomplished ahead of the augers according to the procedures outlined in ASTM D1586. The steep access to the ridgetop precluded coring water delivery to the drill rig at the tank site. Therefore, rock coring of the bedrock was not possible. Observations of the lack of groundwater were made in the borings during drilling, at the completion of drilling and shortly after the completion of drilling.

As each test boring was advanced, the Drilling Technician kept a log of the subsurface profile noting soil and bedrock stratifications, lack of groundwater, penetration test results, and other pertinent data. Representative portions of the split spoon samples were placed in glass jars.

4.0 LABORATORY REVIEW AND TESTING

Samples from the test borings were examined and visually classified in the laboratory by the Project Engineering Geologist. The final test boring logs were prepared by the Project Engineering Geologist on the basis of this visual classification in the laboratory and the field logs kept by the Drilling Technician. Copies of the final test boring logs are included in the Appendix with a Soil Classification Sheet which describes the terms and symbols used on the boring logs.

The dashed lines on the test boring logs indicate an approximate change in soil or bedrock strata as estimated between samples. A solid line indicates a change in the strata occurred in a sample where a more precise measurement can be made. The transition between soil and bedrock types may be abrupt or gradual.

5.0 SUBSURFACE CONDITIONS

The tank will be located on top of a pinnacle shaped ridgetop located just east of a bend in Leeco Road. The pinnacle was created due to cutting along the western and southern flanks of the ridgetop due to adjacent surface mining activities. The remainder of the site is undisturbed and covered with a mature stand of trees. The ground surface in the undisturbed areas is as steep as 1.5:1 along the northern and eastern flanks of the pinnacle whereas the slopes are approximately 2:1 to 4:1 along the remaining portions of the pinnacle which are the disturbed or cut areas. Geologic reconnaissance of the ridgetop and the surrounding hillside showed several exposures of intact horizontally bedded sandstone with numerous sandstone floaters. According to site observations, anecdotal information and review of the Kentucky Geologic Surveys (KGS) Geoportal website, past and current surface mining activities have occurred at the site and immediately in the vicinity of the tank site. No evidence of underground mining could be found at the site or on the KGS website.

Test borings indicate that the ground surface is underlain by thin topsoil over undisturbed bedrock consisting of sandstone of the Pennsylvania Aged Four Corners Formation. According to the Cutshin Geologic Quadrangle, a coal bed called the Francis Coal Bed is mapped on the subject ridgetop. It is possible that the past strip mining activities removed all or part of this coal layer in the vicinity of the tank pad. Test Boring 1 located at the lowest elevation in the tank pad (El. 1604.4) was extended to a depth of 30.5 feet below the existing ground surface in order to determine the thickness of the weathered bedrock. In this test boring, 29.5 feet of brown slightly moist moderately tough to hard highly weathered to weathered fine to medium grained sandstone was encountered. The unweathered bedrock consisted of gray moist hard to very hard fine to medium grained sandstone. Test Borings 2 and 3 were extended to depths of 13 and 21 feet, respectively, and both encountered the same moderately tough to hard weathered fine to medium grained sandstone. The presence of coal beds were not encountered in these test borings. There was evidence in the split spoon samples that the bedrock is fractured and jointed with iron oxide staining along joint and fracture faces.

6.0 GROUNDWATER CONDITIONS

No groundwater was encountered in any of the test borings. Based upon the location of the site on top of a small ridgetop, groundwater seepage is not anticipated to be significant since infiltration will be a minimum because of the steeply sloping terrain on all four sides of the site.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 General

Based upon our engineering reconnaissance of the site, the test borings, a visual examination of the samples, the laboratory tests, our understanding of the proposed construction, and our experience as Geotechnical Consultant in Kentucky, we have reached the following conclusions and make the following recommendations.

The conclusions and recommendations of this report have been derived by relating the general principles of the discipline of Geotechnical Engineering to the proposed construction outlined by the Project Characteristics section of this report. Because changes in surface, subsurface, climatic, and economic conditions can occur with time and location, we recommend for our mutual interest that the use of this report be restricted to this specific project.

Our understanding of the proposed design and construction is based on the documents provided to us at the time this report was prepared and which are referenced in the Project Characteristics section of this report. We recommend that our office be retained to review the final design documents, plans, and specifications to assess any impact changes, additions or revisions in these documents may have on the conclusions and recommendations of this Geotechnical Report. Any changes or modifications which are made in the field during the construction phase which alter site grading, structure locations, infrastructure or other related site work should also be reviewed by our office prior to their implementation.

If conditions are encountered in the field during construction which vary from the facts of this report, we recommend that our office be contacted immediately to review the changed conditions in the field and make appropriate recommendations.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, surface water, groundwater or air, on or below or around this site.

It is our understanding that the time frame for beginning and completing the foundation and site work for this project will be continuous without interruption or delay. Should interruptions or delays occur, our office should be kept apprised to determine what recommendations must be modified accordingly.

We have performed the test borings for our evaluation of the site conditions and for the formulation of the conclusions and recommendations of this report. We assume no responsibility for the interpretation or extrapolation of the data by others.

The earthwork recommendations of this report presume that the earthwork will be monitored continuously by an Engineering Technician under the direction of a Registered Professional Geotechnical Engineer. We recommend that the Owner contract these services directly with Thelen Associates, Inc.

We recommend that a preconstruction meeting be held at the site with the Owner's representative, the Design Civil Engineer, the General Contractor, the Excavating Contractor, the Geotechnical Engineer and any other interested parties to review the scope and schedule of the proposed earthwork and foundation installation.

7.2 Site Preparation and Earthwork

1. It is assumed that the proposed access road will start on the east side of Leeco Road and will ascend up the southern and western flanks of the pinnacle to the proposed water tank. We recommend that any associated cut or fill areas be

stripped of vegetation and topsoil and expose the underlying bedrock. The vegetation should be wasted off site and the topsoil may be reused for landscaping as needed, or should be wasted off site.

2. The tank pad area is currently proposed near the northern flank of the pinnacle. The slopes along the northern flank of the ridge are very steep and numerous loose sandstone boulders were observed. Therefore it is evident that as future weathering on this steep hillside occurs, it may produce periodic spalling of the bedrock possibly along pre-existing joint and fracture faces along the edges of this pinnacle. The lowest test boring, Test Boring No. 1, with a ground surface elevation of 1604.4 MSL, revealed 29.5 feet of moderately tough to hard highly weathered to weathered fine to medium grained sandstone. We recommend that a tank pad elevation of approximately El. 1600.0 MSL be selected. This will require cutting of the ridgetop around the perimeter of the tank area into the bedrock.
3. In general, very large heavy-duty excavation equipment, such as large dozers and large track hoes with ripping teeth or rock saws, will be needed to excavate the tank pad to the recommended tank pad grade, and to excavate for the associated utilities and ring foundation. It is possible that blasting may be necessary in some areas to expedite the excavation process. However, under no circumstances should blasting produce overshot deeper than the intended excavation.
4. We recommend that any cutslopes that may be created to construct the tank pad be geologically mapped during construction to review the exposed geology. Similarly, if cutslopes are made to create the access road, those slopes should also be geologically logged for stability reasons.
5. It should be noted that no subsurface evaluation of the proposed access drive was made as part of this work. If significant improvements are planned for a

new access drive or if a geotechnical evaluation of the current access drive is desired, we recommend that a geotechnical exploration for the access drive be made by Thelen prior to its construction.

- 6. Due to the small area located on the pinnacle-shaped hilltop and the steep slopes around the edges of the hilltop, we recommend against placing any fill soils on the hilltop or for the access road up to the hilltop without first benching horizontally into the underlying bedrock. Underdrainage may also be necessary for the structural fill soils placed on bedrock benches. The installation of underdrainage should be based upon field conditions exposed at time of grading by the Geotechnical Engineer or Engineering Geologist.**

- 7. We recommend that all fill soils be relatively free of topsoil, vegetation, trash, construction debris, frozen materials, particles over 6 inches in maximum thickness or other deleterious materials. All new fill should be placed on prepared horizontal bedrock benches in shallow level layers, 6 to 8 inches in thickness. Bedrock benching should consist of creating horizontal steps approximately 10 feet wide into the bedrock to accept the fill. The new fill should be compacted to at least 95 percent of the maximum dry density as determined by the standard Proctor moisture-density test, ASTM D698. The moisture content of the fill at the time of compaction should be maintained within 2 percent below to 3 percent above the optimum moisture content. We recommend that subgrade soils from the top 8 inches beneath the proposed drive and parking areas be moisture conditioned to within 2 percent of the optimum moisture content and be compacted to at least 100 percent of the standard Proctor maximum dry density (ASTM D698) immediately prior to pavement construction so that the subgrades are moist and well compacted at that time.**

- 8. From our reconnaissance, it appears that the native soils are suitable for use as new compacted and tested fill provided they are moisture conditioned within the**

criteria listed above. However, it should be noted that on-site soils will most likely not be available in quantities sufficient for filling. Sandstone rock fills are not recommended for the proposed construction of the access drive and parking area because of the coarseness of the sandstone and its potential to rapidly degrade into a sand. It will therefore be necessary to import suitable clayey borrow soils to successfully accomplish any significant filling that may be proposed at the site. The outface of any new fill slope should not exceed a 2.5:1 finish slope gradient. Fill slope faces should be slightly overbuilt and then trimmed to achieve a firm slope face. If granular soils are imported to the site, they should be permanently drained. It should be noted that granular soils such as the native on-site soils, derived from decomposed sandstone, are highly susceptible to erosion. Special measures will have to be taken to mitigate erosion of granular fill slope faces with some sort of slope face protection. We also recommend that if the sandstone bedrock is used as structural fill, it should be thoroughly pulverized and moisture-conditioned to near optimum moisture content, mixed into a soil-like consistency, and then compacted to the project specifications recommended in this report. Possibly significant quantities of added water will be necessary to be able to properly moisture condition the bedrock embankment to be used for structural fill.

9. All soils used as trenched backfill should be moisture conditioned to within 2 percent below and 3 percent above the optimum moisture content for compaction and should be placed in shallow level layers, 6 to 8 inches in thickness, and each layer compacted to densities not less than 95 percent, ASTM D698. Granular backfill should be placed in shallow level layers, 4 to 6 inches thick, and compacted to at least 75 percent of relative density per ASTM D4253 and D4254. Under no conditions should any backfill be flushed in an attempt to contain compaction. Oversized materials (greater than 3 inches of maximum dimension) should not be used for backfilling utility trenches.

10. The Contractor should be responsible for the safety of all foundation and utility excavations as well as cutslopes, and should exercise all necessary precautions to shore, slope, provide rock fall protection or otherwise maintain stable excavations to protect workers. All excavations should be maintained in accordance with all federal, state and local regulations.

7.3 Tank Foundations

11. It is our opinion that the proposed tank may be supported on spread footing foundations most likely consisting of one continuous perimeter ring foundation to support the tank walls. It is anticipated that the tank floor (base) will be supported on grade in cut at the top of the ridge. Once the specific foundation details of the tank and other associated improvements are known, we recommend that Thelen be retained to review the plan and have the opportunity to make the specific recommendations should they be necessary. It is our current understanding that the ring foundation is proposed to bear approximately 4 to 6 feet below the established base elevation of the tank and on bedrock. Based upon the relatively shallow depths and quality of the bedrock encountered in the test borings, it is our opinion that the ring footing should bear into the highly weathered to unweathered bedrock (sandstone) and be proportioned for an allowable bearing pressure of 20,000 pounds per square foot (psf), full dead and full live load. Should any coal layers and/or underclay be encountered in the footing excavations, the footing excavations should be extended below this material and bear on the recommended sandstone bedrock. The base of the tank footings should have at least 10 horizontal feet of distance to daylight along the northern flank of the tank. The footings should be extended as needed to comply with this recommendation. For preliminary design purposes, based on Test Boring 1, we recommend that the ring footings of the tank be extended such that they bear at approximately El. 1595.0 MSL or deeper depending upon the quality of the bedrock encountered in the footing excavations on the northern side of the ring foundation, and can then step up to the south as practical maintaining the recommended clear distance and depth of

frost cover. Alternatively, the footings can be raised if the tank is shifted to the south.

12. A background review of related geologic maps of the area does not indicate the presence of karst in the area. Therefore, sinkholes, caves or other solution conduits are not expected to be encountered during the excavation on this particular site. The background review did not reveal any record of underground mining.
13. Although not noted in any of the test borings, it is possible that some weathered high-angle joints, fractures and/or clay seams within the bedrock may be encountered during the foundation excavation. Should any of these be noted, we recommend that they be evaluated in the field by the Geotechnical Engineer or Geologist during construction.
14. All exterior footing bottoms should be placed at least 30 inches below the proposed exterior grades, the accepted depth for frost protection in this area of Kentucky. It is recommended that the bottoms of all footings not be supported higher than a relationship of 2H:1V upward from the invert of any paralleling or nearly paralleling the proposed utility.
15. It is preferred that footing excavations be made to neat lines and grades so that concrete can be placed directly against the banks of the excavation without forming, particularly if any passive resistance is needed. It is important that good surface drainage be obtained during and after construction to prevent water from ponding on and around the excavations. Loosened rock and debris should be removed from the bearing surfaces prior to the placement of concrete.
16. It is recommended that all footing excavations be reviewed by our Project Engineering Geologist or his representative prior to the placement of concrete to

determine that the bearing materials and surfaces are consistent with the recommendations contained herein.

7.4 Drainage and Erosion

17. We recommend that site grades be set to provide surface drainage away from the proposed tank, cutslopes and fill slopes, and away from the proposed parking and drive areas.

18. During construction straw bales or silt fences should be maintained across the low side of the site to minimize the amount of soil carried off of the construction site. Scarified areas should be seeded and strawed, paved, sodded or otherwise protected from erosion as soon as possible after final grading is completed. Granular soils used to create any fill embankments are considered to be highly erosive and, therefore, the slopes should be suitably protected.

19. If any portions of construction are undertaken during the winter or spring months of the year, we recommend that no fill, concrete, or pavement be placed over frozen or saturated soils. In addition, frozen soils should not be used for compacted fill or backfill.

7.5 Seismicity

The Kentucky Building Code (KBC) has been revised. Since July 2007, all commercial projects have been required to meet the KBC 2007. A significant part of KBC 2007 is that it has required that the earthquake having a 2 percent probability of exceedance (POE) in any 50-year period be used as the basis for seismic design. Earlier codes had used the earthquake having a 10 percent POE in any 50-year period as the basis for seismic design. Another significant change in KBC 2007 is the requirement that local site geology, including overburden soils above the bedrock, be a factor in determining seismic parameters to be used in the structural design. The effects on regional seismicity (as mandated by KBC 2007) are presented herein for use by the Structural Engineer. We have assumed that the proposed tank has been designated as a Seismic

Occupancy Category of IV. The proposed tank will be supported on shallow foundations bearing in the highly weathered to weathered bedrock. Based on our assessment of the seismic conditions, in our opinion, the following seismic parameters will be applicable to the tank.

Seismic Occupancy Category	IV (assumed)
S_S	0.352 g
S_1	0.098 g
Site Class	B
F_a	1.0
F_v	1.0
S_{MS}	0.352 g
S_{M1}	0.098 g
S_{DS}	0.235 g
S_{D1}	0.065 g
Seismic Design Category	A or C

Seismic Design Category is A provided that all criteria of Item 1613.5.6.1 of the 2006 International Building Code are satisfied, otherwise the Seismic Design Category is C if the Owner, Civil Engineer and the Project Structural Engineer have confirmed that the Seismic Occupancy Category of IV is applicable for the proposed new water tank. The Project Structural Engineer will need to determine the Seismic Design Category based on the aforementioned criteria.

9.0 CLOSURE

We have included in the Appendix to this report a reprint of "Important Information About Your Geotechnical Engineering Report" published by ASFE, Professional Firms Practicing in the Geosciences, which our firm would like to introduce to you at this time.

We appreciate this opportunity to provide our consulting services to you on this project. Should you have any questions regarding the contents of this report, please do not hesitate to contact us. We look forward to following through with you on this project by

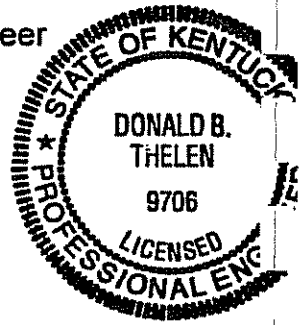
providing the necessary construction review and testing services.

Respectfully submitted,
THELEN ASSOCIATES, INC.

Mark A. Hushebeck
Mark A. Hushebeck, P.G.
Senior Engineering Geologist



Donald B. Thelen
Donald B. Thelen, P. E.
Principal Geotechnical Engineer



MAH/DBT:tmk
080537E
Copies submitted: 3-Client

APPENDIX

ASFE Report Information

Boring Plan, Drawing 080357E-1

Test Boring Logs

Soil Classification Sheet

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Important Information about Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the *most effective method of managing the risks associated with unanticipated conditions.*

A Report's Recommendations Are Not Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that *geotechnical engineering is far less exact than other engineering disciplines.* This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

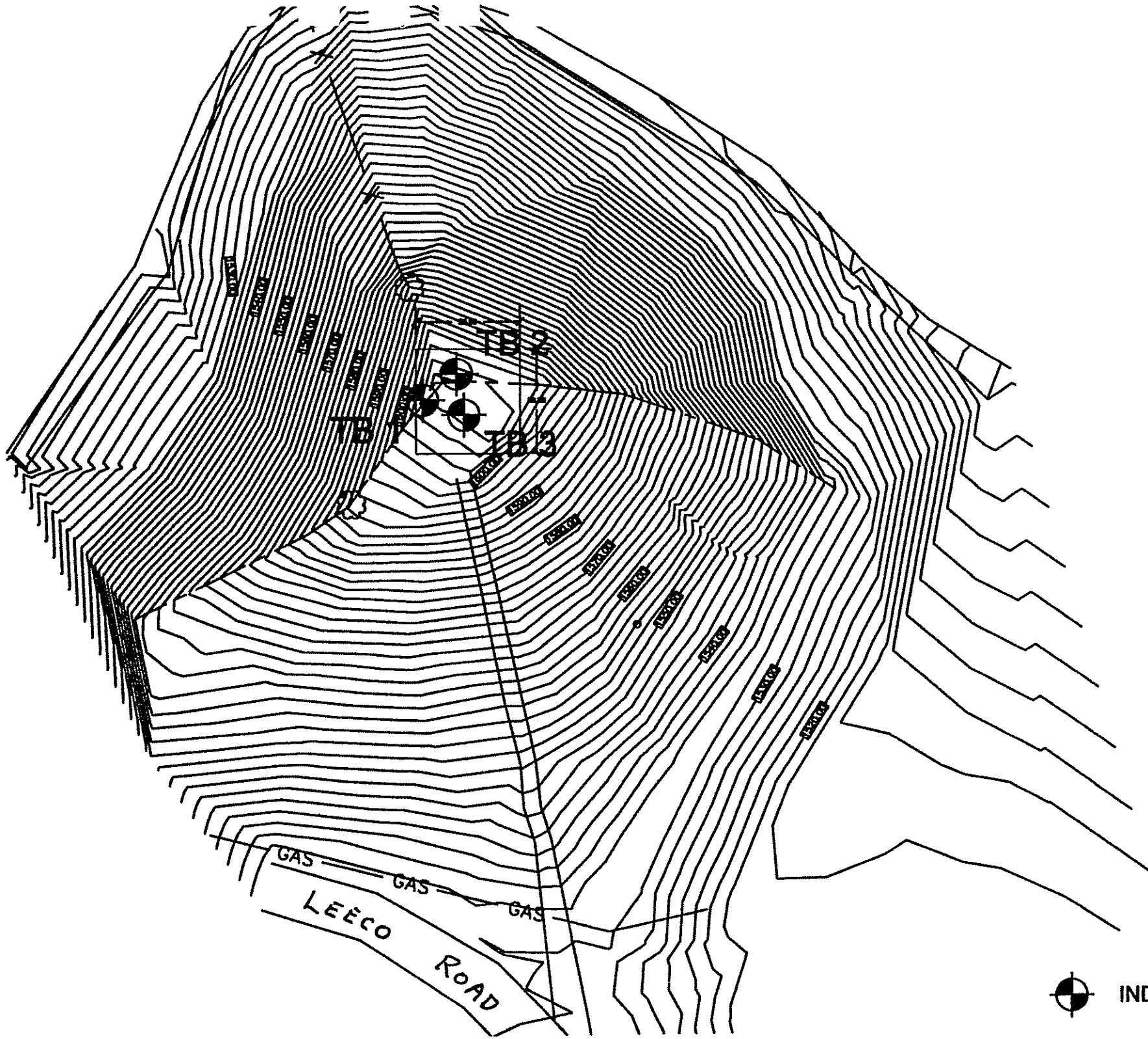
Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

Copyright 2004 by ASFE, Inc. Duplication, reproduction, or copying of this document, in whole or in part, by any means whatsoever, is strictly prohibited, except with ASFE's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of ASFE, and only for purposes of scholarly research or book review. Only members of ASFE may use this document as a complement to or as an element of a geotechnical engineering report. Any other firm, individual, or other entity that so uses this document without being an ASFE member could be committing negligent or intentional (fraudulent) misrepresentation.



INDICATES T



THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408
 2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
 www.thelenassoc.com

LOG OF TEST BORING

CLIENT: Sisler-Maggard Engineering, PLLC (SME) BORING #: 1
 PROJECT: Geotechnical Exploration, SME Contract No. 3, 50,000 Gallon Tank, Leeco Road, Leslie Co., KY JOB #: 080357E
 LOCATION OF BORING: As shown on Boring Plan, Drawing 080357E-1

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE			
				Cond	Blows/6"	No.	Type
1604.4	SURFACE	0.2					
1604.2	TOPSOIL			I	2/2/4	1A 1B	DS 18
	Brown moist moderately tough to hard highly weathered to weathered fine to medium grained SANDSTONE (bedrock).			I	50/6"	2	DS 5
			5	I	50/4"	3	DS 4
				I	41/58/6"	4	DS 11
			10	I	50/6"	5	DS 6
				I	50/4"	6	DS 3
			15	I	12/27/34	7	DS 11
				I	12/27/34	7	DS 11
			20	I	50/3"	8	DS 3"
				I	50/6"	9	DS 5
			25	I	28/50/3"	10	DS 9
1574.9		29.5		I	50/1"	11	DS 1
1573.9	Gray moist hard to very hard SANDSTONE (bedrock).	30.5	30	I	70/6"	12	DS 5
	Bottom of test boring at 30.5 feet.						

Datum MSL Hammer Wt. 140 lbs. Hole Diameter 7 in. Foreman JS / TD-2
 Surf. Elev. 1604.4 ft. Hammer Drop 30 in. Rock Core Dia. - in. Engineer MAH
 Date Started 5/3/08 Pipe Size O.D. 2 in. Boring Method 3-1/4" HSA Date Completed 5/3/08

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED

SAMPLE TYPE

DS - DRIVEN SPLIT SPOON
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUNDWATER DEPTH

FIRST NOTED None ft.
 AT COMPLETION Dry ft.
 AFTER - hrs. - ft.
 BACKFILLED Immed. hrs.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVING CASING
 MD - MUD DRILLING



THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

✓ 1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408
 ○ 2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
 www.thelenassoc.com

LOG OF TEST BORING

CLIENT: Sisler-Maggard Engineering, PLLC (SME) BORING #: 2
 PROJECT: Geotechnical Exploration, SME Contract No. 3, 50,000 Gallon Tank, Leeco Road, Leslie Co., KY JOB #: 080357E
 LOCATION OF BORING: As shown on Boring Plan, Drawing 080357E-1

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE				
				Cond	Blows/ft	No.	Type	Rec. (Inches)
1610.3	SURFACE	0.2						
1610.1	TOPSOIL			I	2/4/16	1A	DS	18
	Brown moist moderately tough weathered fine to medium grained SANDSTONE (bedrock).			I	50/5"	2	DS	4
			5	I	50/6"	3	DS	3
				I	50/5"	4	DS	4
			10	I	27/50/2"	5	DS	5
1597.3			13.0	I	53/6"	6	DS	6
		Bottom of test boring 13.0 feet.						

Datum MSL Hammer Wt. 140 lbs. Hole Diameter 7 in. Foreman JS / TD-2
 Surf. Elev. 1610.3 ft. Hammer Drop 30 in. Rock Core Dia. — in. Engineer MAH
 Date Started 5/3/08 Pipe Size O.D. 2 in. Boring Method 3-1/4" HSA Date Completed 5/3/08

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED
 L - LOST

SAMPLE TYPE

DS - DRIVEN SPLIT SPOON
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUNDWATER DEPTH

FIRST NOTED None ft.
 AT COMPLETION Dry ft.
 AFTER 7 hrs. Dry ft.
 BACKFILLED 7 hrs.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 DC - DRIVING CASING
 MD - MUD DRILLING



THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408

2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756

www.thelenassoc.com

LOG OF TEST BORING

CLIENT: Sisler-Maggard Engineering, PLLC (SME) BORING #: 3
 PROJECT: Geotechnical Exploration, SME Contract No. 3, 50,000 Gallon Tank, Leeco Road, Leslie Co., KY JOB #: 080357E
 LOCATION OF BORING: As shown on Boring Plan, Drawing 080357E-1

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE					
				Cond	Blows/6"	No.	Type	Rec. (Inches)	
1606.5	SURFACE	0.3							
1606.2	TOPSOIL			I	2/2/3	1A	DS	18	
	Brown moist moderately tough weathered fine to medium grained SANDSTONE (bedrock).			I	17/50/6"	2	DS	12	
			5	I	29/37/50/3"	3	DS	11	
				I	19/50/2"	4	DS	7	
			10	I	50/5"	5	DS	4	
				I	8/4/3	6	DS	5	
			15	I	8/11/22	7	DS	11	
				I	18/27/31	8	DS	17	
			20	I	36/50/6"	9	DS	12	
1585.5			21.0						
	Bottom of test boring at 21.0 feet.		25						

Datum MSL Hammer Wt. 140 lbs. Hole Diameter 7 in. Foreman JS / TD-2
 Surf. Elev. 1606.5 ft. Hammer Drop 30 in. Rock Core Dia. - in. Engineer MAH
 Date Started 5/3/08 Pipe Size O.D. 2 in. Boring Method 3-1/4" HSA Date Completed 5/3/08

SAMPLE CONDITIONS

D - DISINTEGRATED
 I - INTACT
 U - UNDISTURBED

SAMPLE TYPE

DS - DRIVEN SPLIT SPOON
 PT - PRESSED SHELBY TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

GROUNDWATER DEPTH

FIRST NOTED None ft.
 AT COMPLETION Dry ft.
 AFTER 5 hrs. Dry ft.
 REACKIFIED 5 hrs.

BORING METHOD

HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGER
 DC - DRIVING CASING
 MD - MUD DRILLING



THELEN ASSOCIATES, INC.

Geotechnical • Testing Engineers

☑ 1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408

○ 2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756

www.thelenassoc.com

SOIL CLASSIFICATION SHEET

NON COHESIVE SOILS

(Silt, Sand, Gravel and Combinations)

Density

Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	- 11 to 30 blows/ft.
Dense	- 31 to 50 blows/ft.
Very Dense	- 51 blows/ft. or more

Relative Properties

Descriptive Term	Percent
Trace	1 – 10
Little	11 – 20
Some	21 – 35
And	36 – 50

Particle Size Identification

Boulders	- 8 inch diameter or more
Cobbles	- 3 to 8 inch diameter
Gravel	- Coarse - 3/4 to 3 inches
	- Fine - 3/16 to 3/4 inches
Sand	- Coarse - 2mm to 5mm (dia. of pencil lead)
	- Medium - 0.45mm to 2mm (dia. of broom straw)
	- Fine - 0.075mm to 0.45mm (dia. of human hair)
Silt	- 0.005mm to 0.075mm (Cannot see particles)

COHESIVE SOILS

(Clay, Silt and Combinations)

Consistency

Consistency	Field Identification
Very Soft	Easily penetrated several inches by fist
Soft	Easily penetrated several inches by thumb
Medium Stiff	Can be penetrated several inches by thumb with moderate effort
Stiff	Readily indented by thumb but penetrated only with great effort
Very Stiff	Readily indented by thumbnail
Hard	Indented with difficulty by thumbnail

Unconfined Compressive Strength (tons/sq. ft.)

Less than 0.25
0.25 – 0.5
0.5 – 1.0
1.0 – 2.0
2.0 – 4.0
Over 4.0

Classification on logs are made by visual inspection.

Standard Penetration Test – Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the drill log (Example – 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e. 8+9=17 blows/ft.). Refusal is defined as greater than 50 blows for 6 inches or less penetration.

Strata Changes – In the column "Soil Descriptions" on the drill log, the horizontal lines represent strata changes. A solid line (————) represents an actually observed change; a dashed line (-----) represents an estimated change.

Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

SECTION 01740

BASIS FOR PAYMENT

PART 1 - GENERAL

All payment for work done under the provisions of this contract shall be in accordance with the basis for payment for the specific items listed herein and in the proposal. The item numbers in this section correspond with the item numbers in the Bid Schedule.

Item 1 – 50,000 Gallon Ground Storage Tank – Leeco Road

Payment for this item shall be made at the lump sum price bid and shall include all work and materials necessary for the complete installation as shown on the drawings or included in specifications, including but not limited to the construction of grading, access road, rip rap ditches, excavation and backfill at the tank site (if required), steel tank, tank foundation with certified design, piping & valves, fence, electrical pole and site electrical, clean up, seeding, fertilizing & mulching, painting (as required), testing, disinfection and other work as required for the complete installation.

The cost of all associated items not specifically listed for separate payment shall be included as an incidental expense.

Rock excavation is not a separate pay item.

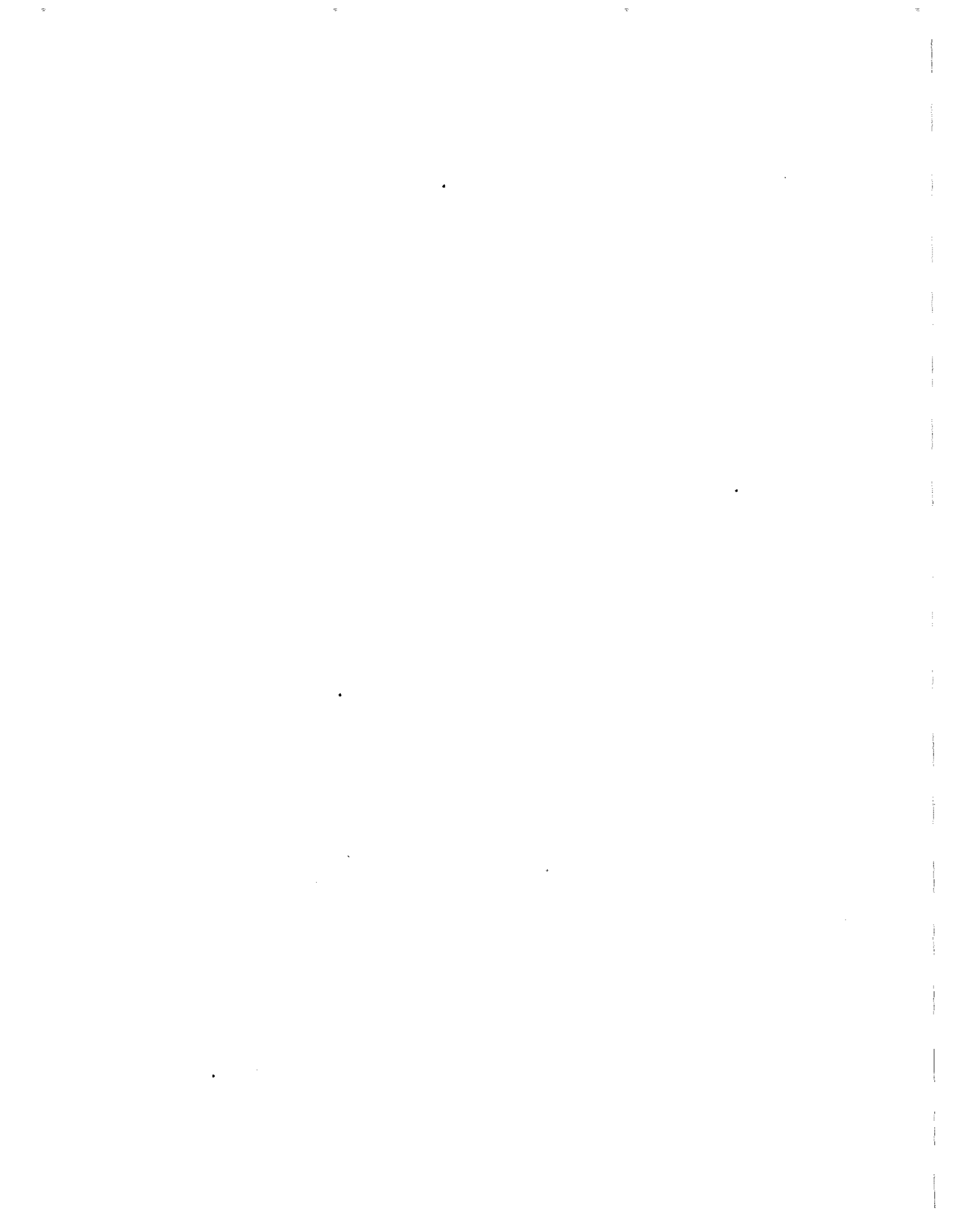
Item 2 – 150,000 Gallon Ground Storage Tank - Rockhouse

Payment for this item shall be made at the lump sum price bid and shall include all work and materials necessary for the complete installation as shown on the drawings or included in specifications, including but not limited to the construction of grading, access road, rip rap ditches, excavation and backfill at the tank site (if required), steel tank, tank foundation with certified design, piping & valves, fence, electrical pole and site electrical, clean up, seeding, fertilizing & mulching, painting (as required), testing, disinfection and other work as required for the complete installation.

The cost of all associated items not specifically listed for separate payment shall be included as an incidental expense.

Rock excavation is not a separate pay item.

END OF SECTION



SECTION 02110
CLEARING AND GRUBBING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. DEFINITIONS

1. Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

2. Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

B. PAYMENT

1. Cost associated with Clearing and Grubbing shall be incidental to facilities being placed.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

3.1. CLEARING

- A. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left

standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

- B. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.2. GRUBBING

- A. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved.
- B. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3. TREE REMOVAL

- A. Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING.
- B. Where Trees shall be disposed of in an approved manner.

3.4. DISPOSAL OF MATERIALS

- A. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations shall be disposed of by the Contractor in an approved manner. The Contractor shall be responsible for compliance with all Federal and State laws and regulations and with reasonable practice relative to the disposal of the material.
- B. Disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

END OF SECTION

SECTION 02202

ROCK REMOVAL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Removal of discovered rock during excavation.
- B. Use of explosives for rock removal.

1.2. RELATED WORK

- A. Geotechnical data as indicated on the Drawings.
- B. Section 02220 - Excavation.

1.3. QUALITY ASSURANCE

- A. Explosives Firm: Company specializing in explosives for disintegration of subsurface rock with a certified blaster in the State of Kentucky.
- B. Contractor shall conform to all State, Federal, and Local laws, ordinances and regulations in regard to transportation, use, and handling of explosives.

1.4. OUTSIDE SERVICES

- A. Contractor shall employ the above mentioned experts if necessary during blasting, to protect workers, property and public.

1.5. SHOP DRAWINGS

- A. Submit means and methods under provisions of Section 01300.
- B. Indicated proposed method of blasting, delay pattern, explosives types, type of blasting mat or cover, and intended rock recovery method.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Rock Definition: Solid mineral material or man made material that cannot

be removed with a power shovel or as defined by KDOH specifications.

- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay Devices: Type recommended by explosives firm and conforming to State regulations.
- D. Blasting Materials: Type recommended by explosives firm and conforming to State regulations.

PART 3 - EXECUTION

3.1. INSPECTION

- A. *Verify site conditions and note irregularities affecting work of this Section.*
- B. Beginning work of this Section means acceptance of existing condition.

3.2. ROCK REMOVAL

- A. Excavate for and remove rock by a mechanical method.
- B. Cut away rock at excavation bottom to form even surface.
- C. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
- D. Correct unauthorized rock removal in accordance with backfilling and compaction requirements of Section 02220, paragraph 3.04.

3.3. ROCK REMOVAL – EXPLOSIVES METHODS

- A. If rock is uncovered requiring the explosives method for rock disintegration, *notify the Engineer.*
- B. Advise Owners of adjacent building or structures in writing prior to setting up seismographs. Describe blasting and seismic operations.
- C. Peak particle velocity will be limited to 4.0 in./sec.
- D. Provide seismographic monitoring during progress of all blasting operations, or as required by State regulations.
- E. Distinguish rock and remove from excavation.

3.4. FIELD QUALITY CONTROL.

- A. Engineer or his representative shall approve the depth of the final rock cut.

3.5. HAUL

- A. No payment will be made separately or directly for haul on any part of the work for removed rock. All haul will be considered a necessary and incidental part of the work, and the cost thereof shall be considered by the Contractor in the contract unit price for the pay items of the work involved.

3.6. ROCK REMOVAL

- A. Rock removal is not a pay item. Cost associated with rock removal shall be incidental to the project and shall be considered by the contractor in the unit price for the pay items of the work involved.

END OF SECTION

SECTION 02221

EXCAVATION, TRENCHING, AND BACKFILLING
FOR UTILITIES SYSTEMS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Excavation, trenching and backfilling for the following systems:
 - 1. Water Systems
 - 2. Sewer System
 - 3. Natural Gas Piping Systems

1.2. RELATED WORK

- A. Section 15260 – Piping Insulation
- B. Section 15410 – Plumbing Piping

1.3 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION
OFFICIALS (AASHTO)

AASHTO T 180 (1986) Moisture-Density Relations of Soils Using a
10-lb. Rammer and an 18 inch Drop

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM D 2487 (1985) Classification of Soils for Engineering
Purposes

1.4 DEFINITIONS

- A. Degree of Compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASSHTO T 180, Method D.

PART 2 - PRODUCTS

2.1 MATERIALS

Satisfactory materials shall consist of any material classified by -ASTM D 2487- as GW, GP, and SW.

- A. Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 3 inches, and materials classified in -ASTM D 2487-, as PT, OH, and OL. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.
- B. Cohesionless materials shall include materials classified in -ASTM D 2487- as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.
- C. Rock shall consist of boulders measuring 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below ground concrete or masonry structures, exceeding 1/2 cubic yard in volume, except that pavements will not be considered as rock.
- E. Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.
- F. Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.
- G. Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1-inch sieve. The maximum allowable aggregate size shall be 1 inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.
- H. Initial backfill shall consist of select granular material or satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 2 inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

PART 3 - EXECUTION

3.1 GENERAL EXCAVATION

- A. Excavation shall be performed to the lines and grades indicated.
- B. Rock excavation shall include removal and disposition of material defined as rock in paragraph "MATERIALS."
- C. Earth excavation shall include removal and disposal of material not classified as rock excavation.
- D. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet.
- E. Excavated material not required or not satisfactory for backfill shall be removed from the site.
- F. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation.

3.2 TRENCH EXCAVATION

- A. The trench shall be excavated as recommended by the manufacturer of the pipe to be installed.
- B. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual.
- C. Where no manufacturer's installation manual is available, trench walls shall be made vertical.
- D. Trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in.
- E. Vertical trench walls more than 4 feet high shall be shored.
- F. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil.
- G. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

- H. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter.
- I. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor.
- J. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.3 BOTTOM PREPARATION

- A. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe.
- B. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing.
- C. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.4 REMOVAL OF UNYIELDING MATERIALS

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 4 inches below the required grade and replaced with suitable materials as provided in paragraph "BACKFILLING AND COMPACTION."

3.5 REMOVAL OF UNSTABLE MATERIALS

- A. Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph "BACKFILLING AND COMPACTION."
- B. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.6 JACKING, BORING AND TUNNELING

Unless otherwise indicated, excavation shall be by open cut, except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Architect/Engineer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.7 STOCKPILES

- A. Stockpiles of satisfactory and wasted materials shall be placed and graded.
- B. Stockpiles shall be kept in a neat and well-drained condition, giving due consideration to drainage at all times.
- C. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled.
- D. Stockpiles of satisfactory materials shall be protected from contamination, which may destroy the quality and fitness of the stockpiled material.
- E. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government.

3.8 BACKFILLING AND COMPACTION

- A. Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required.
- B. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified.
- C. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

3.9 TRENCH BACKFILL

- A. Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests.
- B. The joints and couplings shall be left uncovered during the pressure tests.

3.10 REPLACEMENT OF MATERIALS

- A. Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

- B. Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

3.11 BEDDING AND INTITIAL BACKFILL

- A. Bedding 4" thick shall be placed under sewer and water lines.
- B. Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit.
- C. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe.
- D. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.12 FINAL BACKFILL

- A. The remainder of the trench shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:
- B. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12-inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils.
- C. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

3.13 TESTING

After other required tests have been performed and the trench backfill compacted to the finished grade surface, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Architect/Engineer.

END OF SECTION

SECTION 02270

EROSION CONTROL, SEDIMENTATION, AND CONTAINMENT
OF CONSTRUCTION MATERIALS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The Contractor shall do all work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to the adjacent wetlands.
- B. The Contractor shall not employ any construction method that violates a rule, regulation, guideline, or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- C. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage, and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

PART 2 - PRODUCTS

2.1. METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of water diversion structures, diversion ditches, and settling basins.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area, which must be entered for the construction of temporary, or permanent facilities. The Engineer has the authority to limit the surface area of awardable earth material erodible by clearing and grubbing, excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.

- C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or runoff. Earth berms or diversions constructed to intercept outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the Contractor shall remove those materials from the fouled areas as directed by the Engineer.
- D. For work within easements, all materials used on construction such as excavation, backfill, roadway and pipe bedding and equipment, shall be kept within the limits of the easements.
- E. The Contractor shall not pump silt-laden water from trenches or other excavations into the wetlands or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps to ensure the only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.
- F. Prohibited construction procedures include, but are not limited to, the following:
1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
 2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.
 3. Pumping of silt-laden water from trenches or excavations into surface waters or wetlands.
 4. Damaging vegetation adjacent to our outside of the construction area limits.
 5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
 6. Open burning of debris from the construction work.
- G. Any temporary working roadways required shall consist of clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign materials shall be removed from the site following construction.

2.2. EROSION CHECKS

- A. The Contractor shall furnish and install baled hay or straw erosion checks in all locations indicated on the Drawings, surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer.
- B. Checks, where indicated on the Drawings, shall be installed immediately after the site is cleared and before trench excavation is begun at the location indicated. Checks located surrounding stored material shall be located approximately 6 feet from that material.
- C. Bales shall be held in place with two 2-inch by 2-inch by 4-foot wooden stakes. Each bale shall be butted tightly against the adjoining bale to preclude short-circuiting of the erosion check.

END OF SECTION



SECTION 02480

SEEDING, FERTILIZING AND MULCHING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. CONDITIONS

1. General provisions of CONTRACT DOCUMENTS apply to this section.

B. DESCRIPTION OF WORK

1. Provide labor, material, equipment and services necessary for proper and complete seeding, fertilizing and mulching.
2. Seed all new and disturbed lawn areas not otherwise indicated to be sodded.

1.2. QUALITY ASSURANCE

- A. The intent of these Specifications is to require the Contractor to provide, in all areas to be seeded, fertilized and mulched, a smooth uniform turf of the grasses specified free from bare spots, eroded areas, weeds or other deficiencies. *Acceptance by the Engineer is conditional upon compliance with this intent after initial growing season.*
- B. Areas outside limits of construction, damaged by work under this Contract, shall be repaired as required to match existing conditions. This includes borrow areas for excavation.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Mulch shall be straw or hay mulch, tacked with asphalt, straw or hay mulch fixed in place with disk land packers or disk harrows; or fiber mulch applied simultaneously with grass seed and fertilizer by the use of hydroseeding machinery.
 1. Straw shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold, or other objectionable material. Straw shall be in an air-dry condition suitable for placing with

blower equipment.

2. Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, free from noxious weeds, mold or other objectionable material. Hay shall be in an air-dry condition and suitable for placing with blower equipment.
 3. Wood cellulose fiber for use with hydraulic application or grass seed and fertilizer shall consist of specially prepared wood cellulose fiber or a combination of wood cellulose and recycled newsprint fibers, processed to contain no growth or germination - inhibiting factors and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus 3 percent at the time manufactured. The combination of wood cellulose and recycled newsprint fibers shall contain a maximum of 10 percent moisture plus or minus 3 percent at the time of manufacture. The pH range for either mix shall be between 4.5 and 6.5.
- B. Commercial fertilizer shall be a complete commercial fertilizer of 10-10-10 formula, uniform in composition, dry and free flowing. Fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted.
- C. Limestone shall be finely pulverized (calcium carbonate) containing equivalent of at least 45% calcium oxide, and so pulverized that the residue on #30 and #200 sieves is not more than 0.5% and 15% respectively.
- D. Seed Mixture
Lawn seed shall be guaranteed by dealer and distributed as follows:
- 50% Fine Leaf Falcon Fescue
 - 20% Kentucky Bluegrass "Ken-Blue"
 - 30% Perennial Ryegrass

2.2 SOIL IMPROVEMENTS

- A. A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified. Cost of soil tests is not a pay item and is an incidental cost to the Contractor.

- B. Lime shall be applied at the rate recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.
- C. Fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage or hydroseeding operation.

2.3 SEEDING AND MULCHING

- A. **Planting Seasons and Conditions:** Planting shall not be done when the ground is frozen, snow-covered, or in an unsatisfactory condition for planting. Spring seeding season shall be between February 15 and April 15. Fall seeding shall be between August 15 and October 15.
- B. Seeding seasons may be extended only at direction of Engineer.
 - 1. Seeding:
 - a. Seed shall be broadcast uniformly by approved sowing equipment at the rate of 5 pounds per 1,000 square feet over a designated area. One half of the seed shall be sown in one direction, and the remainder shall be sown at right angles to the first sowing. The seed shall be covered to an average depth of (0.2-0.4) inch by means of spike tooth harrow, cultipacker, or other approved device. Seed shall not be broadcast when winds are above 10 miles per hour.
 - b. Drill seeding shall be accomplished using approved equipment such as cultipacker seeders and grass seed drills. The seed shall be drilled uniformly to an average depth of (0.2-0.4) inch at a rate of 5 pounds per 1,000 square feet.
 - c. When hydroseeding, the (seed and fertilizer), (seed, fertilizer, and approved mulch material) shall be mixed in the required amount of water to produce a homogeneous slurry and then uniformly applied. Wood cellulose or straw mulch shall be added after the seed and fertilizer have been thoroughly mixed. Lime, when applied hydraulically, shall be a single, separate operation.
 - d. Immediately after seeding, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with a cultipacker-type seeder

or if seed is applied in combination with hydromulching, rolling will not be required.

2. Mulching (Straw and Asphalt):

- a. All seeded areas indicated or directed by the Engineer shall be mulched with a straw and asphalt mat. Mulching shall follow seeding operation not later than 48 hours. The asphalt mat will not be required on areas adjacent to buildings, sidewalks or concrete curbs.
- b. Straw and asphalt mat shall be applied at rate of two and one-half (2½) tons of straw per acre, and 200 gallons of asphalt per acre. Asphalt shall either be emulsified RS-1 grade or cutback RC-1 grade. Method of application may be:
 - 1) by spreading straw evenly over seeded area after which asphalt tie-down is sprayed over straw in a solid pattern, or
 - 2) by applying mat in one operation by a jet type mulch spreader in which straw and asphalt are sprayed in mixture evenly over area.

2.4 SEED PROTECTION ON SLOPES

- A. Cover seeded slopes where grade is 3:1 or greater with jute matting. Roll matting down over slopes without stretching or pulling.
- B. Lay matting smoothly on soil surface, boring top end of each section in narrow 6-inch trench. Leave 12 inches overlap from top roll over bottom roll. Leave 4 inches overlap over adjacent section.
- C. Staple outside edges and overlaps at 36-inch intervals.
- D. Lightly dress slopes with topsoil to ensure close contact between matting and soil.
- E. In ditches, unroll matting in direction of flow. Overlap ends of strips 6 inches with upstream section on top.

2.5 WATERING

- A. Immediately following seeding, the Contractor shall water areas thoroughly, including subgrade.

- B. The prepared area is to be watered a minimum of two times per week until it has been accepted. This will not be required if sufficient rain occurs during the week.

2.6 CLEAN-UP

- A. Soil, peat or similar material which has been brought onto paved areas within or outside construction limit by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times.
- B. Upon completion of seeding, all excess soil, stones and debris which have not previously been cleaned up shall be removed from site or disposed of as directed by the Engineer.
- C. All attended areas shall be prepared for final inspection.

2.7 MAINTENANCE

- A. Maintenance shall begin immediately following last operation of seeding and shall continue until turf is formally accepted.
- B. Maintenance shall include watering, weeding, cultivating, mulching, regular mowing or seeded areas, and removal of dead materials.

2.8 INSPECTION FOR ACCEPTANCE

- A. Inspection of work of this section to determine completion, exclusive of possible replacement of seed, will be made by the Engineer upon written notice requesting such inspection submitted at least ten (10) days prior to anticipated date of inspection and provided that an 80% minimum coverage per square foot for all seeded areas has been established. Contractor shall guarantee, at the time of compliance with the intent of this Specification described herein. This guarantee shall apply to all permanent seeding performed in conjunction with project, regardless of type protection used or season in which seeding performed.
- B. When seeding does not meet guarantee requirements at time of inspection, the Contractor will be advised of amount and location of corrective work deemed necessary. Additional work required may include preparation of a new seedbed, refertilizing, reseeding, remulching, or any erosion control items that were originally required. Contractor shall perform all corrective work as soon as favorable working conditions occur after being advised of corrective work required. Corrective work and materials required to fulfill guarantee requirements will not be paid for, except as hereinafter provided for unavoidable damage.

- C. When unavoidable damage occurs after date project is declared complete and before inspection previously described, then payment will be made at original contract unit prices for additional seeding and protection work ordered by the Engineer. Unavoidable damage may result from slides, vehicular traffic, fires, and deluges. Failure of seed to sprout and grow will not be considered unavoidable damage.
- D. From time seeding and protection work begins until date project is declared complete, keep all seeded areas in good condition at all times. Damage to seeded areas or to mulch materials shall be promptly repaired as directed. All work and materials necessary to protect, maintain and restore seeded areas during life of contract shall be performed at no additional cost to Owner, except additional work caused by changes in project by the Engineer.
- E. When it becomes necessary to disturb previously seeded areas at direction of the Engineer, payment for a reasonable amount of additional work, as determined by the Engineer, will be made at original contract unit price. No payment will be made for additional work due to changes made for benefit of Contractor, nor will payment be made for corrective work required because Contractor has failed to properly coordinate his entire erosion control schedule thus causing previously seeded areas to be disturbed by operations that could have been performed prior to seeding.
- F. After inspection, Contractor will be notified in writing by Engineer or acceptance of all work of this Section and Contractor will be notified in writing if there are deficiencies of requirements for completion of work. Replacements, maintenance or repair work remaining to be done shall be subject to re-inspection before acceptance.

2.9 PLANT WARRANTY AND REPLACEMENT

- A. The Contractor shall warrant 80% coverage per square foot of established grass area for duration of one (1) growing season after final acceptance of seeding by Owner. Seed shall be alive and in satisfactory growth at end of warranty period.
- B. Owner will be responsible for all maintenance necessary to keep grass alive and healthy between time lawns are accepted and end of warranty period. Basic needs of lawn during this period are for adequate water and protection from insects and other similar pests.
- C. Should contractor find lawn is not receiving proper maintenance at any time prior to end of the warranty period, he shall advise Engineer and Owner immediately in writing so corrective measures may be initiated.

END OF SECTION

SECTION 02722
DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 RELATED SECTIONS

- A. 01300 – Submittals
- B. 01600 - Material and Equipment

PART 2 - PRODUCTS

2.1 PIPE

- A. Ductile cast iron pipe shall conform to the American Standard for "Ductile Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids", ASA A21.5 (AWWA C151).
- B. The pipe shall be Thickness Class 51, unless otherwise noted.

2.2 JOINTS

- A. Mechanical joints, bell and spigot joints and flange joints for ductile iron pipe in sizes from 2-inches through 48-inches in diameter shall conform to all of the dimensions, shapes and requirements of ASA A21.10 (AWWA C110), "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids." The mechanical joint shall also conform in all respects to ASA A21.11 (AWWA C111), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings."
- B. Push-on joints shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe and forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. The push-on type joint shall conform to the requirements of ASA A21.10 (AWWA C110) and ASA A21.11 (AWWA C111) where applicable.

- C. Where ductile iron pipe with ball and socket type joints are specified, they shall be of the mechanical gland type. Provisions shall be made for longitudinal expansion and contraction with a positive stop against disengagement of the joint. Up to fifteen (15) degrees angular deflection shall be accommodated without leakage and without decrease in full diameter of pipe.

2.3 FITTINGS

- A. Cast iron or ductile iron fittings in sizes 2-inches through 48-inches for mechanical joints, bell and spigot joints and flange joints shall conform to all the requirements of ASA A21.10 (AWWA C110), "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids," and to the requirements of ASA A21.11 (AWWA C111), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings," for mechanical joints and push-on type joints. Push-on joints for cast iron fittings shall be as described in Section 2 of this section.
- B. The cast iron or ductile iron fittings in sizes larger than 12-inch shall have a pressure rating of 150 psi unless the proposal sheets and/or the construction drawings stipulate that 250 psi cast iron fittings are required.
- C. Unless specifically described on the proposal sheets and/or construction drawings, the cast iron fittings may be supplied in gray iron or ductile iron.

2.4 COATINGS FOR DUCTILE IRON PIPE AND FITTINGS

- A. The ductile iron pipe and cast iron or ductile iron fittings for water service shall be furnished with cement mortar lining in accordance with ASA Specifications A21.4 (AWWA C104), "Cement Mortar Lining for Cast Iron Pipe and Fittings." The lining will be 1/16-inch thick for pipe sizes 4-inches through 12-inches in diameter and 3/32-inch thick for sizes 14-inch through 24-inches in diameter. A bituminous seal coat shall be applied to the lining surface immediately following the lining operation to prevent loss of moisture and insure proper curing of the cement mortar. The outside of the iron pipe shall be furnished with a protective coating as outlined in Section 09910, "Painting."
- B. All cast iron or ductile iron fittings and ductile iron pipe which will carry sewage shall be completely coated inside with cement lining and outside with a bituminous coating.
- C. All ductile iron pipe and fittings not installed in a trench condition shall not be coated with a coal-tar pitch on the outside. The pipe and fitting shall be coated in accordance with the Section 09910, "Painting".

2.5 MISCELLANEOUS JOINTING MATERIAL

- A. Poured joints for bell and spigot pipe, if required for connection to existing pressure mains, shall be constructed of a yarning or packing material and lead. The lead for caulking material shall contain not less than 99.73% pure lead. Impurities shall not exceed the following limits:

Arsenic, Antimony & Tin Together	0.015%
Copper	0.08%
Zinc	0.002%
Iron	0.25%
Bismuth	0.25%
Silver	0.02%

- B. The producer's name or the mark of the lead industries shall be clearly cast or stamped upon each piece of lead.
- C. Yarning or packing material shall consist of one of the following: (1) molded or tubular rubber rings, or (2) treated paper rope. The material shall be free of oil, tar or greasy substances.
- D. Victaulic couplings for ductile iron pipe shall consist of malleable iron housing-clamps in two (2) or more parts, a single C-shaped rubber gasket and two (2) or more track-head steel bolts as required to assemble the housing clamps. The coupling shall be of the proper type to encircle the outside diameter of the ductile iron pipe as specified. The malleable iron in the segmental casting shall conform to ASTM A47. The track-type oval neck bolts shall conform to ASTM A183. The rubber gasket shall be Grade "R" natural rubber.
- E. Ductile iron pipe and fittings to be joined with victaulic couplings shall be furnished with shoulders to engage the entire inner circumference of the housing-clamp. The outside surface of the pipe between the shoulder and the pipe end must be smooth and free from deep pits or swells to provide a leaktight seal for the victaulic gasket.
- F. Compression sleeve couplings for plain end ductile iron pipe shall consist of one cylindrical steel middle ring with a pipe stop, two (2) resilient wedge-shaped gaskets, two (2) steel follower rings and a set of high strength steel track-head bolts. The number of bolts furnished will depend on the diameter of the couplings.

PART 3 – EXECUTION

3.1 ANCHORING ASSEMBLIES

- A. Anchoring assemblies for setting valves, fire hydrants, and special bends shall consist of two (2) mechanical joint cast iron or ductile iron gland fittings cast integrally with the pipe nipple.
- B. The anchor assembly fittings shall have a laying length of fourteen (14) inches. Anchoring pipe shall be used where long lengths of pipe are required to anchor fire hydrants. Anchoring pipe may be furnished with regular anchoring glands cast with the pipe or with a ring gland which will allow free movement of the standard mechanical joint tee and anchoring piece for fire hydrant installations where applicable.

3.2 JOINTING PIPE

- A. Joints for buried cast iron or ductile iron pressure main shall be mechanical joint, rubber compression type (push-on joint), poured bell and spigot or victaulic. Cast iron or ductile iron joints within structures may also be flange type or compression sleeve type as shown on the construction drawings. The joints shall be made in the following manner.
- B. Mechanical Joint - The mechanical joint shall conform to the requirements of AWWA A21.11, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings." All surfaces that come in contact with the rubber gasket shall be brushed thoroughly with a wire brush just prior to assembly to remove all rust or foreign material. The clean surface and the rubber gasket shall then be brushed with soapy water. The iron gland shall then be placed on the spigot end with the lip extension facing the joint. The rubber gasket shall then be slipped on the pipe with the thick end toward the gland. The spigot end of the pipe shall then be pushed into the bell seat after which the rubber gasket shall be forced into its retaining space in the bell. Care shall be taken to assure an even seat all around the inner surface of the bell. The gland shall be moved into place for bolting; the bolts shall be inserted and the nuts made up tightly with the fingers only.
- C. The normal range of bolt torques to be applied and length of wrench to produce that torque to the standard cast iron bolts in a joint are as follows:

<u>Size of Bolt</u> <u>Inches</u>	<u>Range of Torque</u> <u>Ft.-Lbs</u>	<u>Length of Wrench</u> <u>Inches</u>
3/4	60 - 90	10
1	70 - 100	12
1-1/4	90 - 120	14

- D. The gland shall be brought up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the

flange at all points around the socket when tightening bolts. It shall be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, and last the remaining bolts. This process shall be repeated until all bolts are within the specified range of torque. If effective sealing is not attained at the maximum torque, the joint shall be disassembled and reassembled after thorough cleaning. The bolts shall not be overstressed to compensate for poor assembly.

- E. Rubber Seal Type Joint (Push-On Joint) - The push-on type joint shall conform to the requirements of AWWA A21.11, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings." Before assembly of the rubber seal type joint, the inside of the bell and the rubber gasket shall be wiped clean with a cloth. The gasket should then be placed in the groove of the bell in the manner that conforms to the contour of the bell. A thin film of special lubricant, of the type recommended by the manufacturer of the pipe, is then applied to the inside of the gasket by brush or hand.
- F. The plain end of the pipe shall be wiped clean and placed in approximate alignment with the bell of the pipe. The joint is then made up by exerting sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket. Pipe eight (8) inches in diameter and larger shall be socketed by fork tools or jacks.
- G. The spigot ends of field cut pipe shall be tapered back one-eighth (1/8) inch at an angle of about thirty (30) degrees to the barrel of the pipe with a coarse file or portable grinder. All sharp or rough edges that may injure the rubber gasket shall be removed in this operation.
- H. Bell and Spigot Joints (used only for Connections to Existing Bell and Spigot Piping - The bell and spigot end of the pipe and/or fitting shall be wiped clean before assembly. The spigot end should then be centered in the bell and the pipe forced home to the back of the bell at the correct line and grade and securely held until the joint is completed.
- I. After the spigot end of the pipe or fitting has been properly seated in the bell of the next pipe or fitting with a uniform annular space around the entire spigot end, yarning material shall be driven tightly against the inside base of the bell with suitable yarning tools.
- J. A space of not less than two and one-quarter (2-1/4) inches shall be left in the bell for lead joints in pipe having a nominal diameter of twenty (20) inches or less. The space shall be not less than two and one-half (2-1/2) inches for 24-inch, 30-inch, and 36-inch diameter pipe and three (3) inches for pipe larger than 36-inch diameter.

- K. Lead should be heated in a melting pot kept in easy reach of the joint to be poured and shall be brought to a proper temperature so that when stirred it will show a rapid change of color. Before pouring, all scum shall be removed. Each joint shall be made with one continuous pour filling the entire joint space with solid lead. Spongy or imperfectly filled joints shall be burned out and re-poured.
- L. The joint runner shall fit snugly against the face of the bell and the outside of the pipe. It shall be dammed with clay to form a pouring lip to provide for filling the joint flush with the face and to the top of the bell.
- M. After the lead has cooled to the temperature of the pipe, lead joints shall be caulked with pneumatic or hand tools operated by competent workmen, until such joints are thoroughly compacted and watertight. The finished joint shall show a hard and even hammered surface overall. Care shall be taken not to overstrain the bells during caulking.
- N. Flanged Joints - The flanged joints shall conform to the requirements of AWWA A21.10, "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids." Flanged joints shall be assembled with bolts and flat ring gaskets of the size and number as specified for "Cast Iron Pipe Flanges and Flanged Fittings," ASA B16.1 for Class 125. The construction drawings will show the details of ASA B16.1b, Class 250 flange assemblies, if such are required. Stud or tap bolts shall be furnished when shown on the construction drawings, and when required to complete special assemblies. All exposed bolts, heads, and nuts shall be coated with two (2) coats of asphaltum or other approved metal coating after the joint has been completed.
- O. Restrained Joints - Special anchorage shall include the use of mechanical joint anchoring fittings, couplings and pipe or positively restrained push-on type pipe and fittings which allow for deflection at the joint after assembly, the equal of "Super-Lock" manufactured by the Clow Corporation. No reduction in pipe wall thickness from that specified shall be permitted in connection with a restrained joint.

3.3 DEFLECTION OF DUCTILE IRON PIPE

Whenever it is desirable to deflect mechanical-joint or push-on joint pipe in order to form a long radius curve, the amount of the deflection shall not exceed the maximum limits shown for the respective type pipe.

TABLE 1Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

<u>Size Of Pipe In Inches</u>	<u>Maximum Permissible Deflection Per Length - Inches</u>			
	<u>12-Ft. Length</u>	<u>16-Ft. Length</u>	<u>18-Ft. Length</u>	<u>20-Ft. Length</u>
6	18	24	27	
8	13	18	20	
10	13	18	20	
12	13	18	20	22
16	9	12	13-1/2	15
20	7-1/2	10	11	12
24	6	8	9	10

TABLE 2Maximum Permissible Deflection in Laying Push-On-Joint Pipe

<u>Size Of Pipe In Inches</u>	<u>Maximum Permissible Deflection Per Length - Inches</u>			
	<u>12-Ft. Length</u>	<u>16-Ft. Length</u>	<u>18-Ft. Length</u>	<u>20-Ft. Length</u>
6	12	17	19	21
8	12	17	19	21
10	12	17	19	21
12	12	17	19	21
16	7-1/2	10	11	12
20	7-1/2	10	11	12
24	7-1/2	10	11	12

END OF SECTION

SECTION 02831

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 WORK INCLUDED

The work covered by these specifications includes the furnishing of all plant, labor, equipment, appliances, transportation and materials required for the installation and/or erection of fences, gates and related items as drawn or herein specified.

1.2 RELATED WORK

Section 03300 – Concrete

1.3 REFERENCES

- A. AISC
- B. ANS
- C. ASTM
- D. FS - Federal Specifications

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials shall conform to the following:
 - 1. Chain Link Fence: FS RR-F-191 and detailed specifications forming the various parts thereto.
 - 2. Fabric: FS FF-F-101/1, Type I, zinc-coated steel wire with minimum coating weight of 1.2 ounces of zinc per square foot of coated surface, or Type II, aluminum-coated steel wire. Fabric shall be fabricated of 9-gauge wire woven in 2-inch mesh. Fabric height shall be 7 feet.
 - 3. Gates:
 - a. For Wire Fence: FS RR-F-191/2. Gate shall be the type and swing shown. Gate frames shall be constructed of Class 1 Grade A or B, steel pipe, size SP2, as specified in FS RR-F-191/3. Gate fabric

shall be as specified for chain-link fabric. Vertical members of gate leaves shall be spaced so that no members are more than 8 feet apart. Gates over 10 feet wide shall be additionally braced with a 5/16-inch, minimum diameter, diagonal truss rod. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that padlock will be accessible from both sides of the gate regardless of the latching arrangement.

- b. For WTR and STP: Gate shall be of the type and swing shown. Post shall be 3 inch galvanized steel set in type B concrete, 36 inches in ground with minimum of 12 inches of concrete on post diameter. Gate swing shall be 1 5/8 inch galvanized steel pipe with radii bend to obtain height of 42" above ground line and extending to center of road. Lock and key to be coordinated with Engineer. Warning sign to be as shown on detail made of weather resistance material, security fastened and non-fading material for working.
- c. Posts: FS FF-F-191/3, zinc-coated; Class 1 Grade A or B, steel pipe; Class 3, formed steel sections. Line posts shall be of the same class throughout the fence. Terminal (corner, gate, and pull) posts selected shall be of the same class throughout the fence.
- d. Braces: FS RR-F-191/3, zinc-coated; Class 1 Grade A or B, steel pipe, size SP1 Class 3, form steel sections, size FS1, conforming to FS RR-F-191/3, may be used as braces and top rails if Class 3 line posts are furnished.
- e. Accessories: FS RR-F-191/4. Ferrous accessories shall be zinc- or aluminum coated. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment.
- f. Concrete: ASTM C 94, using 3/4-inch maximum-size aggregate, and having minimum compressive strength of 2,000 psi at 28 days (Class B) per Section 03300. Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.
- g. Padlocks: FS FF-P-101, Type EPB, Size 1-3/4 inch. A padlock shall be furnished with two keys.

PART 3 - EXECUTION

3.1 GENERAL

Fence shall be installed to the lines and grades indicated. Line post shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts, however, runs between terminal posts shall not exceed 500 feet.

3.2 POSTS AND FRAMING

Posts shall be S-20 set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth of 30 inches with 10 inch diameter of concrete on the post diameter. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to a minimum depth of 30 inches unless a penetration of 18 inches in solid rock is achieved before reaching the 30-inch depth in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than 12 inches in diameter for terminal posts and 10 inches in diameter for line posts. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post so as to be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Class 3 type line posts may be mechanically driven provided soil conditions are such that the driven posts develop strengths at least equal to posts set in concrete and rock is not encountered. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set.

3.3 TOP RAIL

Top rail shall be 1 5/8 inches and supported at each post in a manner that a continuous brace between terminal posts is formed. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail.

3.4 BRACES AND TRUSS RODS

Braces and truss rods shall be installed as required if shown on drawings and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or two diagonal truss rods shall be installed on 12-foot

fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.

3.5 TENSION WIRES AND BARS

Tension wires shall be 3/16 inch by 3/4 inch and installed along the bottom of the fence line and attached to the terminal posts of each stretch of the fence. Bottom tension wire shall be installed within the bottom 6 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.6 CHAIN-LINK FABRIC

Chain-link fabric shall be 9 guage, 1.2 ounce galvanized and be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 15-inch intervals. Fabric shall be pulled taut to provide a smooth uniform appearance free from sag. Fabric shall be fastened to line posts with hog rings at approximately 24-inch intervals and fastened to top rails and tension wires at approximately 24-inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 inches (plus or minus 1/2-inch) above the ground.

END OF SECTION

SECTION 02940
TEMPORARY SILT AND EROSION CONTROL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. This work shall consist of furnishing all labor, material, equipment, and incidentals for the construction of silt control structures to reduce the amount of sediment delivered to waterways. Silt control structures shall be constructed as required to control any silt runoff into streams or at the locations directed by the Engineer or his designated Representative.
- B. A written silt control plan shall be prepared and submitted to the Owner for approval before start of construction.
- C. During the life of the contract, the silt control structures shall be maintained by the Contractor, and silt accumulations which threaten to damage the structures, or preclude their effective operation as determined by the Engineer, shall be removed and replaced.

1.2. RELATED SECTIONS

- A. 01600 – Materials and Equipment

PART 2 - PRODUCTS

2.1. STRAW OR HAY BALE SILT CHECK

- A. This silt check shall be constructed with straw or hay bales firmly bound by twine and solidly staked to remain in place, as shown on the Standard Details.
- B. The location of straw or hay bale silt checks shall be as shown on the Plan drawings, or as directed by the Engineer at the time of construction. When the usefulness of the silt checks has ended, they shall be removed, and surplus materials shall be disposed of properly.

PART 3 - EXECUTION

3.1. MEASUREMENT AND PAYMENT

- A. Payment for installation and maintenance of the temporary silt and erosion control structures shall be considered an incidental expense to the construction. All costs for same shall be included in the prices bid for the items included with the project.

END OF SECTION

SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.1. WORK INCLUDED

This Section shall cover Concrete Forms, Metal Forms, Form Ties and Form Release Agents

1.2. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 347 (1978; R 1984) Concrete Formwork

AMERICAN HARDBOARD ASSN (AHA)

AHA A135.4 (1982) Basic Hardboard

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1983) Construction and Industrial Plywood

1.3. SUBMITTALS

NOT APPLICABLE

1.4. DESIGN

- A. **METHODOLOGY:** Formwork shall be designed in accordance with methodology of ACI 347 for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface which meets the requirements of the class of finish specified in Section 03300 CONCRETE FOR BUILDING CONSTRUCTION.

- B. **PRESSURES:** Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

PART 2 - PRODUCTS

2.1. FORM MATERIALS

- A. **FORMS FOR CLASS B FINISH:** Forms for Class B finished surfaces shall be plywood panels conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels. Forms for round columns shall be the prefabricated seamless type.
- B. **FORMS FOR CLASS D FINISH:** Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.
- C. **FORM TIES:** Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spill concrete upon removal. Solid backing shall be provided for each tie. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than 1/4 inch nor more than 1 inch deep and not more than 1 inch in diameter. Removable tie rods shall be not more than 1-1/2 inches in diameter.
- D. **FORM RELEASING AGENTS:** Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds

PART 3 - EXECUTION

3.1. INSTALLATION

- A. Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements specified in **Section 03300 CONCRETE FOR BUILDING CONSTRUCTION** and conforming to construction tolerance given in **TABLE 1**.
- B. Where concrete surfaces are to have a Class B finish, joints in form panels shall be arranged as approved.
- C. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of mortar.

- D. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface.
- E. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse.
- F. Form ties that are to be completely withdrawn shall be coated with a non-staining bond breaker.

3.2. CHAMFERING

Except as otherwise shown, external corners that will be exposed shall be chamfered, beveled, or rounded by moldings placed in the forms

3.3. COATING

- A. Forms for Class B finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions.
- B. Forms for Class C and D finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures coating shall be mandatory.
- C. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.4. REMOVAL OF FORMS

- A. Forms shall be removed in a manner that will prevent injury to the concrete and ensure the complete safety of the structure.
- B. Formwork for columns, walls, side of beams and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement.
- C. Supporting forms and shores shall not be removed from beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads.
- D. In no case will supporting forms or shores be removed before the concrete strength has reached 70 percent of design strengths as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens, and by a structural analysis

considering the proposed loads in relation to these test strengths and the strength of forming and shoring system.

- E. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

TABLE 1

TOLERANCES FOR FORMED SURFACES

1. Variations from the plumb:
In any 10 feet of length - 1/4 inch
 - a. In the lines and surfaces of columns, piers, walls and in arises Maximum for entire length - 1 inch
 - b. For exposed corner columns
In any 20 feet of length - 1/4 inch
Control-joint grooves, Maximum for entire length-1/2 inch
other conspicuous lines
2. Variation from the level or
In any 10 feet of length - 1/4 inch
from the grades indicated on
In any bay or in any 20 feet
the drawings: of length - 3/8 inch
3. Variation of the linear
In any 20 feet - 1/2 inch
building lines from Maximum - 1 inch
established position in plan
4. Variation of distance 1/4 inch per 10 feet of distance,
between walls, columns, but not more than 1/2 inch in any
partitions one bay and not more than 1 inch
total variation

- | | | | |
|----|---|---------------|------------------------------------|
| 5. | Variation in the sizes and locations of sleeves, floor openings, and wall opening | Minus
Plus | - 1/4 inch
- 1/2 inch |
| 6. | Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls | Minus
Plus | - 1/4 inch
- 1/2 inch |
| 7. | Footings: | | |
| a. | Variation of dimensions in plan
when formed or plus 3 inches when placed against excavation | Minus
Plus | - 1/2 inch
- 2 inches |
| b. | Misplacement of 2 percent of the footing width in eccentricity the direction of misplacement but not more than - 2 inches | | |
| c. | Reduction in thickness | Minus | - 5 percent of specified thickness |

END OF SECTION



SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318 (1983; Rev 1986) Building Code Requirements for Reinforced Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53 (1989a) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

ASTM A 82 (1988) Steel Wire, Plain, for Concrete Reinforcement

ASTM A 184 (1988) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement

ASTM A 185 (1985) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement

ASTM A 497 (1989) Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement

ASTM A 499 (1981; R 1988) Steel Bars and Shapes, Carbon Rolled from "T" Rails

ASTM A 615 (1989) Deformed and Plain Billet Steel Bars for Concrete Reinforcement

ASTM A 675 (1988) Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties

ASTM A 706 (1989) Low-Alloy Steel Deformed Bars for Concrete Reinforcement

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4 (1979) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI DA4 (Jan 1986; 24th Ed) Manual of Standard Practice

1.2. SUBMITTALS

Submit shop drawings and product data under provisions of Section 01300.

1.3. QUALIFICATIONS

- A. Welders shall be qualified in accordance with AWS D1.4..
- B. Qualification test shall be performed at the worksite and the Contractor shall notify the Owner 24 hours prior to conducting tests. .
- C. Welding procedures qualified by others and welders qualified by another employer may be accepted as permitted by AWS D1.4.

1.4. DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 - PRODUCTS

2.1. DOWELS

- A. Dowels shall conform to ASTM A 675, Grade 80, or ASTM A 499.
- B. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2. FABRICATED BAR MATS

Fabricated bar mats shall conform to ASTM A 184.

2.3. REINFORCING STEEL

- A. Reinforcing steel shall be deformed bars conforming to ASTM A 615 or ASTM A 706, grades and sizes as indicated.

- B. Cold drawn wire used for spiral reinforcement shall conform to ASTM A 82.

2.4. WELDED WIRE FABRIC

Welded wire fabric shall conform to ASTM A 185 or ASTM A 497.

2.5. WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.6. SUPPORTS

- A. Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI DA4 and shall be steel or precast concrete blocks.
- B. Precast concrete blocks shall be not less than 4 inches square when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete.
- C. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be plastic protected or of stainless steel.
- D. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface.
- E. For slabs on grade, supports shall be precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire fabric supports fabricated of plastic.

PART 3 - EXECUTION

3.1. REINFORCEMENT

- A. Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318.
- B. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete.
- C. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety.

- D. **PLACEMENT:** Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318 at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.
- E. **SPLICING:** Splices of reinforcement shall conform to ACI 318 and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No. 11 unless otherwise indicated. Welding shall conform to AWS D1.4. *Welded butt splices shall be full penetration butt welds.* Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6-inches. Mechanical butt splices shall be in accordance with the recommendation of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.

3.2. WELDED-WIRE FABRIC

- A. Welded-wire fabric shall be placed in slabs as indicated. Fabric placed in slabs on grade shall be continuous between expansion, construction, and contraction joints.
- B. *Lap splices shall be made in such a way that the overlapped area equals the distance between the outermost crosswires plus 2 inches.* Laps shall be staggered to avoid continuous laps in either direction.
- C. Fabric shall be wired or clipped together at laps at intervals not to exceed 4 feet.
- D. Fabric shall be positioned by the use of supports.

3.3. DOWELS

- A. Dowels shall be installed in slabs on grade at locations indicated and at right angles to joint being doweled.
- B. Dowels shall be accurately aligned parallel to the finished concrete surface and rigidly supported during concrete placement.
- C. One end of dowels shall be coated with a bond breaker.

END OF SECTION



SECTION 03250

EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

1.1 WORK INCLUDED

- A. Contraction-Joint Strips.
- B. Expansion Joint Filler
- C. Joint Sealant
- D. Waterstops

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A135.4 (1982) Basic Hardboard

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1751 (1983) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

ASTM D 1752 (1984) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

ASTM D 2628 (1981) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

ASTM D 2835 (1972; R 1982) Lubricant for Installation of Preformed Compression Seals in Concrete Pavements

CORPS OF ENGINEERS HANDBOOK FOR CONCRETE AND CEMENT (CRD)

CRD-C 513 (1974) Rubber Waterstops

CRD-C 572 (1974) Polyvinylchloride Waterstops

FEDERAL SPECIFICATIONS (FS)

FS SS-S-200	(Rev. E) Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement
FS SS-S-1401	(Rec. C) Sealant, Joint, Non-Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Asphalt Concrete Pavements
FS SS-S-1614	(Rev. A) Sealants, Joint, Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Tar Concrete Pavements

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.

1.4 DELIVERY AND STORAGE

- A. Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants.
- B. Sealants shall be delivered in the manufacturer's original unopened containers. Sealants whose shelf life has expired shall be removed from the site.

PART 2 - PRODUCTS

2.1 CONTRACTION-JOINT STRIPS

- A. Contraction-joint strips shall be 1/8-inch thick tempered hardboard conforming to ANSI A135.4, Class 1.
- B. In lieu of hardboard strips, rigid polyvinylchloride (PVC) insert strips specifically designed to induce controlled cracking in slabs on grade may be used. Such insert strips shall have removable top section.

2.2 EXPANSION-JOINT FILLER

- A. Expansion-joint filler shall be premolded material conforming to ASTM D 1751 or ASTM D 1752.

- B. Unless otherwise indicated, filler material shall be 3/8-inch thick and of a width applicable for the joint formed.

2.3 JOINT SEALANT

- A. Joint sealant shall conform to the following:
- B. Preformed Polychloroprene Elastomeric Joint Seals ASTM D 2628.
- C. Lubricant for Installation of Preformed Compression Seals ASTM D 2835.
- D. Hot-Poured Type FS SS-S-1401.
- E. Cold-Applied Jet-Fuel Resistant Type FS SS-S-200, Type M.
- F. Hot-Applied Jet-Fuel Resistant Type FS SS-S-1614.

2.4 WATERSTOPS

- A. Waterstops shall conform to CRD-C 513 or CRD-C 572..

PART 3 - EXECUTION

3.1 JOINTS

Joints shall be installed at locations indicated and as authorized.

- A. **Contraction Joints:** Contraction joints may be constructed by inserting tempered hardboard strips or rigid PVC insert strips into the plastic concrete or by cutting the concrete with a saw after concrete has set. Joints shall be approximately 1/8-inch wide and shall extend into the slab approximately one-fourth the slab thickness but not less than 1 inch.
 - 1. **Joint Strips:** Strips shall be of the required dimensions and as long as practicable. After the first floating, the concrete shall be grooved with a tool at the joint locations. The strips shall be inserted in the groove and depressed until the top edge of the vertical surface is flush with the surface of the slab. The slab shall be floated and finished as specified. Working of the concrete adjacent to the joint shall be the minimum necessary to fill voids and consolidate the concrete. Where indicated, the top portion of the strip shall be sawed out after the curing period to form a recess for sealer. The removable section of PVC strips shall be discarded and the insert left in place. Means shall be provided to insure true alignment of the strips is maintained during insertion.

2. **Sawed Joints:** Joint sawing shall be early enough to prevent uncontrolled cracking in the slab, but late enough that this can be accomplished without appreciable spalling. Concrete-sawing machines shall be adequate in number and power, and with sufficient replacement blades to complete the sawing at the required rate. Joints shall be cut to true alignment and shall be cut in sequence of concrete placement. Sludge and cutting debris shall be removed.
- B. **Expansion Joints:** Premolded expansion joint filler shall be used in expansion and isolation joints in slabs around columns and between slabs on grade and vertical surfaces where indicated. The filler shall extend the full slab depth, unless otherwise indicated. The edges of the joint shall be neatly finished with an edging tool of 1/8-inch radius, except where a resilient floor surface will be applied. Where the joint is to receive a sealant, the filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed-and-oiled wood strip temporarily secured to the top thereof to form a recess 3/4-inch deep to be filled with sealant. The wood strip shall be removed after the concrete has set. In lieu of the wood strip a removable expansion filler cap designed and fabricated for this purpose may be used.
- C. **Joint Sealant:** Sawed contraction joints and expansion joints in slabs shall be filled with joint sealant, unless otherwise shown. Types and locations of sealants shall be as indicated. Joint surfaces shall be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Joint sealant shall be applied as recommended by the manufacturer of the sealant. Joints sealed with field molded sealant shall be completely filled with sealant.

3.2. WATERSTOPS

- A. Waterstops shall be of the type indicated and shall be installed at the locations shown to form a continuous watertight diaphragm.
- B. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced.
- C. Splices shall be made in conformance with the recommendations of the waterstop manufacturer. Continuity of cross sectional features shall be maintained across the splice. Splices showing evidence of separation after bending shall be remade.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
1. Foundations and footings.
 2. Slabs-on-grade.
 3. Sludge/water container structures.
 4. Elevated slabs on vaults.
 5. Equipment pads and bases.
- C. Coordination: Unless other satisfactory agreements are specifically entered into by contractors concerned, all miscellaneous iron and steel, sleeves, anchors, etc., required by work of other contractors, will be furnished and installed by such other contractors with the cooperation of this contractor.

1.3 SUBMITTALS

- A. General: Submit according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and others if requested by the Engineer.
- C. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
1. Computer generated electronic structural construction document files (ACAD R14) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said files shall be as defined in the CRSI "Code of Standard Practice" Sections 4.19 and 6.4.1.
 2. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.

- D. Laboratory test reports for concrete mix design with the following data:
1. Method used to determine the proposed mix design (per ACI 301, Section 4).
 2. Gradation and quantity of fine and coarse aggregates.
 3. Proportions of all ingredients including all admixtures added either at the time of batching or at the job site.
 4. Water/cement ratio and water/cementitious ratio.
 5. Slump – ASTM C143.
 6. Certification and test results of the total water soluble chloride ion content of the design mix – FHWA RD-77 or AASHTO T 260-84.
 7. Air content of freshly mixed concrete by the pressure method, ASTM C231, or the volumetric method, ASTM C173.
 8. Unit weight of concrete – ASTM C138.
 9. Strength at 7 and 28 days – ASTM C39. Document strength on basis of previous field experience or trial mixtures, per ACI 301 Section 4. Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard calculation, and *determination of required average compressive strength*.
 10. Complete and include Structural Engineer's standard mix design submittal form for each mix. A blank copy is included at the end of this section.
- E. Laboratory test reports for concrete materials or material certificates in lieu of material laboratory test reports. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- F. Drawings showing proposed construction and/or contraction joint locations.
- G. Minutes of preinstallation conference.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified. Each contractor having reference to ACI Documents shall maintain copies of same on project site.

AMERICAN CONCRETE INSTITUTE

1. ACI 117-90 – Tolerance for Concrete Construction and Material.
2. ACI 211.1-91 – Selecting Proportions Normal, Heavyweight and Mass.
3. ACI 301.1-96 – Specification for Structural Concrete for Buildings.
4. ACI 302.1R-96 – Guide for Concrete Floor and Slab Construction.
5. ACI 304.2R-95 – Placing Concrete by Pumping Methods.
6. ACI 305R-91 – Hot Weather Concreting.
7. ACI 306R-88 – Cold Weather Concreting.
8. ACI 308-92 – Standard Practice for Curing Concrete.
9. ACI 209R-87 – Guide for Consolidation of Concrete.
10. ACI 311 – Recommended Practice for Concrete Inspection.
11. ACI 315-92 – Details and Detailing of Concrete Reinforcement.
12. ACI 318-95 – Building Code Requirements for Reinforced Concrete and Commentary.
13. ACI 347R-94 – Guide to Formwork for Concrete.

AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

1. ASTM A82 – Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A185 – Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A615 – Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ASTM C31 – Practice for Making and Curing Concrete Test Specimens in the Field.
5. ASTM C33 – Specification for Concrete Aggregates.
6. ASTM C39 – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
7. ASTM C94 – Specification for Ready-Mixed Concrete.
8. ASTM C143 – Test Method for Slump of Hydraulic Cement Concrete.
9. ASTM C150 – Specification for Portland Cement.
10. ASTM C171 – Specification for Sheet Materials for Curing Concrete.
11. ASTM C172 – Practice for Sampling Freshly Mixed Concrete.
12. ASTM C231 – Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
13. ASTM C260 – Specification for Air-Entraining Admixtures for Concrete.
14. ASTM C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
15. ASTM C494 – Specification for Chemical Admixtures for Concrete.
16. ASTM C618 – Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
17. ASTM C881 – Specification for Epoxy Resin Base Bonding Systems for Concrete.
18. ASTM E-329 – *Inspecting and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.*

CONCRETE REINFORCING STEEL INSTITUTE (CRSI):

1. CRSI – Manual of Standard Practice.
 2. CRSI 63 – Recommended Practice for Placing Reinforcing Bars.
 3. CRSI 65 – Recommended Practice for Placing Bar Nomenclature.
- B. Qualifications of Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper execution of the work required by this Division.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section “Project Meetings” and the following:
1. At least 35 days prior to start of the concrete construction schedule, the contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction.
 2. The contractor shall require responsible representatives of every party who are concerned with the concrete work to attend the conference, including but not limited to, the following:
 - a. Contractor’s superintendent – Laboratory responsible for the concrete design mix – Laboratory responsible for field quality control – Concrete subcontractor – Ready-mix concrete producer – Admixture manufacturer(s) – Concrete pumping contractor.

3. The Architect and the Owner's Representative may be present at the conference. The Contractor/Construction Manager shall notify the Architect at least five days prior to the scheduled date of the conference.
4. Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Owner's representative – Resident engineer – Consultant engineer.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum volatile organic compounds (VOCs), not to exceed those allowable by jurisdictional regulations, that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1 ½ inches to the plane of the exposed concrete surface.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric in flat sheets.
- C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I. High early strength (when specified), ASTM C150, Type III.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Type C or F, except maximum loss on ignition: 3%.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling or surface discoloration due to oxidation.
- D. Water: Potable.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Air-Mix or Perma-Air, Euclid Chemical Co.
 - b. Darex AEA or Daravair, W.R. Grace & Co.
 - c. MB-VR or Micro-Air, Master Builders, Inc.
 - d. Sealtight AEA, W.R. Meadows, Inc.
 - e. Sika AER, Sika Corp.
 - f. Catexol A.E. 260, Axim Concrete Technologies.
 - g. RSA-10 or RAE-260, RussTech Admixtures, Inc.
 - h. Or approved equal
- F. Water-Reducing Admixture: ASTM C 494, Type A.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Chemtard, ChemMasters Corp.
 - b. Eucon WR-75, Euclid Chemical Co.
 - c. WRDA, W.R. Grace & Co.
 - d. Pozzoloth Normal or Polyheed, Master Builders, Inc.
 - e. Metco W.R., Metalcrete Industries.
 - f. Plastocrete 161, Sika Corp.
 - g. Catexol 1000N, Axim Concrete Technologies
 - h. LC-400P, LC-500, or FINISHEASE NC, RussTech Admixtures, Inc.
 - i. Or approved equal
- G. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Super P, Anti-Hydro Co., Inc.
 - b. Eucon 37, Euclid Chemical Co.
 - c. WRDA 19 or Daracem, W.R. Grace & Co.
 - d. Rheobuild or Polyheed, Master Builders, Inc.

- e. Superslump, Metalcrete Industries.
- f. Sikament 300, Sika Corp.
- g. Catexol 1000SP-MN, Axim Concrete Technologies.
- h. SUPERFLO 2000RM, RussTech Admixtures, Inc.
- i. Or approved equal.

H. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Q-Set, Conspec Marketing & Manufacturing Co.
 - b. Accelguard 80, Euclid Chemical Co.
 - c. Daraset, W.R. Grace & Co.
 - d. Pozzutec 20, Master Builders, Inc.
 - e. Accel-Set, Metalcrete Industries.
 - f. LCNC-166, RussTech Admixtures, Inc.
 - g. Or approved equal

I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Eucon Retarder 75, Euclid Chemical Co.
 - b. Daratard-17, W.R. Grace & Co.
 - c. Pozzolith R, Master Builders, Inc.
 - d. Plastiment, Sika Corporation.
 - e. Catexol 1000R, Axim Concrete Technologies.
 - f. LC-400R or LC-500, RussTech Admixtures, Inc.
 - g. Or approved equal

J. Prohibited Admixture: Calcium chloride thiocyanates or admixture containing more than 0.05 percent chloride ions.

2.4 RELATED MATERIALS

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Headed Steel Studs: ASTM A 108, Grade 1015 through 1020, cold finished carbon steel, AWS D1.1, Type B. Dimensions shall comply with AISC specifications.
- C. Joint sealant: Elastomeric, low-modulus, nonacid-curing silicone sealant. Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, etc.; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- D. Premolded Interior Joint Filler: Non-asphaltic, wood, or vegetable fiber.

- E. Premolded Exterior Joint Filler: Asphalt impregnated or non-asphaltic mineral or vegetable fiber.
- F. Expansion Joint Filler: Open celled, vulcanized elastomeric, polyvinyl chloride seal strip.
- G. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:
 - 1. Polyethylene sheet not less than 10 mils thick conforming to ASTM E 1745 Class C.
- H. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- I. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- J. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
 - 1. Provide material that has a maximum volatile organic compound (VOC) rating not to exceed those allowable by jurisdictional regulations.
 - 2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Highseal, Conspec Marketing and Mfg. Co.
 - b. Sealco-VOC, Cormix Construction Chemicals.
 - c. Safe Cure and Seal, Dayton Superior Corp.
 - d. Aqua-Cure, Euclid Chemical Co.
 - e. Dress & Seal WB, L&M Construction Chemicals, Inc.
 - f. Masterkure 100W, Master Builders, Inc.
 - g. Vocomp-20, W.R. Meadows, Inc.
 - h. Metcure, Metalcrete Industries.
 - i. Stontop CS1, Stonhard, Inc.
 - j. Or approved equal
- K. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Aquafilm, Conspec Marketing and Mfg. Co.
 - b. Eucobar, Euclid Chemical Co.
 - c. E-Con, L&M Construction Chemicals, Inc.
 - d. Confilm, Master Builders, Inc.
 - e. Waterhold, Metalcrete Industries.
 - f. EVRT, RussTech Admixtures Inc.
 - g. Or approved equal.

L. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. Polyvinyl Acetate (Interior Only):

- 1) Superior Concrete Bonder, Dayton Superior Corp.
- 2) Euco Weld, Euclid Chemical Co.
- 3) Weld-Crete, Larsen Products Corp.
- 4) Everweld, L&M Construction Chemicals, Inc.
- 5) Herculox, Metalcrete Industries.
- 6) Ready Bond, Symons Corp.
- 7) Or approved equal

b. Acrylic or Styrene Butadiene:

- 1) Acrylic Bondcrete, The Burke Co.
- 2) Strongbond, Conspec Marketing and Mfg. Co.
- 3) Day-Chem Ad Bond, Dayton Superior Corp.
- 4) SBR Latex, Euclid Chemical Co.
- 5) Daraweld C, W.R. Grace & Co.
- 6) Hornweld, A.C. Horn, Inc.
- 7) Everbond, L&M Construction Chemicals, Inc.
- 8) Acryl-Set, Master Builders, Inc.
- 9) Intralok, W.R. Meadows, Inc.
- 10) Acrylpave, Metalcrete Industries.
- 11) Sonocrete, Sonneborn-Chemrex.
- 12) Stonlock LB2, Stonhard, Inc.
- 13) Strong Bond, Symons Corp.
- 14) Or approved equal

M. Injection Adhesive System (For Reinforcing Dowels): two-component material consisting of acrylic resin, hardener, cement and water, suitable for use on dry or damp surfaces.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. HIT HY150, Hilti.
- b. Acrylic-Tie, Simpson StrongTie.
- c. Acrylic-7, Red Head.
- d. Or approved equal

N. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, of consistency suitable for application, and a 30-minute working time.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. NS Grout, The Euclid Company.
 - b. Five Star Grout, U.S. Grout Corp.
 - c. Masterflow 713, Master Builders.
 - d. Sikagrout 212, SIKA.
 - e. Or approved equal
- O. Nonmetallic, Shrinkage-Resistant Grout for Channel Bottom Chamfers: Nonmetallic, noncorrosive, nonstaining polymer-modified, portland cement mortar. Mortar may be extended with 3/8" coarse aggregate as recommended by manufacturer.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. SikaTop 122 Plus, Sika Corporation.
 - b. Emaco R300 CI, Master Builders.
 - c. Or approved equal
- P. Penetrating Concrete Sealer: The sealer shall be a siloxane based compound which has a 92% chloride ion screen and a repellency factor of 92% when tested in accordance with NCHRP #244, Test Method. In addition, the sealer-treated concrete must exhibit no scaling when exposed to 125 cycles of freezing and thawing. The system shall conform to ASTM C957-81. The tests must be made by an independent testing laboratory.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Environseal, Hydrozo Company.
 - b. Euco-Guard, Euclid Chemical Co.
 - c. Or approved equal

2.5 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs. Trial batch and field experience tests shall have been performed within 12 months of submittal date. Use mix design submittal form included at the end of this section.
1. Do not use the same testing agency for field quality control testing.
 2. Limit use of fly ash to not exceed 25 percent of cement content by weight.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect. The approved mix designs shall be used throughout this project unless changes are approved by the Architect/Engineer prior to use.

- C. The specified compressive strengths (f'_c) of the concrete for each portion of the Structure and minimum cement content shall be as follows:

CLASS	WHERE USED	REQUIRED 28-DAY STRENGTH	MINIMUM CEMENT CONTENT-POUNDS PER CUBIC YARD
I	Building Wall Footings	3,000 psi	470
II	Interior Slabs on Grade	4,000 psi	550
III	Water and Sludge Containment Structures slab on grade, walls, elevated slabs, etc.	4,000 psi (max.w/c=0.45)	564
IV	Grout Topping Slabs	3,000 psi	470

With an approved water-reducing agent, minimum cement content may be reduced by 47 pounds of cement per cubic yard.

- D. **Water/Cement Ratio:** All concrete subjected to deicers and/or required to be watertight shall have a maximum water/cement ratio of 0.45.
- E. **Slump Limits:** Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps and sloping surfaces: Not more than 3 inches.
 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
 3. Concrete containing mid-range or high-range water-reducing admixture: Not more than 8 inches after adding admixture to 2-to-3-inch slump concrete.
 4. Other concrete: Not more than 4 inches.
- F. **Adjustment to Concrete Mixes:** Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability and in all pumped concrete, and in all concrete for water and sludge containment structures.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use air-entraining admixture in exterior exposed concrete and concrete for water and sludge containment structures unless otherwise indicated. Add air-entraining admixture at

manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1 ½ percent within the following limits:

1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 5.5 percent for 1 ½-inch maximum aggregate.
 - b. 6.0 percent for 1-inch maximum aggregate.
 - c. 6.0 percent for ¾-inch maximum aggregate.
 - d. 7.0 percent for ½-inch maximum aggregate.
 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
- D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the *installation of joint materials, vapor retarder/barrier, and other related materials* with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
1. Provide Class A tolerances for concrete surfaces exposed to view.
 2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain *required finishes*. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. *Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.*
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.
- G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER INSTALLATION

- A. Install vapor barrier below slab on grade of offices, lavatory, and laboratory of Control Building.
- B. Place vapor barrier sheeting in position with longest dimension parallel with direction of pour. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.
- C. Install vapor retarder over 4" of compacted crushed stone.

3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Deliver reinforcement to job site bundled, tagged and marked. Use waterproof tags indicating bar size, length, and mark corresponding to placing drawings.

- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect. Lifting welded wire fabric into position during concrete placement is not permitted.
- E. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- F. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire.
- G. Welding of reinforcing bars will not be permitted without approval of the Architect/Engineer.
- H. When permitted, field bend bars cold, except during cold weather when moderate heating is necessary to avoid brittle failures.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1 ½ inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations as indicated.
 1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."
 2. Hold top of premolded filler material down ½" from top of slab.
 3. At locations where drawings do not specifically call for premolded filler, provide bond breaker between slab and vertical surface. The vapor retarder may be turned up and used for this purpose.

- G. **Contraction (Control) Joints in Slabs-on-Grade:** Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
1. Contraction joints may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 2. Soft cut method may be used immediately after final finishing.
 3. Provide joints in pattern and spacing shown on the structural drawings. Clean joint and with specified elastomeric sealant per manufacturer's recommendations.
 4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS

- A. **General:** Set and build into formwork anchorage devices, anchor bolts, and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Aluminum conduit shall not be installed in concrete. Aluminum guardrail, plates, etc. shall have a dielectric separator between aluminum and concrete.
- C. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

3.7 PREPARING FORM SURFACES

- A. **General:** Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.
 2. Do not spray reinforcing with form oil.

3.8 CONCRETE PLACEMENT

- A. **Inspection:** Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. **General:** Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified. Concrete delivery tickets shall show:
1. Batch number.
 2. Mix by number with cement content in pounds and maximum size aggregate.
 3. Admixtures.
 4. Air content.

5. Slump.
 6. Time dispatched and discharged.
 7. Date.
 8. Contractor.
 9. Ready Mix Supplier.
 10. Project Name and Address.
 11. Volume of Concrete.
- C. If any water is added to the mix on the job, it must be approved by the Architect's representative and delivery ticket noted with the amount of water and signed by the Architect's representative. The maximum water/cement ratio of an approved mix design may not be exceeded.
1. When the ambient air temperature is between 80 and 90 degrees Fahrenheit, one (1) gallon of water per cubic yard of concrete may be added at the job site to compensate for water evaporation during transit.
 2. When the ambient air temperature exceeds 90 degrees Fahrenheit, two (2) gallons of water per cubic yard of concrete may be added at the job site to compensate for water evaporation during transit.
- D. Discharge concrete within 1 ½ hours after water has been added to the cement, unless a longer time has been authorized by the Architect/Engineer. During hot weather or other conditions contributing to a quick stiffening of the concrete, the Architect/Engineer may require discharge in less than 1 ½ hours.
- E. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Do not subject concrete to any procedure that will cause segregation. Deposit concrete as near as possible to the final position to avoid segregation.
1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 3. Maintain reinforcing in proper position on chairs during concrete placement.
- H. Cold-Weather Placement: When air temperature is expected to fall below 40 degrees Fahrenheit (4 deg C) within the first 72 hours after concrete placement, comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When mean daily air temperature is expected to fall below 40 deg F (4 deg C) for more than three successive days after concrete placement, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature at point of placement as follows:
 - a. Not less than 55 deg F (13 deg C) or more than 75 deg F (24 deg C) for concrete sections less than 12 inches in the least dimension (width or thickness).
 - b. Not less than 50 deg F (10 deg C) or more than 70 deg F (21 deg C) for concrete sections 12 inches or greater in the least dimension (width or thickness).
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- I. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.
- J. Pumping Concrete: Grout used to prime a pump shall not be placed in the forms of any concrete exposed to view in the final structure.

3.9 FINISHING FORMED SURFACES

- A. **Rough-Formed Finish:** Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding $\frac{1}{4}$ inch in height rubbed down or chipped off.
- B. **Smooth-Formed Finish / Grout-Cleaned Finish:** Provide a smooth-formed / grout-cleaned finish on formed concrete surfaces exposed to view.
1. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
 2. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 3. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- C. **Smooth-Formed Finish:** Provide a smooth-formed finish on formed concrete surfaces to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- 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.

3.10 MONOLITHIC SLAB FINISHES

- A. **Float Finish:** Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to

drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

- B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
 - 1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
- C. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment. Use the specified non-shrink, non-metallic grout.

3.12 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Curing procedures shall conform with ACI 308 Standard Practice For Curing Concrete.
- C. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.

- D. Curing Methods: Cure concrete by curing compound or by moisture curing as specified.
- E. Provide curing compound on interior slabs, exterior slabs that will not be exposed to de-icing salts, walks, and curbs as follows:
1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- F. Provide moisture curing on interior and exterior slab surfaces exposed to deicing salts and on slabs where the finish flooring is not compatible with curing compounds for 7 days by one of the following methods:
1. Keep concrete surface continuously wet by soaking with water.
 2. Keep concrete surface continuously wet with water-saturated absorptive cover.
 3. Keep concrete surface continuously wet by water-fog spray.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including walls, columns, sides and underside of beams, supported slabs, and other similar surfaces, by moisture curing with forms in place for 7 days or until forms are removed. If forms are removed within the first 7 days, continue moisture curing without forms for the balance of the 7 day curing period.
1. For vertical surfaces, after the concrete has hardened and while the forms are still in place, the form ties shall be loosened and water shall be applied to run down the inside of the form to keep the concrete wet.
 2. After formwork has been removed from vertical surfaces, keep surface continuously wet by water spray or water-saturated absorptive cover.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including the top of exposed walls, beams, etc. by moisture curing for 7 days by one of the following methods:
1. Keep concrete surface continuously wet by soaking with water.
 2. Keep concrete surface continuously wet with water-saturated absorptive cover.
 3. Keep concrete surface continuously wet by water-fog spray.
- I. Cold Weather Concreting ("Cold Weather Concreting", ACI Report 306).
1. All freshly placed concrete shall be kept from freezing for the following periods:
 - a. 3 days for all concrete with an air entraining admixture.
 - b. 4 days for all concrete without an air entraining admixture.
 2. A cumulative curing time of seven days at a minimum surface temperature of 50 degrees F (10 degrees C) shall be provided or until concrete has attained 75% of its design strength. This shall be followed by cooling of concrete in a gradual transition to surrounding conditions. The temperature drop during this period shall not be at a

- rate exceeding 2 degrees F per hour until the outside or surrounding temperature is reached.
3. When concrete is placed under conditions of cold weather concreting (defined as a period when the mean daily temperature drops below 40 degrees F for more than three successive days), take additional precautions as specified in "Cold Weather Concreting" by the American Concrete Institute (ACI Report 306) when placing, curing, monitoring and protecting the fresh concrete.
- J. Hot Weather Concreting ("Hot Weather Concreting" by the American Concrete Institute Committee 305).
1. When concrete is placed under conditions of hot weather concreting, provide extra protection of the concrete against excessive placement temperatures and excessive drying throughout the placing and curing operations. Hot weather is defined as air temperature which exceeds 80 degrees F or any combination of high temperature, low humidity and/or high wind velocity which causes a rate of evaporation in excess of 0.2 pounds per square foot per hour as determined by Figure 2.1.5 of ACI Report 305. Hot weather curing is required if these conditions occur within a 24 hour period after completion of concrete placement.
 2. Forms, reinforcing and the air shall be cooled by water fog spraying immediately before placing concrete. The placement temperature of the concrete shall be 75 degrees to 80 degrees F.
 3. Immediately following screeding, protect concrete by applying the specified evaporation retarder in accordance with the recommendations of the manufacturer.

3.13 PENETRATING CONCRETE SEALER

- A. Apply penetrating concrete sealer to all interior concrete floor surfaces exposed to view in the finished structure.
- B. Coverage rate shall be 125 square feet per gallon or greater.
- C. Follow manufacturer's recommended installation instructions.

3.14 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.16 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2 ½ parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over ¼ inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.

3.17 QUALITY CONTROL

- A. General: The General Contractor shall employ a testing agency which meets the requirements of ASTM E329 to perform tests and to submit test reports. The agency will monitor concrete quality by means of site and laboratory tests. They will be authorized to reject plastic concrete not conforming to specifications. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
1. See Section 01412 – Structural Inspections for testing and inspection to be performed.
 2. Test results will be reported in writing to the Architect, Engineer, ready-mix producer and General Contractor within 24 hours after tests.
 3. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect.

END OF SECTION

SECTION 05540

CASTINGS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, and equipment required to install castings as shown on the Drawings and specified herein. Included in this section are manhole covers, steps, and valve boxes.

1.2 RELATED WORK

- A. Section 03300 - Concrete.

1.3 SUBMITTALS

- A. The Contractor shall submit to the Engineer, in accordance with Division 1, Section 01300, copies of construction details of castings proposed for use. The Engineer shall review the submittals, making notations if necessary, and distribute to the Contractor and the Resident Project Representative.

PART 2 - MATERIALS

2.1 GENERAL

- A. All casting shall be gray iron, conforming to the requirements of the ASTM Standards, Designation A 48-76, Class 30 for manhole castings, and Class 20 for valve boxes.

2.2 VALVE BOXES

- A. Slide Type for Iron Body Valves
 - 1. Valve boxes shall be provided for each buried valve. They shall be cast iron, of heavy pattern slide adjustable type without screw and provided with cast iron cover of sufficient length to allow for 30 inches of cover over the top of the pipe. The upper section of each box shall have a bottom flange of sufficient bearing area to prevent settling. The bottom of the lower section shall enclose the stuffing box and operating nut of the valve. Boxes shall have barrels of not less than 5 inch in diameter and be of length

adapted to pipe cover. Boxes shall be slide type adjustable, without screw, with a lap of at least 6 inch when in the most extended position. The covers shall be circular with a corrugated surface and have pick holes in the periphery and be marked "Water", "Gas", "Sewer", or "Air" according to use. Covers shall also have the word "OPEN" and an arrow indicating the direction of opening cast into covers in raised letters. Provide valve stem extensions for all buried valves.

2.3 MISCELLANEOUS SLAB CASTINGS

A. Floor Boxes

1. Floor boxes for openings through slabs for key operation of valve nuts shall be at least 5-1/4 inch diameter and 6 inches deep with circular caps having a corrugated surface. The setting shall be flush with the top surface. Furnish M & H Style 1106, or equal.

2.4 BOX COVERS

- ### A. Meter box covers shall be two piece cast iron with a minimum 11 inch circular opening and a base sized to fit an 18 inch inside diameter box. Furnish Ford Meter Box Company No. C32 for non-traffic areas and No. C32H for traffic areas, or equal.

PART 3 - EXECUTION

- 3.1 The insulation of castings is generally covered under specifications for pipe work and manholes. Castings shall be leveled, plumbed and secured before pouring concrete or attaching to masonry with solid, watertight, cement mortar joints.

END OF SECTION

SECTION 09901

SURFACE PREPARATION & COATING NEW STEEL WATER STORAGE TANK

1. SCOPE OF WORK:

- A. The intent of these specifications is to solicit bidding on **welded steel tanks and/or glass lined bolted steel tanks** as manufactured by A.O. Smith Harvestore Products, Inc. of De Kalb, IL., or engineer approved equal.

The drawings and specifications are set up to allow as much latitude as possible to BIDDERS. Contractor shall designate the tanks (type) to be furnished on the Bid Forms.

All portions of specifications and drawings NOT specific to welded or glass lined tanks shall apply to bolted tanks and as well as AWWA specifications for epoxy coated bolted tanks. **Obviously if welded steel tanks are not selected then these coating specifications do not apply.**

- B. The Contractor shall furnish all labor, material and equipment of any kind required to perform painting on the project as hereinafter set forth. The Contractor shall provide materials and labor to produce a first class job. Painting shall be performed at such times and in such places as the Contractor and Engineer may agree upon in order that dust-free and neat work be obtained. All painting shall be done in strict accordance with the recommendations of the manufacturer and shall be performed in a manner satisfactory to the Engineer.

2. APPLICABLE PUBLICATIONS:

The publications listed below form a part of this specification to the extent referenced. The publications referred to in text by the basic designation only.

2.1 American Water Works Association, Inc. (AWWA) Standards:

D100-Latest Revision	Welded Steel Tanks For Water Storage
D102-Latest Revision	Painting Steel Water Storage Tanks

2.2 Steel Structures Painting Council (SSPC) Specifications:

SSPC-SP 1	Solvent Cleaning
SSPC-SP 10	Near White Blast Cleaning

3. MATERIALS:

- 3.1 Quality of Coatings: The paints and paint products of the **Induron Protective Coatings, Birmingham, Alabama**, mentioned in the following specifications are set up as standards of quality. Coatings manufacturer shall have a local technical representative who is familiar with elevated water tank surface preparation and coating system design and is familiar with climbing elevated water tanks. **Coating system representative shall be a NACE Level 3 Certified Coating Inspector and shall have all OSHA approved climbing equipment for accessing the tank as required.** The usual "or equal" clause shall apply. No request for substitution will be considered which decreases the film thickness and/or the number of coats to be applied, or which offers a change from the generic type of coating specified. Request for substitution shall contain the following:

- A. FULL NAME OF EACH PRODUCT

- B. DESCRIPTIVE LITERATURE
- C. DIRECTIONS FOR USE
- D. GENERIC TYPE
- E. NON VOLATILE CONTENT BY VOLUME
- F. PERFORMANCE CRITERIA AS LISTED IN SECTION 11 OF THESE SPECIFICATIONS.

Bidders desiring to use paints other than those specified shall submit their proposal based on the specified materials, together with the information noted above, and indicate the sum which will be added to or deducted from the base bid, should the alternate materials be acceptable. In no case will the request be considered unless received, in writing, ten days prior to the bid opening date.

- 3.2 Certifications: Protective coatings for interior wet application shall be listed by NSF International as approved for potable water contact in accordance with ANSI/NSF Std. 61, Section 5 Protective (Barrier) Materials.

- 3.3 Shipping, Storage and Handling:

All paints shall be properly prepared by the manufacturer and delivered to the site for field painting in the original unbroken containers with manufacturer's label plainly printed thereon. Type of material to be applied at each location shall be submitted to the Engineer with the manufacturer's written recommendation of the type paint for each item to be painted.

All coatings shall be stored in an enclosed structure to protect them from weather and excessive heat or cold. Flammable coatings must be stored to conform to City, County, State and Federal safety codes for flammable coatings or paint materials. At all times coatings shall be protected from freezing.

3.4 SUBMITTALS

- A. Submittals shall be as specified in Section of 01300 of these specifications.
- B. Submit the following:
 1. Coating manufacturer's certificate for each coating proposed for use attesting that the coatings meet the specifications in this Section and are proper for the proposed application;
 2. Coating manufacturer's specifications and data sheets and application instructions for each coating proposed for use on the interior and exterior of the tank including the coating for the logo;
 3. Color chart for Engineer's/ Owner's selection of colors
 4. Certificate of compliance to each product performance requirement.

4. APPLICATION:

4.1 General:

No paint shall be applied when the air or surface temperature, as measured in the shade, is below that which is recommended by the manufacturer. Paint shall not be applied to wet or damp surfaces, and shall not be applied in rain, snow, fog, mist, or when the surface temperature will be less than 5 F above the dew point. No paint shall be applied when it is expected that the surface temperature will drop below the manufacturer's recommendation within 2 - 4 hours after the application of the paint. Dew or moisture condensation should be anticipated, and if such conditions are prevalent, painting shall be delayed until it is certain that the surfaces are dry. In addition, the days painting shall be completed well in advance of the probable time of day when moisture condensation will occur in order to permit the film the required drying time as specified

by the manufacturer prior to the formation of moisture. Care must be exercised that the coatings are applied in the film thickness range recommended by the manufacturer and that adequate drying time is permitted between coats to assure proper release of solvents.

4.2 Workmanship:

Workmanship shall be of first class quality. Finish painting shall show no drips, runs, sags, holidays, or other defects. The finish coat shall be free from noticeable laps or brush marks. Paint during application shall be continuously stirred. Paint shall be thoroughly worked into all joints, corners, and well brushed out over all surfaces. Should any coat or paint be judged unsatisfactory, the Contractor shall remove the coat(s) as necessary and repaint at no additional cost to the Owner.

4.3 Existing Utilities, Structures and Properties:

It shall be the responsibility of the contractor to locate and avoid damage or overspray or fugitive dust encroachment to any and all existing water, gas, sewer, electric, telephone, and other utilities, structures, property or appurtenances. The Contractor shall repair or pay for all damages caused by his operations or his personnel to existing utilities, structures, appurtenances, or properties, either below ground or above ground and shall settle in full all damage suites which may arise as a result of his operations.

4.4 Ventilation:

It is essential that the solvent vapors released during and after application of coatings be removed from the tank. During coating application the capacity of ventilating fans shall be at least 300 cfm per gallon of coating applied per hour. Continuous forced ventilation at a rate of at least one complete air change per 4 hours shall be provided for at least 7 days after coating application is completed. Air shall be exhausted from the lowest portions of the tank with the top openings kept open and clear. A minimum of seven days following application of the final coat on the interior shall be allowed before the tank is sterilized or filled with water.

5. TESTING EQUIPMENT & PROCEDURES:

5.1 General:

The Contractor shall have on the project site the following testing equipment. Equipment shall be in calibration and proper working order. Equipment shall be used in accordance with the manufacturers' instructions or as directed by the Engineer. The Engineer shall be notified of time of testing so that he might be present to witness testing. The Contractor shall keep a daily log of environmental conditions, work schedule, and any other pertinent information. The log shall be turned over to the Owner at the end of the project to be included in the permanent record.

- A. Sling Psychrometer: Relative humidity and dew point readings shall be taken at intervals throughout the days work. Readings shall be taken at the start of the mornings work, mid day and afternoon. Should environmental conditions change, additional reading shall be taken to assure that coatings are being applied under the conditions as outlined by the coatings manufacturer.
- B. Surface Temperature Thermometer: Surface temperatures shall be taken in areas where work is being performed. Surface temperature shall be that as specified by the coatings manufacturer.
- C. Replica Tape & Micrometer: Testex X-Course Replica Tape shall be employed to determine the surface profile of blasted surfaces. Surface profile shall be as specified.
- D. Dry Film Thickness Measurements: Dry film thickness reading shall be taken with a properly calibrated (per the manufacturer's instructions) Type 1 (magnetic) or Type 2 (electromagnetic) instrument. Dry film thickness reading will be taken and recorded in the in a frequency and manner as dictated by the Engineer.

- E. Holiday Detection: After completion of the interior coating system, interior surfaces shall be holiday detected in accordance with ASTM G 62 low voltage holiday detection. Holiday detector shall be a Tinker & Rasor Model M-1 or equal. Areas found to have holidays shall be marked and repaired in accordance with the paint manufacturer's instructions. The Engineer shall be notified of time of testing so that he might be present to witness testing. The Contractor shall provide ladders, rigging, etc. as necessary to allow the Engineer to spot check paint thickness of each coat.

6. CLEANING AND PAINTING:

- 6.1 Shop Surface Preparation: Prior to surface preparation, all surfaces shall be cleaned of all oil and grease in accordance with SSPC-SP 1 Solvent Cleaning. All interior and exterior surfaces shall be sand blasted to remove all dust, rust and scale, as well as all other foreign matter and shall result in a surface preparation equal to that of SSPC-SP 10 Near White Blast Cleaned Surface. Surface profile shall be 1.5 - 2.5 mils.
- 6.2 Following surface preparation, all interior and exterior surfaces shall receive one coat of primer as hereinafter specified. The primer shall be applied in accordance with the recommendations of the manufacturer and not more than eight hours after surface preparation.
- A. Interior Primer: All interior surfaces shall receive one full coat of Induron PE-54 Epoxy applied at a rate to achieve 3.0 - 5.0 dry mils. **Color: Tan.**
- B. Exterior Primer: All exterior surfaces shall receive one full coat of Induron Indurazinc MC67 applied at a rate to achieve 2.5-3.5 mils. **Color: Greenish Gray.**
- 6.3 Field Cleaning: After erection and prior to painting, all interior and exterior surfaces shall be cleaned of all grease, oil, dirt, dust, rust, weld flux and spatter, and all other foreign matter or contaminants. All field welded edges and joints, as well as all abraded areas, shall be Near White Blasted in accordance with SSPC-SP 10 on the interior and SSPC-SP 6 on the exterior
- 6.4 Field Painting: After the tank is completely erected, any abraded spots and all field-welded areas shall be cleaned as specified in the paragraph above. Field application of the coatings to a field sandblasted area shall be done the same day that the cleaning operation is carried out. Surfaces not coated the same day as surface preparation operations shall be re-blasted prior to application of the prime coat. All field-sandblasted areas shall be primed and the entire interior and exterior of the tank shall be finish painted as hereinafter specified.
- A. INTERIOR:
1. Spot Prime: After spot blasting, all surfaces cleaned to bare metal shall receive one full coat of Induron PE-54 Epoxy Primer applied at a rate to achieve 3.0 - 5.0 dry mils. **Color: Tan.**
 2. Seam Treatment/Stripe Coat: Following spot prime coat, all weld seams, ladders, sharp edges, and any other difficult to coat areas shall receive one additional coat of Induron PE-54 Epoxy Finish applied, by brush, at a rate to achieve 2.0 - 4.0 dry mils. **Color: White.**
 3. Intermediate: After proper cure of the Prime coat, all interior surfaces shall receive one full coat of Induron PE-54 Epoxy applied at a rate to achieve 3.0 - 5.0 dry mils. **Color: Gray.**
 4. Finish: After installation of the intermediate coat, all surfaces shall receive one full finish coat of Induron PE-54 Epoxy applied at a rate to achieve 3.0 - 5.0 dry mils. **Color: White.**
 5. THE INTERIOR COATING SYSTEMS SHALL HAVE A TOTAL DRY FILM THICKNESS OF NOT LESS THAN 12.0 DRY MILS OR GREATER THAN 15.0 MILS.

B. EXTERIOR:

1. **Spot Prime:** All exterior surfaces that have been spot blast cleaned in accordance with the paragraph above shall receive one coat of Induron Indurazinc MC67 Primer applied at a rate to achieve 2.5-3.5 dry mils. Color: Greenish-Gray.
2. **Intermediate:** After the prime coat has been properly installed, all exterior surfaces shall receive one intermediate coat of Induron Armorguard Epoxy applied at a rate to achieve 2.5 – 4.0 dry mils. Color: Shall be noticeably different from the finish coat selected.
3. **Finish Coat:** Following the intermediate coat, all exterior surfaces shall receive one full finish coat of Induron Indurethane 5500PLUS (Aliphatic Acrylic Polyurethane) applied at a rate to achieve 2.0 – 3.0 dry mils. Color: As Selected.
4. **Lettering (if required):** Lettering and / or logos shall be located in accordance with the drawings and shall be applied using two coats of Induron Indurethane 5500-PLUS Polyurethane applied at a rate to achieve 2.0 – 2.5 dry mils per coat. Color: As Selected.

CITY OF TAYLORSVILLE

The Contractor shall submit to Engineer a scaled drawing of the tank with actual letter dimensions, spacing between letters and words, and the placement of said words. The direction the letters shall face will be determined by the Owner and Engineer at time of construction.

5. **THE EXTERIOR COATING SYSTEM SHALL HAVE A MINIMUM DRY FILM THICKNESS OF 7.0 DRY MILS.**
7. **DAMAGED COATINGS:**
 - 7.1 Damaged coatings, pinholes, and holidays shall have edges feathered and repaired in accordance with the recommendations of the manufacturer, as approved by the Engineer.
 - 7.2 All finish coats, including touch up and damage-repair coats shall be applied in a manner which will present a uniform texture and color-match appearance.
8. **UNSATISFACTORY APPLICATION:**
 - 8.1 If the item has an improper finish, color, or insufficient film thickness, the surface shall be cleaned and topcoated with the specified material to obtain the specified color and coverage. Specific surface preparation information to be secured from the coatings manufacturer and the Engineer.
 - 8.2 All visible areas of chipped, peeled, or abraded paint shall be hand or power-sanded, feathering the edges. The areas shall then be primed and finish coated in accordance with the specifications.
 - 8.3 Work shall be free of runs, bridges, shiners, laps, or other imperfections. Evidence of these conditions shall be cause for rejection.
 - 8.4 Any defects in the coating system shall be repaired by the Contractor per written recommendations of the coating manufacturer.
9. **CLEAN UP & DISINFECTION:**
 - 9.1 All cloths and waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site and/or destroyed in an approved and legal manner. Paint spots, oil, or stains upon adjacent surfaces and floors shall be completely removed, and the entire job left clean and acceptable to the Engineer.

Disinfection of Water Contact Surfaces and Filling of Water Storage Tanks:

Do not disinfect water contact surfaces or fill water storage tanks until application of coating systems is complete, coatings have fully cured, and field quality control inspection is complete.

Allow number of days in accordance with manufacturer's instructions and as directed by Engineer for full cure of coating systems on water contact surfaces before flushing, disinfecting, or filling with water.

Disinfection: AWWA C 652 Method 2 or 3.

The tank shall be filled by the Contractor to testing, disinfection and flushing at his cost as set out in special conditions – paragraph 44.

The tank shall be filled with clean water after disinfection and flushing is complete.

10. GUARANTEE AND ANNIVERSARY INSPECTION:

- 10.1 In accordance with AWWA D102-97, Section 5.2, all work shall be warranted for a period of one year from the date of completion.
- 10.2 The Owner will notify the Contractor at least 30 days prior to the anniversary date and shall establish a date for the inspection. The tank will be drained and the Owner's representative and the Contractor shall thoroughly inspect all surfaces both inside and out. Any defects in the coating system shall be repaired by the Contractor at no additional cost to the Owner. Should a failure occur to 25% of the painted surface, either interior or exterior, the entire surface shall be cleaned and painted in accordance with these specifications.

11. COATING PERFORMANCE CRITERIA:**11.1 Interior Coating System Testing Requirements:**

The following test data shall be provided to the Engineer Owner should the Contractor wish to utilize coatings other than those specified.

- A. TYPE: Polyamide Epoxy
- B. SOLIDS BY VOLUME: 70% Minimum.
- C. ASTM D-3359 Method B, Class. 5B
- D. ASTM B-117-73 Salt Spray (Unscribed): 8,760 Hours.
- E. ASTM D-3363-74 Pencil Hardness.
- F. ASTM D-522 Elongation - 1/2 inch Mandrel
- G. ASTM D-2794 Direct Impact (16 Gauge Panel)
- H. ASTM A-4060 CS-17 WHEEL, 1,000 Cycles, CS-17 Wheel.
- I. ASTM 96-66 @ 4.88 mils DFT
- J. IMMERSION -Distilled Water: 56,000 Hours
- K. IMMERSION - Jet Fuel: 31,000 Hours.
- L. IMMERSION - Gasoline: 14,400 Hours
- M. IMMERSION - Mineral Oil: 31,000 Hours.

11.2 Exterior Coating System Testing Requirements (Primer):

- A. TYPE: Polyamide Epoxy
- B. SOLIDS BY VOLUME: 70% Minimum.
- C. ASTM D-3359 Method B, Class. 5B
- D. ASTM B-117-73 Salt Spray (Unscribed): 8,760 Hours.
- E. ASTM D-3363-74 Pencil Hardness.
- F. ASTM D-522 Elongation - 1/2 inch Mandrel
- G. ASTM D-2794 Direct Impact (16 Gauge Panel)
- H. ASTM A-4060 CS-17 WHEEL, 1,000 Cycles, CS-17 Wheel.

- I. ASTM 96-66 @ 4.88 mils DFT
- J. IMMERSION -Distilled Water: 56,000 Hours
- K. IMMERSION - Jet Fuel: 31,000 Hours.
- L. IMMERSION - Gasoline: 14,400 Hours
- M. IMMERSION - Mineral Oil: 31,000 Hours.

11.3 Exterior Coating System Testing Requirements (Intermediate):

The following test data shall be provided to the Engineer/Owner should the Contractor wish to utilize coatings other than those specified.

- A. PRIMER TYPE: Rust Inhibitive Polyamide Epoxy.
- B. INTERMEDIATE TYPE: Polyamide Epoxy.
- C. SOLIDS BY VOLUME: 51% Minimum.
- D. ASTM 3359 Cross Hatch Adhesion
- E. IMMERSION: 25% Sodium Hydroxide, 2,800 hours.
- F. IMMERSION: 3% Sulfuric Acid, 77F., 2,800 hours.
- G. IMMERSION: Distilled Water, 77F., 2,800 hours.
- H. IMMERSION: JP4 Jet Fuel, 77F., 2,800 hours.

11.4 Exterior Coating System Testing Requirements (Finish Coat):

The following test data shall be provided to the Engineer/Owner should the Contractor wish to utilize coatings other than those specified.

- A. QUV (UV B) (Artificial Weathering) 1,544 Hours Exposure. Requirement: Report % gloss retained.
- B. QUV (UV A) (Artificial Weathering) 4,500 Hours Exposure. Requirement: Report % gloss retained.
- C. ASTM D 2729 direct Impact.
- D. ASTM D-522 Mandrel Bend.
- E. ASTM D 3359 B (Cross Hatch Adhesion).
- F. CHEMICAL RESISTANCE, SPLASH: 30% Sodium Hydroxide.
- G. CHEMICAL RESISTANCE, SPLASH: 10% Sodium Hydroxide.
- H. CHEMICAL RESISTANCE, SPLASH: 10% Acetic Acid.
- I. CHEMICAL RESISTANCE, SPLASH: 30% Sulfuric Acid.
- J. CHEMICAL RESISTANCE, SPLASH: Xylol.
- K. CHEMICAL RESISTANCE, SPLASH: Mineral Spirits.
- L. CHEMICAL RESISTANCE, SPLASH: Transformer Oil.
- M. Graffiti Clean Up: Spray Paint.

END OF SECTION

SECTION 13500

GLASS COATED, BOLTED STEEL WATER STANDPIPE

PART 1 GENERAL

1.01 Scope of Work

- A. The Contractor may furnish and erect an approved glass-coated, bolted steel water storage tank with all appurtenances shown on the Drawings and as specified above. The manufacturer of the tank shall be specialized in the design, fabrication erection of water storage tank systems and shall have tanks currently in satisfactory service for a minimum of five years. The tank coating system shall be a glass fused to steel system and shall be NSF approved. The materials, design, fabrication and erection shall conform to ANSI/AWWA D103, latest revision. The tank foundation shall be designed by the manufacturer to safely sustain the structure and its live loads. The foundation shall be designed for a maximum applied soil pressure of 1.75 tons/square foot. A greater solid bearing capacity may be allowed when determined by geotechnical analysis at the option of and cost to Contractor. No separate payment will be made for any geotechnical analysis.
- B. Furnish and erect a glass-coated, bolted-steel water storage tank, including foundation, tank structure and tank appurtenances as shown on the contract drawings and described herein.
- C. All required labor, materials and equipment shall be included.
- D. Submittals: Shop drawings as per section 01300 required.
- E. Geotechnical information is included in Section 01731,.

1.02 Qualifications of Tank Supplier

- A. The Engineer's selection of factory applied glass- fused-to-steel bolt together tank construction for this facility has been predicated upon the design criteria, construction methods specified, and optimum coating for resistance to internal and external tank surface corrosion. Deviations from the specified design, construction or coating details, will not be permitted.
- B. The bidder shall offer a new tank structure as supplied from a manufacturer specializing in the design, fabrication and erection of factory applied glass-fused-to-steel, bolt together tank systems. The manufacturer shall own and operate its production plant, fabricate and glass coat the tank at one location.
- B. The tank shown on the contract drawings and specified herein shall be as manufactured by A. O. Smith Harvestore Products, Inc. of DeKalb, Illinois or approved equal.
- C. Alternate glass-fused-to-steel tank products, as provided by other manufacturers, will be considered for prior approval by the Engineer.

Manufacturers lacking the experience requirement will be considered, if the manufacturer provides a satisfactory 5 year 100% Performance Bond in lieu of evidence of experience and long term operation.

- D. Strict adherence to the standards of design; fabrication; erection; product quality; and long term performance, established in this Specification will be required by the Owner and Engineer.
- F. Tank suppliers wishing to pre-qualify shall submit the following to the Engineer/Owner for consideration:
 - 1. Typical structure and foundation drawing(s).
 - 2. List of tank materials, appurtenances and tank coating specifications.
 - 3. List of five (5) tanks presently in potable water service, of size and character specified herein, operating satisfactorily for a minimum of five (5) years, including the name and telephone number of Owner and Engineer.

1.03 Submittal Drawings and Specifications

- A. Construction shall be governed by the Owner's drawings and specifications showing general dimensions and construction details, after written approval by the Engineer of detailed erection drawings prepared by the tank bidder. There shall be no deviation from the drawings and specifications, except upon written order from the Engineer.
- B. The bidder is required to furnish, for the approval of the Engineer and at no increase in contract price, five (5) sets of complete specifications and construction drawings for all work not shown in complete detail on the bidding drawings. A complete set of structural calculations shall be provided for the tank structure and foundation. All such submissions shall be stamped by a Registered Professional Engineer licensed in the state of project location, as well as, by a Registered Professional Engineer employed on the tank manufacturer's engineering staff.
- C. When approved, two sets of such prints and submittal information will be returned to the bidder marked "APPROVED FOR CONSTRUCTION" and these drawings will then govern for the work detailed thereon. The approval by the Engineer of the tank supplier's drawings shall be an approval relating only to their general conformity with the bidding drawings and specifications and shall not guarantee detail dimensions and quantities, which remains the bidder's responsibility.
- D. Warranty shall be as set out in these specifications.

PART 2 DESIGN CRITERIA

2.01 Tank Size

- A. The factory coated glass-fused-to-steel, bolt together tank shall meet conditions set out on drawings.

2.02 Tank Capacity

- A. Tank capacity shall meet conditions set out on drawings.

2.03 Floor Elevation

- A. Finished floor elevations shall be as shown on drawings.

2.04 Tank Design Standards

- A. The materials, design, fabrication and erection of the bolt together tank shall conform to the AWWA Standard for "Factory-Coated Bolted Steel Tanks For Water Storage" - ANSI/AWWA D103, latest revision.
- B. The tank coating system shall conform solely to Section 10.4 of ANSI/AWWA D103.
- C. The tank shall be certified and listed by the National Sanitation Foundation (NSF) to meet ANSI/NSF Additives Standard No. 61.

2.05 Design Loads

- A. Specific Gravity 1.0
- B. Wind Velocity 100 mph
- C. Shape Factor 0.6
- D. Allowable Soil 2500 psf
- E. Roof Snow Load 25 psf
- F. Earthquake Seismic Zone, AWWA D103
 - 1. AWWA D103 Fixed Percentage, Zone 1.

PART 3 MATERIALS SPECIFICATIONS

3.01 Plates and Sheets

- A. Plates and sheets used in the construction of the tank shell, or tank roof, shall comply with the minimum standards of AWWA D103, Section 2.4.
- B. Design requirements for mild strength steel shall be ASTM A570 Grade 30 with a maximum allowable tensile stress of 15,000 psi.
- C. Design requirements for high strength steel shall be ASTM A607 Grade 50 with a maximum allowable tensile stress of 26,000 psi.
- D. The annealing effect created from the glass coated firing process shall be considered in determining ultimate steel strength. In no event shall a yield strength greater than 50,000 psi be utilized for calculations detailed in AWWA D103, Sections 3.4 and 3.5.
- E. Multiple vertical bolt line sheets and plates of ASTM A607 Grade 50 only shall be manufactured such that holes are staggered in the vertical bolt lines and that no two adjoining holes are in-line horizontally, except at the center of the sheet or plate.

3.02 Rolled Structural Shapes

- A. Material shall conform to minimum standards of ASTM A36 or AISI 1010.

3.03 Horizontal Wind Stiffeners

- A. Design requirements for intermediate horizontal wind stiffeners shall be of the "web truss" design.
- B. Web truss stiffeners shall be of steel with hot dipped galvanized coating.
- C. Rolled steel angle stiffeners are not permitted for intermediate stiffeners.

3.04 Bolt Fasteners

- A. Bolts used in tank lap joints shall be 1/2" - 13 UNC2A rolled thread, and shall meet the minimum requirements of AWWA D103, Section 2.2.
- B. Bolt Material
 - 1. SAE Grade 2
 - a) Tensile Strength - 74,000 psi Min.
 - b) Proof Load - 55,000 psi Min.
 - c) Allowable shear stress - 18,164 psi (AWWA D103).
 - 2. SAE grade 8/ASTM A325 heat treated to:
 - a) Tensile Strength - 150,000 psi Min.
 - b) Proof Load - 120,000 psi Min.
 - c) Allowable shear stress - 36,818 psi (AWWA D103).
- C. Bolt Finish - Zinc Plate, electro-galvanized
 - 1. .0003" Min - under bolt head.
 - 2. .0003" Min - on shank.
 - 3. .0005" to .0007" - on last five threads.
 - 4. Iridite #3 bronze color coat.
- D. Bolt Head Encapsulation
 - 1. High impact polypropylene co-polymer encapsulation of entire bolt head up to the splines on the shank.
 - 2. Natural resin only.
- E. All tank shell bolts shall be installed such that the head portion is located inside the tank, and the washer and nut are on the exterior.
- F. All lap joint bolts shall be properly selected such that threaded portions will not be exposed in the "shear plane" between tank sheets. Also, bolt lengths shall be sized as to achieve a neat and uniform appearance. Excessive threads extending beyond the nut after torquing will not be permitted.
- G. All lap joint bolts shall include a minimum of four (4) splines on the underside of the bolt head at the shank in order to resist rotation during torquing.

3.05 Sealants

- A. The lap joint sealant shall be a one component, moisture cured, polyurethane compound. The sealant shall be suitable for contact with

potable water and meet applicable FDA Title 21 regulations, as well as, ANSI/NSF Additives Standard 61.

- B. The sealant shall be used to seal lap joints, bolt connections and sheet edges. The sealant shall cure to a rubber-like consistency, have excellent adhesion to the glass coating, have low shrinkage, and be suitable for interior and exterior exposure.
- C. Sealant curing rate at 73°F and 50% RH
 - 1. Tack-free time: 6 to 8 hours.
 - 2. Final cure time: 10 to 12 days.
- D. The sealant shall be Harvestore Products, Inc. System Sealer No. 79.
- E. Neoprene gaskets and tape type sealer shall not be used.

PART 4 GLASS COATING SPECIFICATION

4.01 Surface Preparation

- A. Following the decoiling and shearing process, sheets shall be steel grit-blasted on both sides to the equivalent of SSPC-10. Sand blasting and chemical pickling of steel sheets is not acceptable.
- B. The surface anchor pattern shall be not less than 1.0 mil.
- C. These sheets shall be evenly oiled on both sides to protect them from corrosion during fabrication.

4.02 Cleaning

- A. After fabrication and prior to application of the coating system, all sheets shall be thoroughly cleaned by a caustic wash and hot rinse process followed immediately by hot air drying.
- B. Inspection of the sheets shall be made for traces of foreign matter or rust. Any such sheets shall be re-cleaned or grit-blasted to an acceptable level of quality.

4.03 Coating

- A. All sheets shall receive one coat of a glass precoat to both sides and then air dried.
- B. A final coat to both sides of the sheets, of cobalt blue glass frit, shall be made.
- C. The sheets shall then be fired at a minimum temperature of 1500° F in strict accordance with the manufacturer's quality process control procedures, including firing time, furnace humidity, temperature control, etc.
- D. Minimum dry coating thickness shall be 6.0 mils. The finished inside color shall be cobalt blue. The finished outside color may be other than cobalt blue as specified but the color shall be fired over a cobalt blue base.

4.04 Inspection

- A. All coated sheets shall be inspected for mil thickness (Mikrotest or equal).
- B. All coated sheets shall be checked for color uniformity by an electronic colorimeter.
- C. An electrical leak detection test shall be performed on the inside surface after fabrication of the sheet. Sheets with excessive electrical leakers shall be rejected so as to minimize field touch up (See Sec. 5.3.4).

4.05 Packaging

- A. All approved sheets shall be protected from damage prior to packing for shipment.
- B. Heavy paper or plastic foam sheets shall be placed between each panel to eliminate sheet-to-sheet abrasion during shipment.
- C. Individual stacks of panels will be wrapped in heavy mil black plastic and steel banded to special wood pallets built to the roll-radius of the tank panels. This procedure eliminates contact or movement of finished panels during shipment.
- D. Shipment from the factory to the jobsite will be by truck, hauling the tank components exclusively.

PART 5 ERECTION

5.01 Foundation

- A. The tank foundation and floor is a part of this contract and shall be installed by the tank bidder.
- B. The tank foundation and floor shall be designed by the manufacturer and a Kentucky licensed professional engineer to safely sustain the structure and its live loads.
- C. Tank footing and floor design shall be based on 2500 psf soil bearing capacity or greater as determined by geotechnical analysis performed by a licensed soils engineer. The cost of this investigation and analysis is not to be included in the bid price. Copies of the soils report are to be provided to the bidder prior to bid date by the Owner or Engineer and found at Section 01731 of these specifications.
- D. Footing and floor designs for soil bearing strengths less than that specified, and those designs deviating from tank manufacturers standard shall be the responsibility of the Owner and his Engineer based on tank live and dead loading data provided by the tank manufacturer.

5.02 Concrete Floors

- A. The floor design is of reinforced concrete with an embedded glass coated steel starter sheet per the manufacturer's design. The floor and foundation design must be certified by a Kentucky licensed Professional Engineer.

- B. Leveling of the starter ring shall be required and the maximum differential elevation *within the ring shall not exceed one-eighth (1/8) inch, nor exceed one-sixteenth (1/16) inch* within any ten (10) feet of length.
- C. A leveling plate assembly (per Harvestore Products, Inc. - U.S. Patent No. 4,483,607), consisting of two 18" anchor rods (3/4" dia.) and a slotted plate (3 1/2" X 11" X 3/8" thick) shall be used to secure the starter ring, prior to encasement in concrete. Installation of the starter ring on concrete blocks or bricks, using shims for adjustment, is not permitted.
- D. Two waterstop seals made of a butyl rubber elastomer special for this application shall be placed on the inside surface of the starter ring below the concrete floor line. These materials shall be installed as specified by the tank manufacturer.

5.03 Sidewall Structure

- A. Field erection of the glass-coated, bolted-steel tank shall be in strict accordance with the procedures outlined in the manufacturer's erection manual, and performed by an authorized dealer of the tank manufacturer, regularly engaged in erection of these tanks.
- B. Specialized erection jacks and building equipment developed and *manufactured by the tank manufacturer* shall be used to erect the tanks.
- C. Particular care shall be taken in handling and bolting of the tank panels and members to avoid abrasion of the coating system. Prior to liquid test, all surface areas shall be visually inspected by the Engineer.
- D. An electrical leak test shall be performed during erection using a nine (9) volt leak detection device. All electrical leak points found on the inside surface shall be repaired in accordance with manufacturer's published touch up procedure.
- E. The placement of sealant on each panel may be inspected prior to placement of adjacent panels. However, the Engineer's inspection shall not relieve the bidder from his responsibility for liquid tightness.
- F. No backfill shall be placed against the tank sidewall.

5.04 Roof

- A. Tanks with diameters of 14 to 31 ft. shall include a radially sectioned roof fabricated from glass-coated, bolted steel panels, as produced by the tank manufacturer, and shall be assembled in a similar manner as the sidewall panels utilizing the same sealant and bolting techniques, so as to assure a *water/air tight assembly*. The roof shall be clear-span and self-supporting. Both live and dead loads shall be carried by the tank walls. The exterior coating finish shall include a white glass fired over the cobalt blue glass. The manufacturer shall furnish a roof opening which shall be placed near the outside tank ladder and which shall be provided with a hinged cover and a hasp for locking. The opening shall have a clear dimension of at least twenty-four (24") inches in one direction and fifteen (15") inches in the other direction. The opening shall have a curb at least four (4") inches in height, and the cover shall have a downward overlap of at least two (2")

- inches, or a gasketed weather-tight cover in lieu of the four (4") inch curb and two (2") inch overlap.
- B. The dome shall be clear-span and designed to be self-supporting from the periphery structure with primary horizontal thrust contained by an integral tension ring. The dome dead weight shall not exceed 3 pounds per square foot of surface area.
 - C. The dome and tank shall be designed to act as an integral unit. The tank shall be designed to support an aluminum dome roof including all specified live loads.
 - D. Materials:
 - 1. Triangulated space truss: 6061-T6 aluminum struts and gussets.
 - 2. Triangular closure panels: .050"t 3003-H16 aluminum sheet.
 - 3. Tension ring: 6061-T6 aluminum.
 - 4. Fasteners: 7075-T73 anodized aluminum or series 300 stainless steel.
 - 5. Sealant and gaskets: silicone rubber.
 - 6. Dormers, doors, vents and hatches: 6061-T6, 5086-H34 or 3003-H16 aluminum.
 - E. Supplier shall be TEMCOR of Torrance, California or approved equal.
 - F. Roof Vent
 - 1. A properly sized vent assembly in accordance with AWWA D103 shall be furnished and installed above the maximum water level of sufficient capacity so that at maximum possible rate of water fill or withdrawal, the resulting interior pressure or vacuum will not exceed 0.5" water column.
 - 2. The overflow pipe shall not be considered to be a tank vent.
 - 3. The vent shall be constructed of aluminum.
 - 4. The vent shall be so designed in construction as to prevent the entrance of birds and/or animals by including an expanded aluminum screen (1/2 inch) opening. An insect screen of 23 to 25 mesh polyester monofilament shall be provided and designed to open should the screen become plugged by ice formation.

5.05 Appurtenances (per AWWA D103, Section 5)

- A. Pipe Connections
 - 1. Where pipe connections are shown to pass through tank panels, they shall be field located, saw cut, (acetylene torch cutting or welding is not permitted), and utilize an interior and exterior flange assembly. Harvestore Systems Sealer No. 79 or approved equal shall be applied on any cut panel edges or bolt connections.
 - 2. Overflow piping shall be 8 inches diameter schedule 80 PVC, seamless aluminum tubing, or FRP.
- B. Outside Tank Ladder
 - 1. An outside tank ladder shall be furnished and installed as shown on the contract drawings.
 - 2. Ladders shall be fabricated of aluminum and utilize grooved, skid-resistant rungs.

3. Safety cage and step-off platforms shall be fabricated of galvanized steel.
- C. Access Doors
1. One bottom access door shall be provided as shown on the contract drawings in accordance with AWWA D-103.
 2. Such door shall be a minimum of 24 inches in diameter and shall include a properly designed reinforcing frame and cover plate.
- D. Identification Plate A manufacturer's nameplate shall list the tank serial number, tank diameter and height, and maximum design capacity. The nameplate shall be affixed to the tank exterior sidewall at a location approximately five (5') feet from grade elevation in a position of unobstructed view.
- E. Cathodic Protection shall be as shown on drawings, if required.
1. Attachment of rectifier boxes, anodes, or wiring to tank structure shall be approved by tank manufacturer.
 2. When cathodic protection is specified, electrical continuity between all tank sidewall or floor panels shall be the responsibility of the tank manufacturer.
- F. Level Indicator
1. A float type level indicator, which shall be unaffected by high winds, shall be mounted so as to be readable from the ground level. Float level indicator shall be full-travel type, with stainless steel guided float, aluminum gage board with aluminum vinyl coating with black calibrations on white background.
 2. A standard design level indicator, as fabricated by tank contractor, shall be considered equal to a supplier manufactured level indicator, subject to approval of shop drawings.

PART 6 FIELD TESTING

6.01 Hydrostatic

- A. Following completion of erection and cleaning of the tank, the structure shall be tested for liquid tightness by filling tank to its overflow elevation.
- B. Any leaks disclosed by this test shall be corrected by the erector in accordance with the manufacturer's recommendations.
- C. The Contractor will be required to pay for all water used for testing. See Special Conditions, page 4 - 13. Disposal of test water shall be the responsibility of the Contractor.
- D. Labor and equipment necessary for tank testing is to be included in the price of the tank.

PART 7 DISINFECTION

7.01 Standards

- A. The tank structure shall be disinfected at the time of testing by chlorination in accordance with AWWA Specification C652 "Disinfection of Water Storage Facilities" as modified by the tank manufacturer.

- B. Disinfection shall not take place until tank sealant is fully cured (10 to 12 days at 73°F/50%RH).
- C. Acceptable forms of chlorine for disinfection shall be:
 - 1. Liquid chlorine as specified in AWWA C652.
 - 2. Sodium hypochlorite as specified in AWWA C652.
 - 3. Calcium hypochlorite (HTH) is not acceptable.
- D. Acceptable methods of chlorination per AWWA C652:
 - 1. Section 4.1.1.
 - 2. Section 4.1.2 - chemical feed pump only (4.1.2.1).
 - 3. Section 4.3.
- E. Section 4.2 is not acceptable.

PART 8 WARRANTY

- 8.01 Structure: If within a period of one (1) year from date of completion the water storage tank, or any part thereof, shall prove to be defective in material or workmanship the Contractor shall replace or repair the tank to the satisfaction of the Engineer and Owner.
- 8.02 Glass Coating System: If within a period of five (5) years from date of completion of the tank the coating on the tank chips, cracks, spills, or undercuts during normal water service, the manufacturer shall (after examination by the manufacturer) supply an identical or substantially similar replacement part f.o.b. the manufacturer's factory, or, at the manufacturer's option, repair or allow credit for such part.

PART 9 INSPECTION

- 9.01 On or near the one year anniversary date of initial tank use the manufacturer's authorized dealer shall make a visual inspection of the tank interior coating and appurtenances; tank exterior coating and appurtenances; and the immediate area surrounding the tank. A written summary of this inspection will be filed with the tank owner and the tank manufacturer.

END OF SECTION

SECTION 15020

GATE VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Gate valves for buried pipelines shall be iron body, bronze mounted, resilient-seated gate valves with non-rising stems having either parallel or inclined seats in accordance with AWWA C509, "Resilient-Seated Gate Valves for Water and Sewerage Systems."
- B. Mechanical joint bell ends will be used in buried pipelines of mechanical joint and rubber seal type joint cast iron. Bell and flange ends will be used in exposed cast iron piping at the locations shown on the construction drawings.

1.2 SUBMITTALS

- A. Manufacturer's Data:
 - 1. Material and component data.
 - 2. Performance data.
 - 3. Product warranties.
- B. Submit in accordance with Section 01300.

1.03 RELATED SECTIONS

- A. 01300 - Submittals
- B. 01600 - Materials and Equipment.
- C. 01610 - Transportation and Handling

PART 2 - PRODUCTS

2.1 OPERATING NUTS

Gate valves for buried pipelines shall be furnished with two (2) inch square wrench nuts. Nuts shall have a flanged base upon which shall be cast an arrow two (2) inches long showing the direction of opening, and the word "OPEN" in one-half (1/2) inch or larger letters, shall be cast on the nut to indicate clearly the direction to turn the wrench when opening the valve.

2.2 HANDWHEELS

Hand-wheels may be specified for operating valves in exposed piping on the construction drawings. The hand-wheels shall have an arrow and the word "OPEN", cast thereon, to clearly indicate the direction the hand-wheel is to be turned to open the valve. The diameter of the hand-wheel shall conform to the following dimensions for the various size gate valves.

Size of Valve	Diameter of Hand-wheel
4"	10"
6"	12"
8"	14"
10" and 12"	18"
16" and 18"	22"
24" and 30"	30"

2.3 HORIZONTAL MOUNTING

Gate valves in size sixteen (16) inches and larger may be installed in the horizontal position. Bronze tracks, rollers, and scrapers will be provided for valves to be installed in the horizontal position. Horizontal valves for pressure lines shall be furnished with beveled gear operators. The gear cases for buried service shall be totally enclosed, and the gear cases for exposed piping in a vault shall be of the extended type.

2.4 BYPASS VALVES

Bypasses shall be furnished on valves when so specified on the proposal sheets or shown on the construction drawings. The bypass valve shall be furnished of the same type as the main line valve to which it is fitted. The size requirements of the bypass shall be as follows:

Valve Diameter - Inches	Bypass Diameter - Inches
16-20	3
24-30	4
26-42	6
48	8

2.5 RISING STEM VALVES

Outside screw and yoke rising stem valves shall conform to all of the requirements of AWWA C509 except for the rising stem mechanism. The OS

and Y valves shall have a rugged cast iron yoke machined to provide accurate stem alignment. The OS and Y valves shall be furnished with hand-wheels. OS and Y valves shall only be installed where shown on the drawings.

2.6 UNDERWRITERS VALVES

Gate valves for fire protection systems shall be manufactured in conformance to the requirements of the Underwriters Laboratories, Inc., and the Associated Factory Mutuals Laboratories. Gate valves which support an indicator post shall contain a flange of the indicator post base. Such valves are specified on the construction drawings and shall bear the inspection label of the Underwriters Laboratories, Inc. Gate valves shall be M&H, Mueller or approved equal.

PART 3 - EXECUTION

3.1 SPECIAL DETAILS

The details of other valve requirements and valve appurtenances such as special ends and materials, position indicators, floor stands, cylinders, chain operators, and extension stems and guides are described on the construction drawings.

3.2 SETTING GATE VALVES

Gate valves shall be installed of the size and the location as shown on the construction drawings. Vertical valves shall be set plumb and horizontal valves installed so that the valve body is level. The valves shall be set to the new pipe in the manner specified for cleaning, laying, and jointing pipe. Mechanical joint, rubber compression seal, or bell and spigot shall be used for buried pipelines. Other types of joints for pipelines within structures will be shown on the construction drawings.

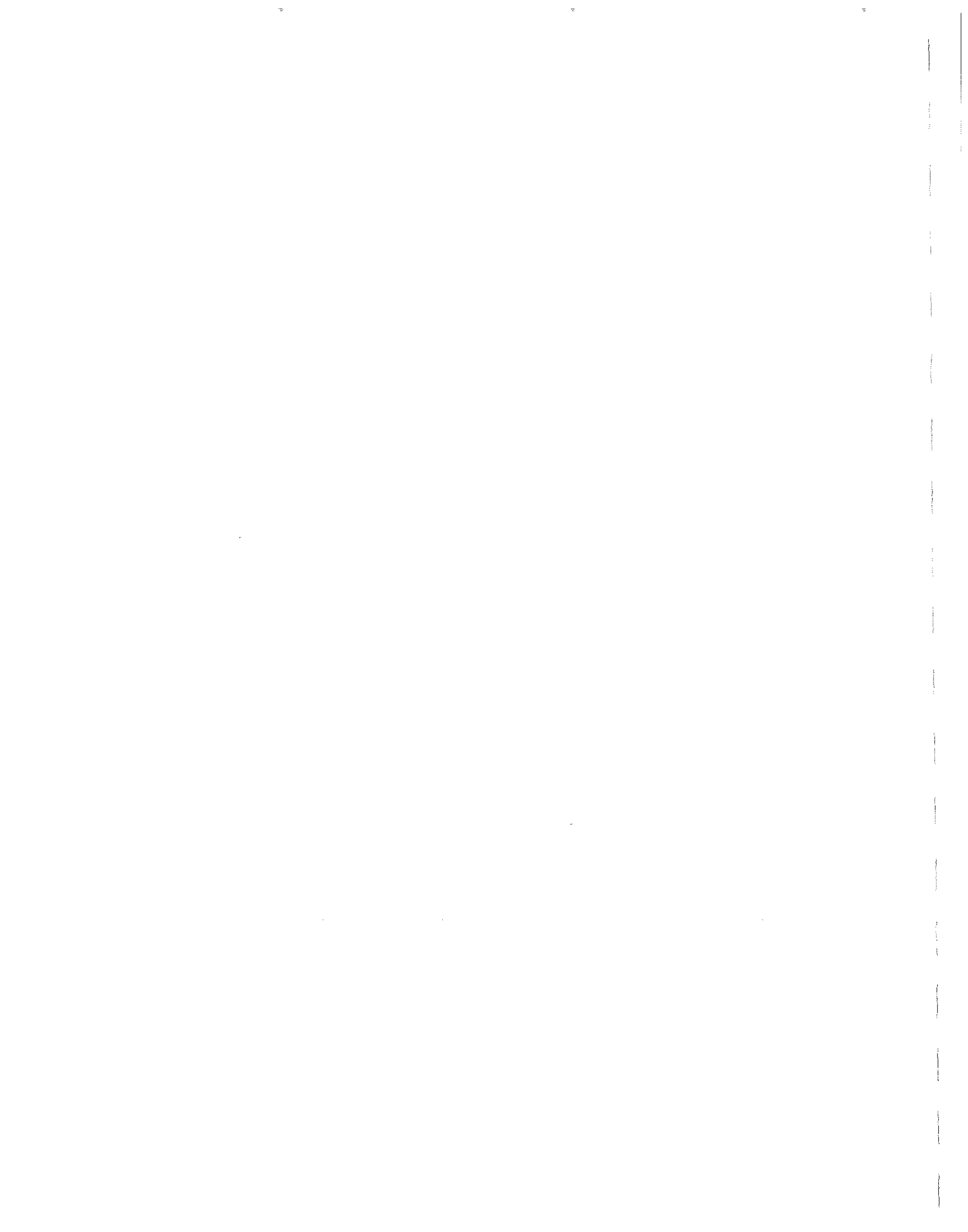
3.3 CHAIN OPERATORS

All gate valves six (6) feet or more above the floor surface shall be equipped with a chain operator unless otherwise indicated on the construction drawings.

3.4 SPARE PARTS

The Contractor shall furnish the Owner one (1) valve rebuild/maintenance kit for each size and type of valve. Each Contractor shall also furnish the Owner one (1) T type valve wrench.

END OF SECTION



SECTION 15030
MECHANICAL CHECK VALVES

PART 1 - GENERAL

1.1 SUBMITTALS

- A. **Manufacturer's Data:**
 - 1. **Material and component data.**
 - 2. **Performance data.**
 - 3. **Product warranties.**
- B. **Submit in accordance with Section 01300.**

1.2 RELATED SECTIONS

- A. **01300 – Submittals**
- B. **01600 - Materials and Equipment**
- C. **01610 - Transportation and Handling**

PART 2 PRODUCTS

2.1 SWING CHECK TYPE

Swing check valves shall be constructed with heavy cast iron or cast steel body with a bronze or stainless steel seat ring, and a non-corrosive shaft for attachment of weighted lever that shall be keyed to the shaft. The seat ring must be renewable and shall be securely held in place by a threaded joint.

The valve shall be full ported with the disc unseated 25° to ensure quiet closing. The valve disc shall be constructed of cast iron or cast steel and shall be suspended from a non-corrosive shaft which will pass through a stuffing box and be connected to a weighted lever. O-ring seals will not be acceptable.

The swing check valves shall have flanged ends, be suitable for a working pressure not less than 175 PSIG, and shall be G. A. Industries, Mueller Model A-2600-6-01, or equal as approved by the Engineer.

2.2 SILENT CHECK TYPE

The silent check valve shall be a globe type, non-slam check valve. The body of the check valve shall be semi-steel. The plug, seat and guide bushings shall be bronze and conform to ASTM Designation B-143. The valve spring and seat retainers shall be stainless steel and conform to ASTM Designation A-276. The valve plug shall be guided at both ends by a center shaft integral with the valve plug. Alignment of the center shaft shall be provided through the usage of guide bushings. The check valve shall be designed to prevent water hammer by returning the valve plug to the seat before reversal of flow occurs. The check valves shall be designed so as to be easily repaired in the field.

The valve supplied shall be flanged and drilled to conform to 125 lb. ANSI standards and sized as shown on the drawings.

The valve shall be G. A. Industries, Val-Matic 1800 series, or equal.

2.3 TILTED DISC CHECK TYPE

The check valve shall be of the tilted disc, full body flange type.

The valve housing shall consist of two body sections bolted together at a central diagonal flange, which shall be inclined at an angle of 55 degrees. The inlet body section shall contain a seat ring positioned and captured by the diagonal flange. The outlet body section shall accept two, eccentrically located, in-line pivot trunnions about which a disc shall rotate.

The eccentric pivot trunnions must be so located as to divide the disc into approximately a one-third/two-third proportion, and also must allow the seating surface of the disc to rotate away from the seating surface of the seat ring cleanly, without contact. A small amount of clearance must exist between the pivot pin and bushing when the disc is seated to prevent binding and to insure a drop tight seal. To demonstrate the capability of the valve to maintain excellent seating and sealing characteristics over an extended service life, a 250,000 cycle test shall be conducted and witnessed by an independent consulting firm. The results of the test must indicate a leakage rate not to exceed 75 percent of the allowable rate for new valves as called for by A.W.W.A. and M.S.S. check valve specifications.

The disc shall travel no more than 40 degrees from the closed to the fully open position. The design contours of the disc, and its position during flow, must prevent disc flutter at a minimum flow velocity of four (4) F.P.S.

The flow area, through the valve body inlet and outlet, shall be equal to pipe size, and gradually increase to an area 40 percent greater than pipe size through the valve seat.

Inspection ports shall be provided upstream and downstream of the valve disc. An indicator must be supplied and visually show the disc position at all times.

Materials of construction: body sections to be cast iron ASTM A126, Class B, disc to be cast iron ASTM A126, Class B, seat ring to be centrifugally cast aluminum bronze ASTM B271, copper alloy #954. Disc ring to be centrifugally cast aluminum bronze ASTM B271, copper alloy #955. Pivot pins to be aluminum bronze ASTM B505, copper alloy #954. Pivot pin bushings to be aluminum bronze ASTM B505, copper alloy #954.

The tilted disc check valve shall be series 9000 as manufactured by Val-Matic Valve and Manufacturing Corporation, Elmhurst, Illinois, or approved equal.

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 15040
BUTTERFLY VALVES

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Butterfly valves shall be one piece iron body with integral cast iron hub sections.
- B. Valves shall be designed, manufactured and tested in accordance with AWWA C504. Valve seats shall be retained in a groove in the body of the valve. Valve disc edge shall be 304 S.S. permanently welded to the disc. Valves shall be rated and tested for absolute zero leakage at rated pressure when closed. The valve shall be of wafer or flanged design with short face to face dimensions.
- C. Lug wafer will not be allowed.

1.2. SUBMITTALS

- A. Manufacturer's Data:
 - 1. Material and component data.
 - 2. Performance data.
 - 3. Product warranties.
- B. Submit in accordance with Section 01300.

1.3. RELATED SECTIONS

- A. 01300 – Submittals
- B. 01600 - Materials and Equipment
- C. 01610 - Transportation and Handling

PART 2 – PRODUCTS

1.4. GENERAL

- A. The valve body and workings shall be rated for a minimum working pressure of 150 psi on the inlet side of the booster pump and 300 psi on the outlet side of the pump.

- B. The valve disc shall be constructed of bronze materials meeting ASTM B584 standards or of cast iron meeting requirements of ASTM A48.
- C. The disc seat shall be of rubber material and shall seal against the disc edge. The valve shaft shall be constructed of stainless steel material which meets the standards of ASTM A582. Stainless steel materials shall also be used for shaft wedge keys and retaining nuts.
- D. Shaft bearings shall be self lubricating type with a nylon or woven Teflon backed sleeve for bearing surfaces. The bearings shall be press fitted to the valve body to inhibit rust formation between the body and bearings.
- E. Valve packing shall be "O" ring, self adjusting type contained in a removable corrosion resistant recess. Unless otherwise indicated on the plans, valves 6 inches and smaller shall be operated by hand lever.
- F. Valves 8 inches and larger shall have a traveling nut hand-wheel operator assembly.
- G. Valves shall be Henry Pratt or equal. Valve shall be able to sit in any position with-out movement and the assist of locking device.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 15100
FLUSHING HYDRANT

PART 1 - GENERAL

1.1. SUBMITTALS

A. MANUFACTURER'S DATA:

1. Material and Component Data.
2. Performance Data.
3. Product Warranties.

B. *Submit in accordance with Section 01300.*

1.2. RELATED SECTIONS

A. 01600 - Materials and Equipment.

B. 01610 - Transportation and Handling

PART 2 – PRODUCTS

2.1. POST HYDRANT

Post Hydrants shall have a brass 2" FIP inlet and be of compression-type, closing with the water pressure. Water pressure alone shall close valve. All working parts and operating rod shall be of brass and be removable from above ground with no digging. Hydrants will operate by the use of a portable top stock which will couple with the hydrant at or near the grounding. All hydrants shall be 3' bury and have a 3" PVC schedule 80 marker pipe for easy location, as manufactured by Kupferle Foundry, St. Louis, MO, #78 Mainguard Hydrant, or approved equal.

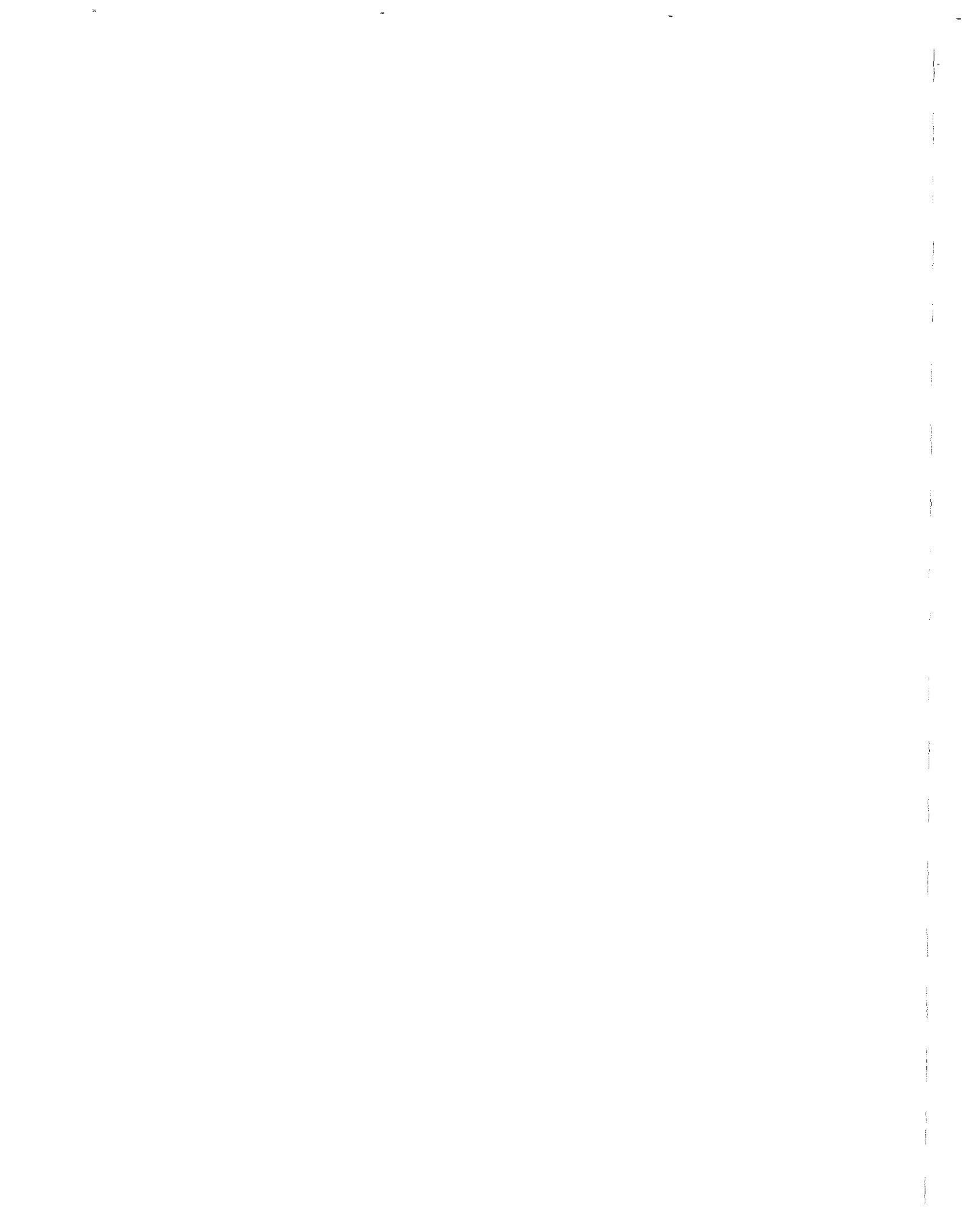
2.2. PORTABLE TOP STOCK

The portable top stock shall have a 3" galvanized steel casing and outlet with cast aluminum handle. Operating screw, operating rod and all interior operating parts shall be brass and removable from the top stock for servicing. Sampling station parts shall be complete with 3/4" brass ball valve and nozzle. The flushing station parts shall be complete with 2" brass ball valve with 2 1/2" NST fire hose nozzle. The portable top stock shall be as manufactured by Kupferle Foundry, St. Louis, MO, #78 Mainguard Hydrant, or approved equal.

PART 3 – EXECUTION

NOT USED

END OF SECTION



SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. General Requirements specifically applicable to Division 16.

1.2. CONTRACT DOCUMENTS

- A. The Instructions to Bidders, General and Special Conditions and all other Contract Documents shall apply to the Electrical Contractor's work as well as to each of his subcontractor's work.
- B. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.

1.3. WORK SEQUENCE

- A. Construct Work in sequence under provisions of this specification.
- B. Schedule power outages with owners' representative.

1.4. COORDINATION

- A. Coordinate the Work specified in this Division under provisions of this specification.
- B. Prepare drawings showing proposed rearrangement of Work to meet job conditions, including changes to Work specified under other Sections. Obtain permission of Architect/ Engineer before proceeding.

1.5. REFERENCES

- A. ANSI/IEEE C2 - National Electrical Safety Code.
- B. ANSI/NFPA 70 - National Electrical Code.
- C. NECA - Standard of Installation.

1.6. REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 70 as incorporated in the Kentucky Building Code.
- B. Conform to ANSI/IEEE C2.
- C. Conform to Kentucky Building Code.
- D. Conform to 702 KAR 4:070.
- E. Inspections: Contractor is to pay for electrical inspection and is to provide a final certificate of inspection.

1.7. SUBMITTALS

- A. Submit inspection and permit certificates under provisions of this specification.
- B. Include certificate of final inspection and acceptance from authority having jurisdiction.
- C. Submit shop drawings as specified in other divisions of this specification.
 - 1. Shop drawings and/or manufacturer's descriptive literature shall have the Architect/Engineer project numbers indicated thereon and shall be clearly referenced to the specification section number, schedule, materials, etc., so the Engineer may readily determine the particular item the Contractor or subcontractor proposes to furnish. Each submission shall also contain Date Submitted. If shop drawings and/or other items are transmitted by correspondence, each item of correspondence shall bear the Architect/Engineer project number.
 - 2. The Contractor shall submit with such promptness as to cause no delay in his own work or in that of any other Contractor, with a two (2) week allowance for the Architect/Engineer's review, eight (8) copies plus those required by the Contractor and his suppliers, of all Shop drawings and schedules required for the work of the various trades, and the Engineer shall pass on them with reasonable promptness, making desired corrections relating to the design concept. The Contractor shall make any corrections required by the Engineer, and if the Engineer so requests file with him eight (8) corrected copies and furnish such other copies as may be needed. The Engineer's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing

called to the Engineer's attention such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules. The term "as specified" will not be acceptable as shop drawings must be submitted on all equipment.

3. The Contractor shall request that shop drawings be prepared by the subcontractors and be submitted to him for approval. The Contractor shall correct the shop drawings in colored pencil, if necessary, return them to the subcontractor for correction, then submit correct shop drawings in their final form to the Engineer for approval. All shop drawings must not only bear the Contractor's stamp of approval, but shall show evidence that he has thoroughly checked each drawing submitted. Any drawings submitted without this evidence and stamp of approval will not be considered and will be returned to the Contractor for proper resubmission.
4. Schedules, brochures or equipment, operating instructions and manuals, material literature, etc. shall be processed by the Contractor and submitted to the Engineer for approval in the same manner as outlined herein for shop drawings.
5. The Contractor shall maintain at least one (1) set of all approved shop drawings and specification documents at the site for reference.

PART 2 – PRODUCTS

2.1. MATERIALS AND EQUIPMENT

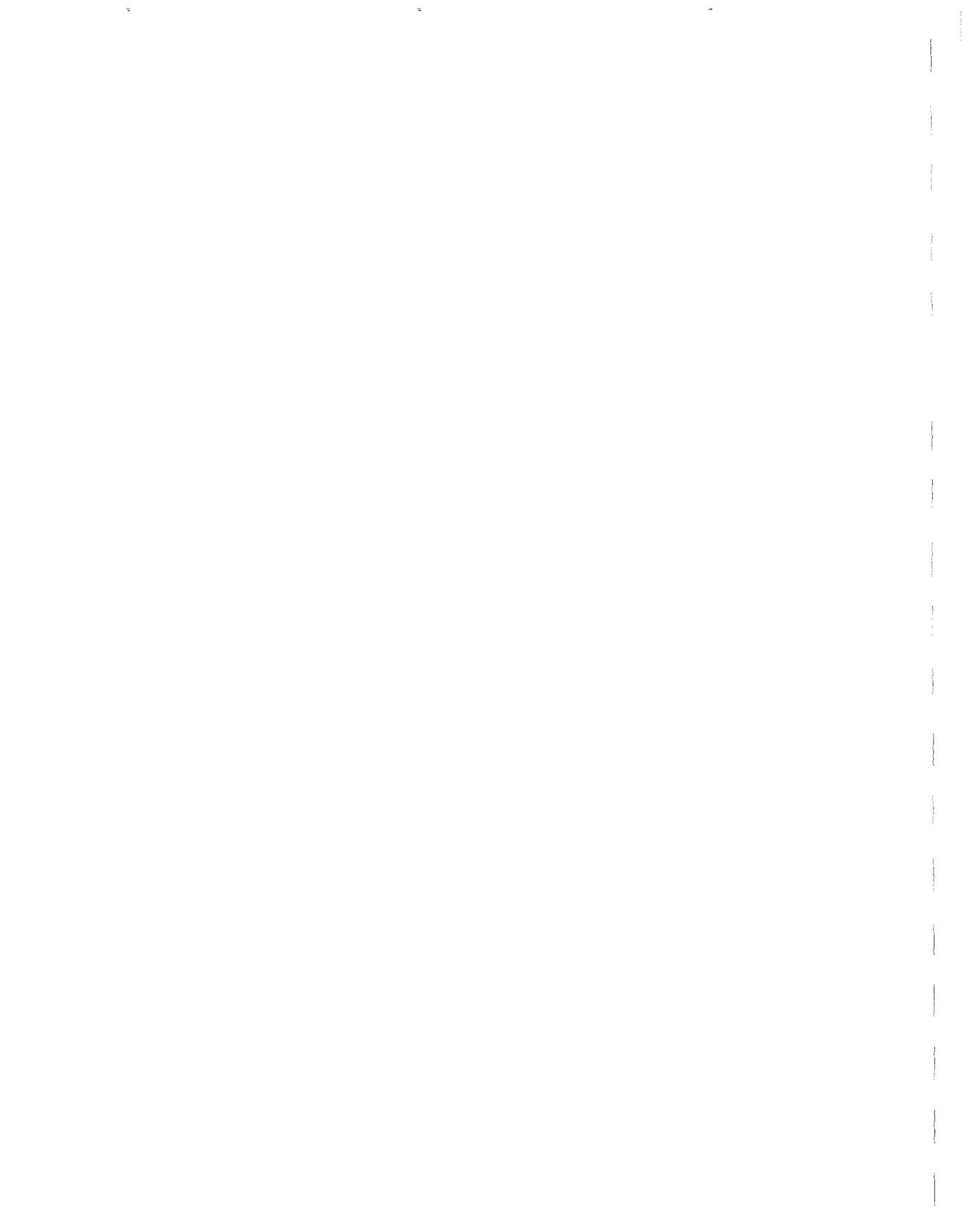
- A. Materials and Equipment: Acceptable to the authority jurisdiction as suitable for the use intended.
- B. Unregistered Bidders are required to obtain 10 day prior approval.

PART 3 - EXECUTION

3.1. WORKMANSHIP

- A. Install Work using procedures defined in NECA Standard of Installation.

END OF SECTION



SECTION 16111

CONDUIT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Rigid metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Thickwall nonmetallic conduit.
- F. Fittings and conduit bodies.

1.2 RELATED SECTIONS

- A. Section 16130 - Boxes.
- B. Section 16170 - Grounding and Bonding.
- C. Section 16190 - Supporting Devices.
- D. Section 16195 - Electrical Identification.

1.3 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. NECA "Standard of Installation."
- F. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.5 SUBMITTALS

- A. Submit under provisions of Section 15010/16010.
- B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit, metallic tubing, nonmetallic conduit, fittings, conduit bodies.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 15010/16010.
- B. Accurately record actual routing of conduits larger than 2 inches.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Section 15010/16010.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

1.9 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
 - 1. More than Five Feet from Foundation Wall:
 - 2. Use thickwall nonmetallic conduit with galvanized rigid steel elbows through concrete slab.
 - 3. Within Five Feet from Foundation Wall:
 - 4. Use thickwall nonmetallic conduit with galvanized rigid steel elbows through concrete slab.
- C. In or Under Slab on Grade:
 - 1. Use thickwall nonmetallic conduit with galvanized rigid steel elbows through concrete slab.
 - 2. Minimum Size: 3/4 inch.
- D. Outdoor Locations, Above Grade:
 - 1. Use rigid steel and intermediate metal conduit.
- E. Wet and Damp Locations:
 - 1. Use thickwall nonmetallic conduit.
- F. Dry Locations:
 - 1. Concealed: Use electrical metallic tubing.
 - 2. Exposed: Use electrical metallic tubing.

2.2 RIGID METAL CONDUIT

- A. Manufacturers:
 - 1. Allied Tube & Conduit.
 - 2. Wheatland Tube Co.
 - 3. Triangle PWC, DAC.
 - 4. Substitutions: Under provisions of Section 15010/16010.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Intermediate Metal Conduit (IMC): Rigid steel.

- D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Manufacturers:
 - 1. Afflex Corp.
 - 2. AFC Co.
 - 3. Electri-Flex Corp.
 - 4. Substitutions: Under provisions of Section 15010/16010.
- B. Description: Interlocked steel construction.
- C. Fittings: ANSI/NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers:
 - 1. Afflex Corp.
 - 2. AFC Co.
 - 3. Electri-Flex Corp.
 - 4. Substitutions: Under provisions of Section 15010/16010.
- B. Description: Interlocked aluminum construction with PVC jacket.
- C. Fittings: ANSI/NEMA FB 1.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit.
 - 2. Wheatland Tube Co.
 - 3. Triangle PWC, DAC.
 - 4. Substitutions: Under provisions of Section 15010/16010.
- B. Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel, compression type.

2.6 THICKWALL NONMETALLIC CONDUIT

- A. Manufacturers:
 - 1. Carlon.
 - 2. Cantex Industries.
 - 3. Electri-Flex Corp.
 - 4. Substitutions: Under provisions of Section 15010/16010.

- B. Description: NEMA TC 2; Schedule 40 PVC.
- C. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. *Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.*
- E. Group related conduits; support using conduit rack. Construct rack using steel channel.
- F. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.
- G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports
- H. Do not attach conduit to ceiling support wires.
- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route conduit parallel and perpendicular to walls.
- K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- L. Route conduit in and under slab from point-to-point.
- M. Do not cross conduits in slab.
- N. Provide two coats of asphaltum paint on all underground or underslab metal conduits.
- O. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- P. Cut conduit square using saw or pipecutter; de-burr cut ends.

- Q. Bring conduit to shoulder of fittings; fasten securely.
- R. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- S. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations.
- T. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender or factory elbows for bends in metal conduit larger than 2 inch size.
- U. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- V. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- W. Provide suitable pull string in each empty conduit except sleeves and nipples.
- X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- Y. Ground and bond conduit under provisions of Section 16170.
- Z. Exposed surface mounted conduit feeding device boxes in finished areas shall be mounted securely to wall with one-hole straps and offset at device box connections. Conduit hangers with exposed bolts used to space the conduit from the wall shall not be acceptable for this type installation.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 16123
BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Wiring connectors and connections.

1.2 RELATED SECTIONS

- A. Section 16111 - Conduit.
- B. Section 16130 - Boxes.
- C. Section 16195 - Identification.

1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 15010/16010.
- B. Product Data: Provide for each cable assembly type.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.

- B. Conductor sizes are based on copper unless indicated as aluminum or "AL".
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

- A. Determine required separation between cable and other work.
- B. Determine cable routing to avoid interference with other work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - BUILDING WIRE AND CABLE

- A. Capital Wire and Cable.
- B. General Cable.
- C. Carol.
- D. Substitutions: Under provisions of Section 15010/16010.

2.2 BUILDING WIRE AND CABLE

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THHN/THWN.

2.3 WIRING CONNECTORS

- A. Split Bolt Connectors:
 - 1. Burndy.
 - 2. IlSCO.
 - 3. Kearney.

4. Substitutions: Under provisions of Section 15010/16010.
- B. Solderless Pressure Connectors:
1. Buchanan.
 2. Ideal.
 3. Thomas & Betts.
 4. Substitutions: Under provisions of Section 15010/16010.
- C. Spring Wire Connectors:
1. Buchanan.
 2. Ideal.
 3. Thomas & Betts.
 4. Substitutions: Under provisions of Section 15010/16010.
- D. Compression Connectors:
1. Buchanan.
 2. Ideal.
 3. Thomas & Betts.
 4. Substitutions: Under provisions of Section 15010/16010.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 WIRING METHODS

- A. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
- B. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
- C. Above Accessible Ceilings: Use only building wire, Type THHN/THWN insulation, in raceway.
- D. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
- E. Exterior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.

- F. **Underground Installations:** Use only building wire, Type THHN/THWN insulation, in raceway.

3.3 INSTALLATION

- A. Install products in accordance with manufacturers instructions.
- B. Use solid conductor for feeders and branch circuits 12 AWG and smaller.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- G. Pull all conductors into raceway at same time.
- H. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- I. Protect exposed cable from damage.
- J. Support cables above accessible ceiling, using spring metal clips or plastic cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
- K. Use suitable cable fittings and connectors.
- L. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- M. Clean conductor surfaces before installing lugs and connectors.
- N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- O. Use *split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.*
- P. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- Q. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

- R. Terminate stranded conductors under screws using crimp-on wire terminals. Wrapping stranded wire around screw stem and tightening shall not be permitted.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 16195.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.
- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.

END OF SECTION



SECTION 16130

BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling device boxes.
- B. Pull and junction boxes.

1.2 RELATED SECTIONS

- A. *Section 16140 - Wiring Devices: Wall plates in finished/unfinished areas.*
- B. *Section 16160 - Cabinets and Enclosures.*

1.3 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Operation and Maintenance Data: Submittals for Project closeout.
- B. Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.

- B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 DEVICE BOXES (RECESSED)

- A. Sheet Metal Device Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- B. Nonmetallic Device Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- D. Wall Plates for Finished/Unfinished Areas: As specified in Section 16140.

2.2 DEVICE BOXES (SURFACE)

- A. Cast Aluminum Device Boxes: NEMA FB 1, aluminum.
 - 1. Surface mounted device boxes shall be cast aluminum box with threaded conduit openings. Exterior of box shall be smooth with unused conduit openings filled with flush sealing plugs. Exterior of box, surface conduit and hangers shall be painted to match wall finish. Standard wall plates as specified in Section 16140 shall be used. Wall plate size shall be selected to match the exterior dimension of the box as closely as possible to avoid overhanging edge of box. Box shall be mounted using mounting ears in wet locations and mounted through holes in the back of the box in dry locations.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer for wet locations.

2.3 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 16160.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
- E. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.
- F. Maintain headroom and present neat mechanical appearance.
- G. Install boxes to preserve fire resistance rating of partitions and other elements.
- H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- I. Align adjacent wall mounted device boxes for switches, thermostats, and similar devices.
- J. Use flush mounted device box in finished areas.
- K. Locate flush mounted device box in masonry wall to require cutting wall of masonry unit in block opening only. Coordinate masonry cutting to achieve neat opening.
- L. Do not install flush mounted boxes back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- M. Secure flush mounted boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- N. Install flush mounting box without damaging wall insulation or reducing its

effectiveness.

- O. Use adjustable steel channel fasteners for hung ceiling outlet box.
- P. Do not fasten boxes to ceiling support wires.
- Q. Support boxes independently of conduit.
- R. Use gang box where more than one device is mounted together. Do not use sectional box.
- S. Use gang box with plaster ring for single device outlets.
- T. Use cast device box in exterior locations exposed to the weather and other wet locations.
- U. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation of device boxes for equipment connected under Section 16180.

3.3 ADJUSTING

- A. Section 01650 - Testing, Adjusting, and Balancing: Adjusting installed work.
- B. Adjust flush-mounting devices to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

3.4 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 16141
WIRING DEVICES

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Wall switches.
- B. Receptacles.
- C. Device plates and box covers.

1.2. REFERENCES

- A. NEMA WD 1 - General-Purpose Wiring Devices.
- B. NEMA WD 5 - Specific-Purpose Wiring Devices.

1.3. SUBMITTALS

- A. Submit product data under provisions of this specification.
- B. Provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.

PART 2 - PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS - WALL SWITCHES.

- A. Hubbell.
- B. Sylvania.
- C. General Electric.

2.2. WALL SWITCHES

- A. Wall Switches for Lighting Circuits and Motor Loads Under ½ HP: NEMA WD; 1 AC general use snap switch with toggle handle, rated 20 amperes and 120-277 volts AC.
- B. Handle: Ivory plastic.

2.3. ACCEPTABLE MANUFACTURERS – RECEPTACLES

- A. Hubbell
- B. Pass & Seymour.
- C. Slater.

2.4. RECEPTACLES

- A. Convenience and Straight-blade Receptacles: NEMA WD 1.
- B. Convenience Receptacle Configuration: NEMA WD 1; Type 5 20 R, ivory plastic face.
- C. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter.

2.5. ACCEPTABLE MANUFACTURERS - WALL PLATES

- A. Hubbell.
- B. General Electric.
- C. Sylvania.
- D. Substitutions: Approved equal.

2.6. WALL PLATES

- A. Decorative Cover Plate: Stainless Steel.

PART 3 – EXECUTION

3.1. INSTALLATION

- A. *Install convenience receptacles as shown on drawings.*
- B. Install stainless steel plates on switch, receptacle, and blank outlets.
- C. Install devices and wall plates flush and level.

END OF SECTION

SECTION 16195
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Wire and cable markers.

1.2 RELATED SECTIONS

- A. Section 16130 - Boxes.

1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 15010/16010.
- B. Product Data: Provide catalog data for nameplates, labels, and markers.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Nameplates: Engraved three-layer laminated plastic, white letters on black background.
- B. Locations:
 - 1. Each electrical distribution and control equipment enclosure.

2. Communication cabinets.
3. Motor Starters.

C. Letter Size:

1. Use 1/8 inch letters for identifying individual equipment and loads.
2. Use 1/4 inch letters for identifying grouped equipment and loads.

2.2 WIRE MARKERS

A. Manufacturers:

1. Panduit.
2. Brady.
3. Thomas & Betts.
4. Substitutions: Under provisions of Section 15010/16010.

B. Description: Tape, split sleeve, or tubing type wire markers.

C. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings

2.3 UNDERGROUND WARNING TAPE

A. Manufacturers:

1. Panduit.
2. Thomas & Betts.
3. Thor Enterprises.
4. Substitutions: Under provisions of Section 15010/16010.

B. Description: 4 inch wide plastic tape, colored red with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates.

3.2 APPLICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using adhesive.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

END OF SECTION



SECTION 16440
DISCONNECT SWITCHES

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Disconnect switches.
- B. Fuses.
- C. Enclosures.

1.2. REFERENCES

- A. ANSI/UL 198C - High-Intensity Capacity Fuses; Current Limiting Types.
- B. ANSI/UL 198E - Class R Fuses.
- C. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses).
- D. FS W-S-865 - Switch, Box, (Enclosed), Surface-Mounted.
- E. NEMA KS 1 - Enclosed Switches.

1.3. SUBMITTALS

- A. Submit product data under provisions of this specification.
- B. Include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

PART 2 - PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS - DISCONNECT SWITCHES

- A. Square D.
- B. General Electric.
- C. Westinghouse - Bryant.
- D. Substitutions: Approved equal.

2.2. DISCONNECT SWITCHES

- A. Fusible Switch Assemblies: NEMA KS 1; FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F-870. Designed to accommodate Class R fuses.
- B. Nonfusible Switch Assemblies: NEMA KS 1; Type GD; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- C. Enclosures: NEMA KS 1; Type 1.

2.3. ACCEPTABLE MANUFACTURERS – FUSES

- A. General Electric.
- B. Westinghouse.
- C. Square D.
- D. Substitutions: Approved equal.

2.4. FUSES

- A. Fuses 600 Amperes and Less: ANSI/UL 198C, Class R; current limiting, delay, one-time fuse, 250 volt.
- B. Interrupting Rating: 200,000 rms amperes.

PART 3 – EXECUTION

2.5. INSTALLATION

- A. Install disconnect switches where indicated on Drawings.
- B. Install fuses in fusible disconnect switches.
- C. Install disconnect switches on all relocated, and/or new equipment where required by code. Absence of disconnect on drawing does not relieve the Contractor of responsibility for meeting code.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Distribution panelboards.
- B. Branch circuit panelboards.

1.2. RELATED SECTIONS

- A. Section 16190 - Supporting Devices.
- B. Section 16195 - Electrical Identification: Engraved nameplates.

1.3. REFERENCES

- A. NECA (National Electrical Contractors Association) "Standard of Installation."
- B. NEMA AB 1 - Molded Case Circuit Breakers.
- C. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- D. NEMA KS 1 - Enclosed Switches.
- E. NEMA PB 1 - Panelboards.
- F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- G. NFPA 70 - National Electrical Code.

1.4. SUBMITTALS

- A. Submit under provisions of Section 15010/16010.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include

instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.5. PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 15010/16010.
- B. Record actual locations of Products; indicate actual branch circuit arrangement.

1.6. OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 15010/16010.
- B. Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.7. QUALITY ASSURANCE

Perform Work in accordance with NECA Standard of Installation.

1.8. QUALIFICATIONS

Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.9. REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

1.10. MAINTENANCE MATERIALS

- A. Provide maintenance materials under provisions of Section 15010/16010.
- B. Provide two of each panelboard key.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

- A. Square D.

- B. General Electric.
- C. Westinghouse/Cutler Hammer.
- D. Substitutions: Under provisions of Section 15010/16010.

2.2. DISTRIBUTION PANELBOARDS

- A. Panelboards: NEMA PB 1, circuit breaker type.
- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards, or as indicated.
- D. Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- E. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1. Provide circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
- F. Controllers: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower, with melting alloy overload relay. Coil operating voltage: 240 volts, 60 Hertz. Size as shown on Drawings. Provide HAND-OFF-AUTO selector, STOP-START pushbutton station, and GREEN indicating light in front cover.
- G. Provide circuit breaker accessory trip units and auxiliary switches as indicated.
- H. Enclosure: As indicated.
- I. Cabinet Front: Surface type, fastened with concealed trim clamps. Provide hinged door with flush lock. Finish in manufacturer's standard gray enamel.

2.3. BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1, circuit breaker type.

- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards, or as indicated.
- D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
- E. Enclosure: As indicated.
- F. Cabinet Front: Surface cabinet front with concealed trim clamps, concealed hinge, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

PART 3 – EXECUTION

3.1. INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Install panelboards plumb. Provide supports in accordance with Section 16190.
- C. Height: 6 ft to top of panelboard; install panelboards taller than 6 ft with bottom no more than 4 inches above floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section 16195.

3.2. FIELD QUALITY CONTROL

Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

SECTION 16577
OBSTRUCTION LIGHTS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Obstruction lighting equipment. (New Tank Only)

1.2. REFERENCES

- A. FAA AC 70/7460-1G - Obstruction Marking and Lighting.
- B. FAA AC 150/5340-21 - Airport Miscellaneous Lighting Visual Aids.
- C. FAA AC 150/5345-1 - Approved Airport Lighting Equipment.
- D. FAA AC 150/5345-43 - Specification for Obstruction Lighting Equipment.

1.3. SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide for each device.

1.4. QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience, and listed in FAA AC 150/5345-1.

1.5. REGULATORY REQUIREMENTS

- A. Conform to FAA AC 70/7460-1G.

PART 2 – PRODUCTS

2.1. OBSTRUCTION LIGHTS

- A. Flashing Red Beacon Lights: FAA AC 150/5345-43: Type L866, weatherproof duplex style.

PART 3 – EXECUTION

3.1. INSTALLATION

- A. Install obstruction lighting equipment to the requirements of FAA AC 150/5340-21.

- B. Install obstruction lighting units on 1-1/4 inch threaded conduit ends.
- C. Install photocell unit on receptacle base.

3.2. FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01410.
- B. Inspect and test obstruction lighting equipment to FAA AC 150/5340-21.

3.3. ADJUSTING

- A. Adjust flash rate and photocell level setpoints to meet requirements of FAA.

END OF SECTION

SECTION 16578

SOLAR POWER EQUIPMENT SPECIFICATION

PART 1 - GENERAL

1.1. WORK INCLUDED

The Tank RTU where indicated shall be powered from 12 volt DC incoming service, generated from solar power equipment as specified herein. The equipment shall consist of a solar array module(s), batteries, solar battery charger/load controller, and necessary connectors, fuses, and enclosures.

The solar array module shall be capable of producing a minimum of 4.73 amps at 16.9 volts, of multi-crystalline cells and mounted on an aluminum frame. The frame shall be capable of being pipe or surface-mounted and contain the necessary hardware for either method. The module shall also contain a 25-year output warranty. The module shall be mounted to the top rail hardware on top of the tank structure.

The batteries shall be 6 volt (2 in series) or 12 volt DC, and shall be of the "deep cycle flooded lead acid" type, 226 amp-hour capacity at the 20 hour rate as a minimum. The batteries shall be mounted within a lockable 12 gauge steel Nema 3R hot dipped galvanized weatherproof battery box with hinged cover.

The battery charge/load controller shall be mounted within a weatherproof enclosure, and indicate battery voltage, charging amperage, and load amperage on an LCD display. The controller shall be reverse-polarity protected, temperature compensated, and disconnect the load upon low voltage. The controller shall contain a 5-year warranty.

Wiring between the solar array and solar controller shall be 8 gauge minimum.

Connections between the solar array and controller, batteries and controller, and the controller and load shall be fused protected and furnished with the above equipment.

END OF SECTION



SECTION 7

CONTRACT AND BOND FORMS

AGREEMENT

PAYMENT BOND

PERFORMANCE BOND

CERTIFICATE OF INSURANCE

NOTICE OF AWARD

NOTICE TO PROCEED

CHANGE ORDER

PARTIAL PAYMENT REQUEST

CERTIFICATE OF SUBSTANTIAL COMPLETION

FORM OF WAIVER AND RELEASE OF LIEN
(General Contractor)

FORM OF WAIVER AND RELEASE OF LIEN
(Sub-Contractor)



AGREEMENT

THIS AGREEMENT, made this the ____ day of _____, and between The Hyden-Leslie County Water District hereinafter called "OWNER", and _____ doing business as (a corporation, a partnership, or individual) hereinafter called "CONTRACTOR."

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

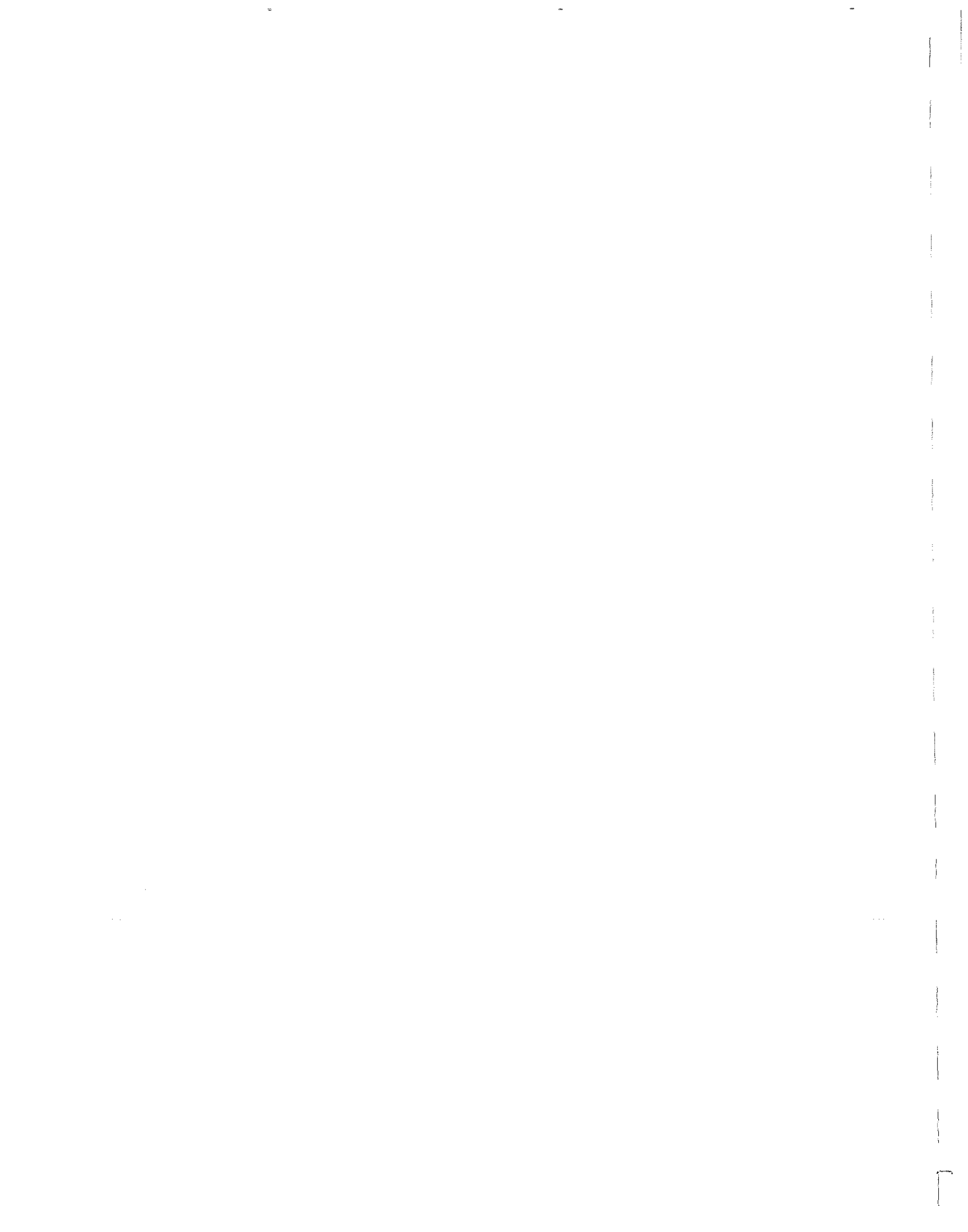
1. The CONTRACTOR will commence and complete the construction of: Contract No. 9 – Water Storage Tanks.
2. The CONTRACTOR will furnish all the material, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the Project Work described herein.
3. The CONTRACTOR will commence the Work required by the CONTRACT DOCUMENTS within 10 calendar days after the date of the NOTICE TO PROCEED and will complete the same within 240 calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS. If the Work is not completed within the 240 calendar days specified. Liquidated Damages will be deducted from the compensation otherwise due him at the rate \$500.00 per calendar day that the Work remains uncompleted.
4. The CONTRACTOR agrees to perform all of the Work described in the CONTRACT DOCUMENTS and to comply with the terms therein for the sum of \$ _____ as shown in the Bid Schedule.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - A. Advertisement for Bids
 - B. Instructions to Bidders
 - C. Bid Form with Certifications



- D. Bid Bond with Power of Attorney
- E. Agreement
- F. General and Supplemental Conditions
- G. Special Conditions
- H. Payment Bond with Power of Attorney
- I. Performance Bond with Power of Attorney
- J. Notice of Award
- K. Notice to Proceed
- L. Change Order
- M. Certificate of Substantial Completion
- N. All Conditions and Technical SPECIFICATIONS prepared or issued by Sisler-Maggard Engineering, PLLC, dated _____ or as amended.
- Q. DRAWINGS prepared by Sisler-Maggard Engineering, PLLC, consisting of _____ sheets for Contract No. 9 – Water Storage Tanks and dated _____ for SME Project No. 03004.
- R. ADDENDA
No. _____, dated _____, 2008
No. _____, dated _____, 2008

6. The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions & Supplemental Conditions such amounts as required by the CONTRACT DOCUMENTS.

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



IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in 6 (six) counterparts each of which shall be deemed an original on the date first above written.

OWNER: Hyden-Leslie County Water District

(SEAL)

BY: _____

ATTEST:

NAME: Fred Ratliff
(PLEASE TYPE)

TITLE: Chairman

NAME: _____
(PLEASE TYPE)

TITLE: _____

ADDRESS: 325 Wendover Rd.
HC 61 Box 2590
Hyden, Kentucky 41749

PHONE: 606-672-2791
FAX: 606-672-7510

(SEAL)

CONTRACTOR: _____

BY: _____

ATTEST:

NAME: _____
(PLEASE TYPE)

TITLE: _____

NAME: _____

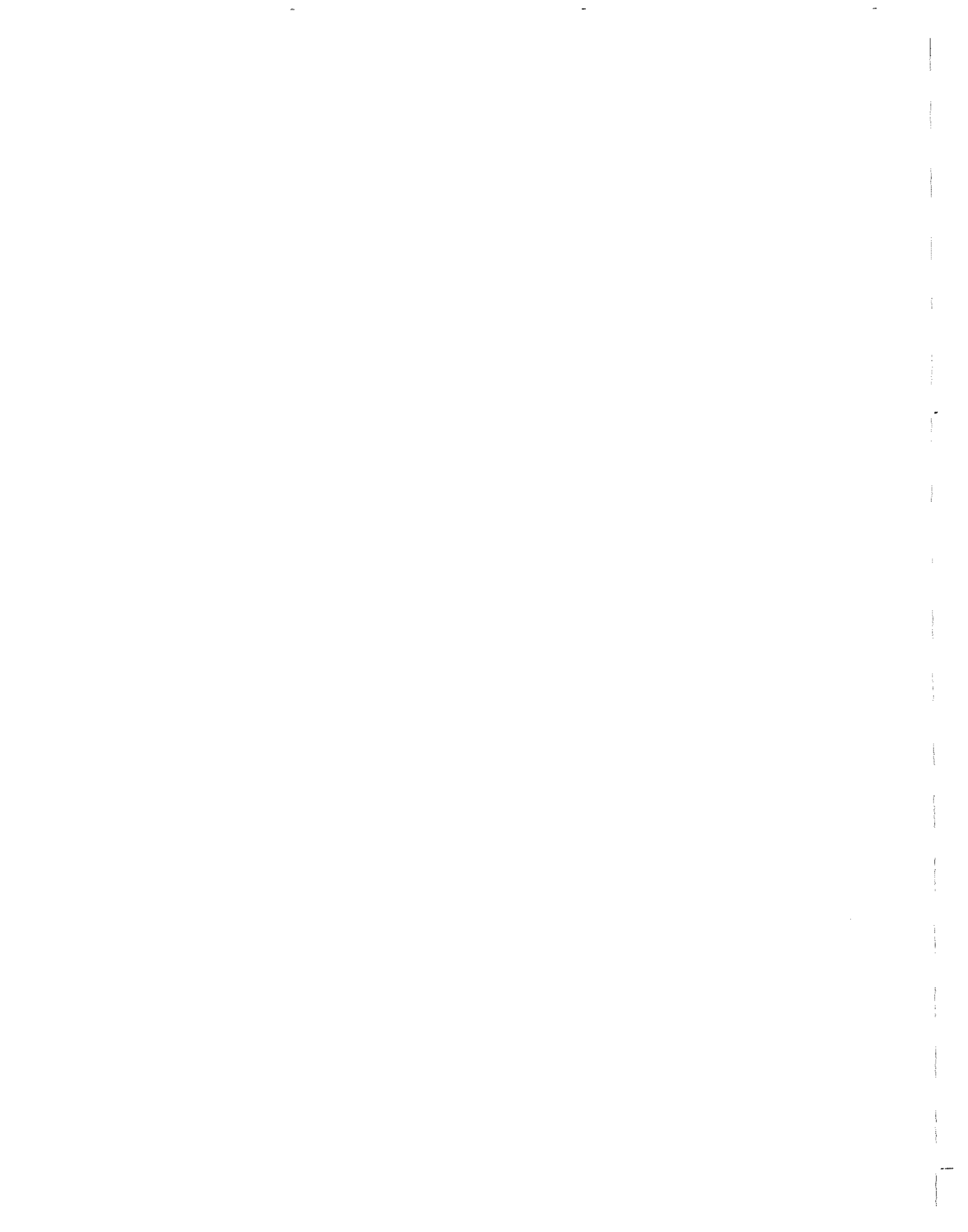
ADDRESS: _____

_____ (PLEASE TYPE)

TITLE: _____

PHONE: _____

FAX: _____



PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal,

and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

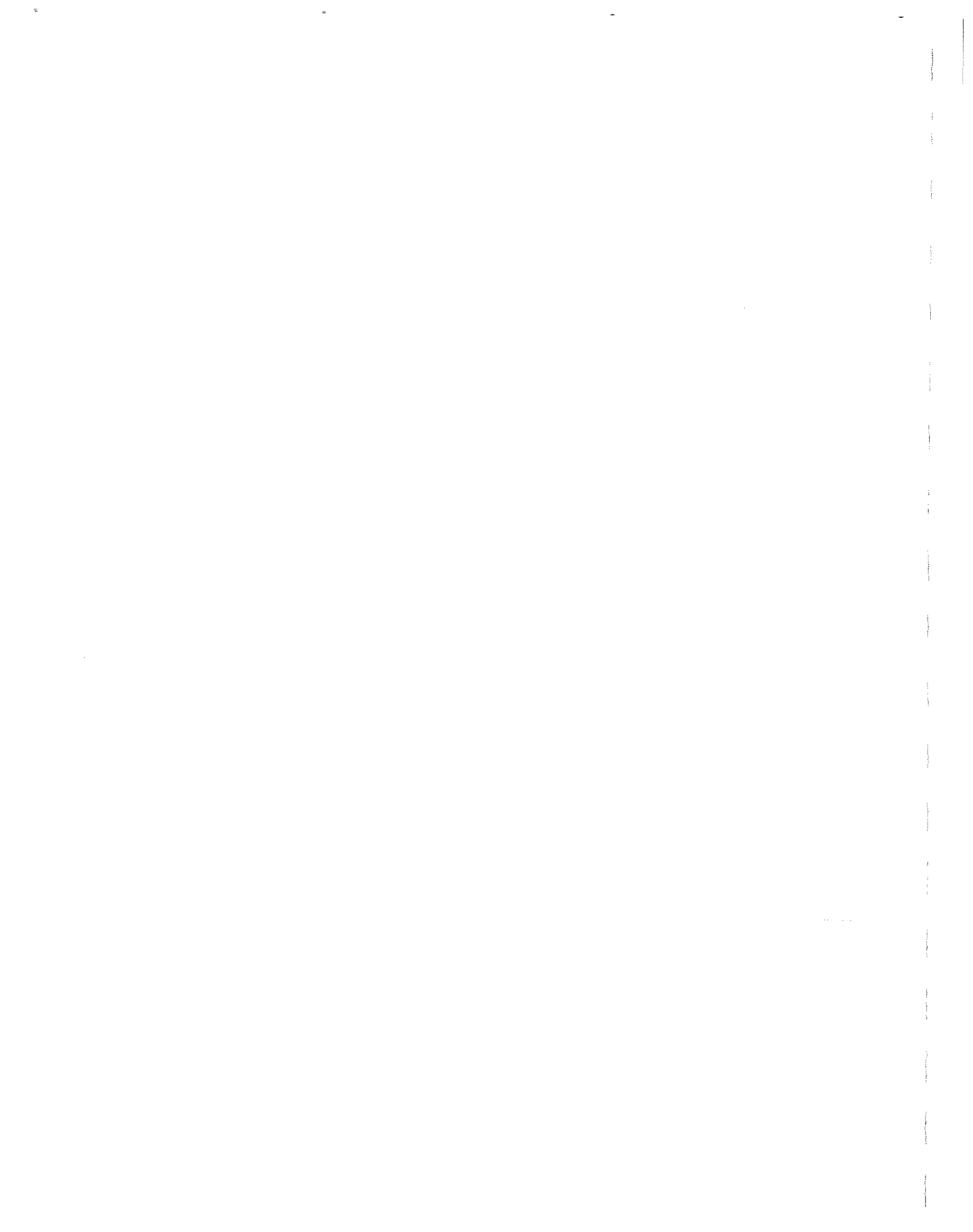
(Name of Owner)

(Address of Owner)

hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars (\$_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the ____ day of _____, 2008, a copy of which is hereto attached and made a part hereof for the construction of: **Contract No. 9 – Water Storage Tanks.**

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal, and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor



cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

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

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL (or with the GOVERNMENT in the event the GOVERNMENT is performing the obligations of the OWNER), shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (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 the PRINCIPAL, 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. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the 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.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no financial settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.



IN WITNESS WHEREOF, this instrument is executed in _____ counterparts,
(number)

each one of which shall be deemed an original, this the _____ day of _____, 2008

ATTEST:

(Principal)

(Principal Secretary)

(SEAL)

BY: _____(s)

(Witness as to Principal)

(Address)

(Address)

(Surety)

ATTEST:

BY: _____
Attorney-in-Fact

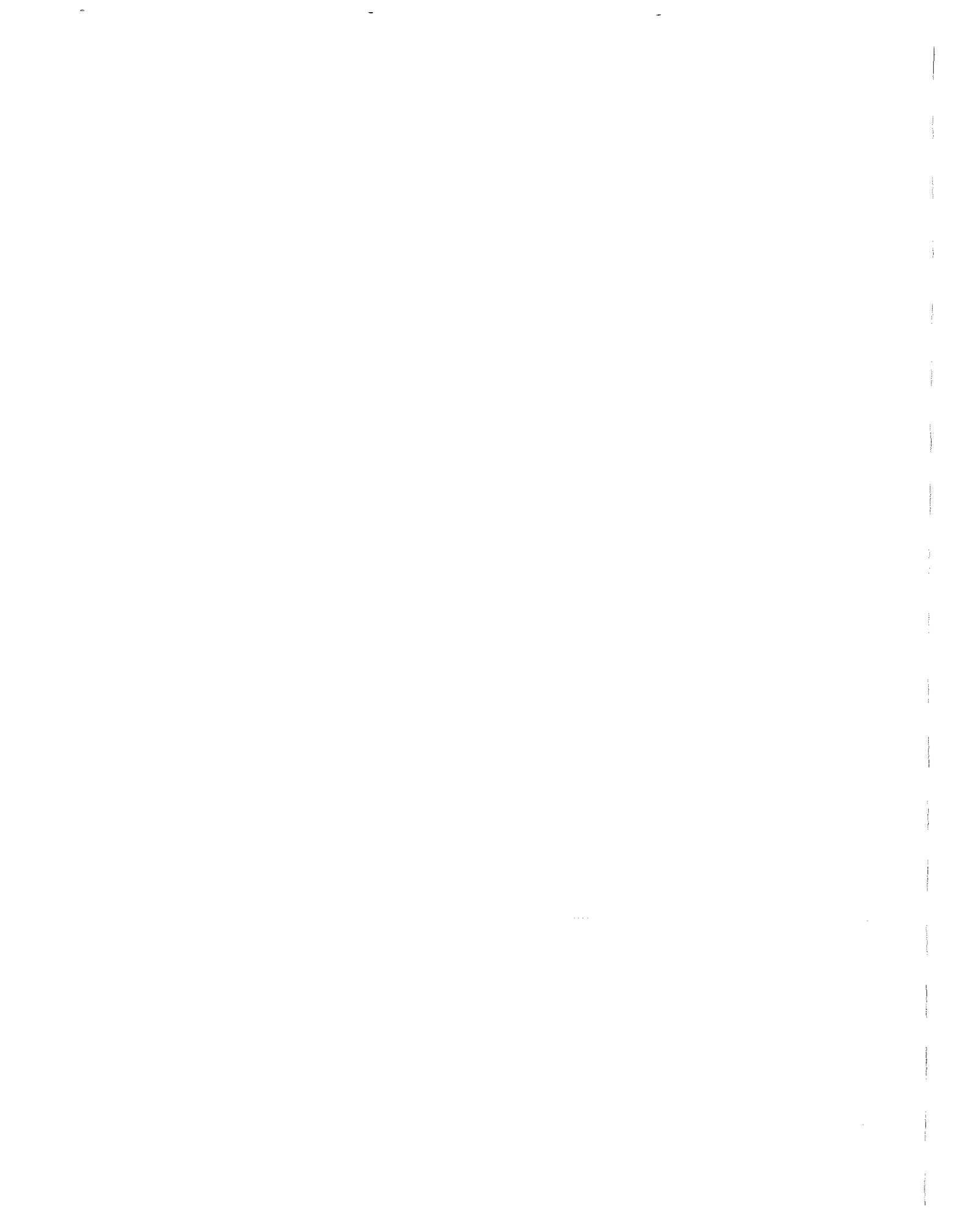
(Witness to Surety)

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of CONTRACT. If CONTRACTOR is a partnership, all partners shall execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in Kentucky.



PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

_____, hereinafter called Principal,
and
(Corporation, Partnership or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

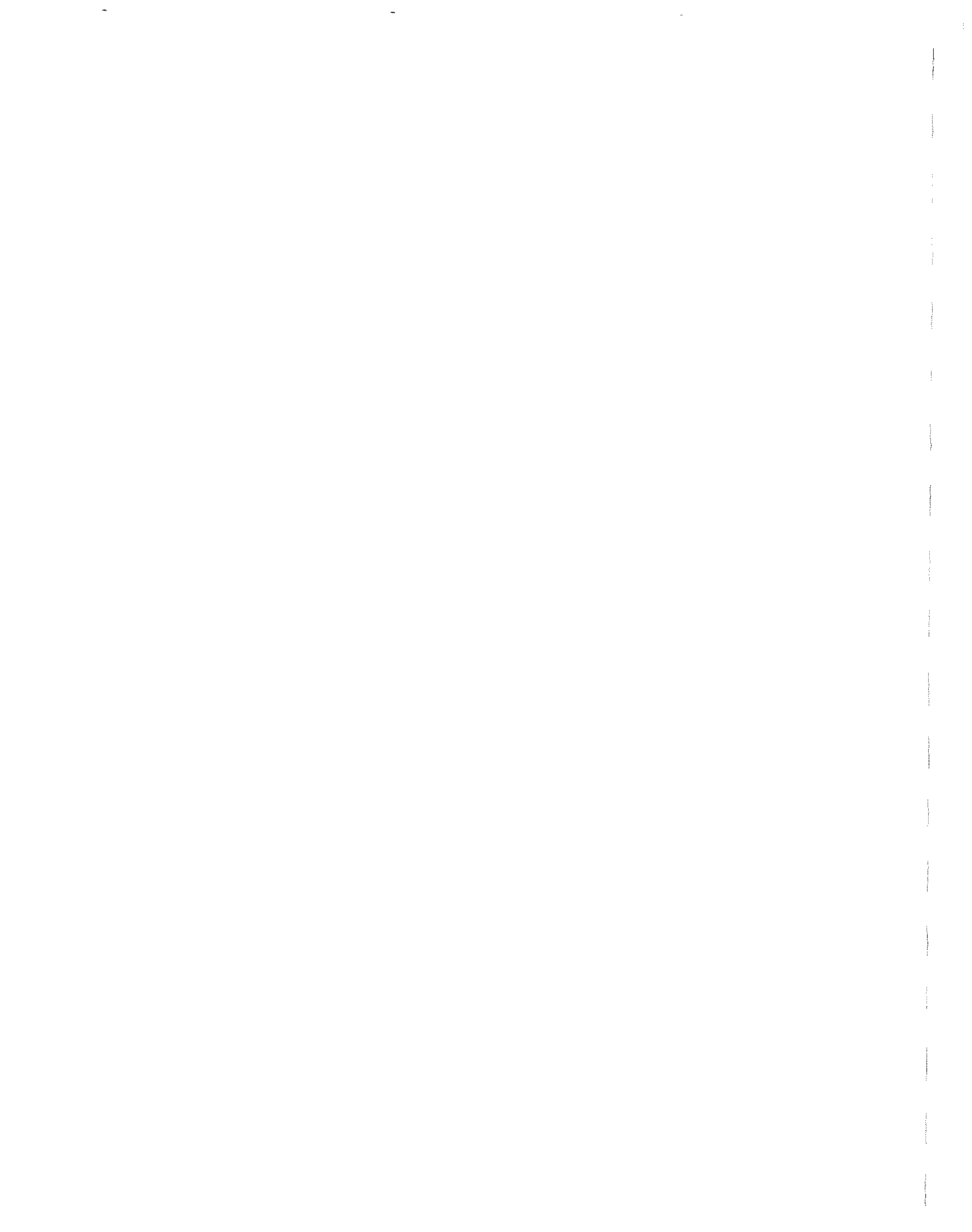
(Address of Owner)

hereinafter called OWNER in the total aggregate sum of _____ Dollars (\$)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the ____ day of _____, 2008, a copy of which is hereto attached and made a part hereof for the construction of:

Contract No. 9 – Water Storage Tanks



NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one year guaranty period, and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then his obligation shall be void otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no financial settlement between the OWNER and the PRINCIPAL shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER are the only beneficiaries hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts,
(number)
each one of which shall be deemed an original, this the _____ day of _____, 2008.

ATTEST:

(Principal)

(Principal Secretary)
(SEAL)
(s)

BY: _____

(Witness as to Principal)

(Address)

(Address)

ATTEST:

(Surety)

(Surety Secretary)
(SEAL)
(s)

BY: _____

(Witness to Surety)

(Attorney-in-Fact)

(Typed Name)

(Address)

(Phone)

NOTE: Date of BOND must not be prior to date of CONTRACT.

If CONTRACTOR is a partnership, all partners shall execute BOND.

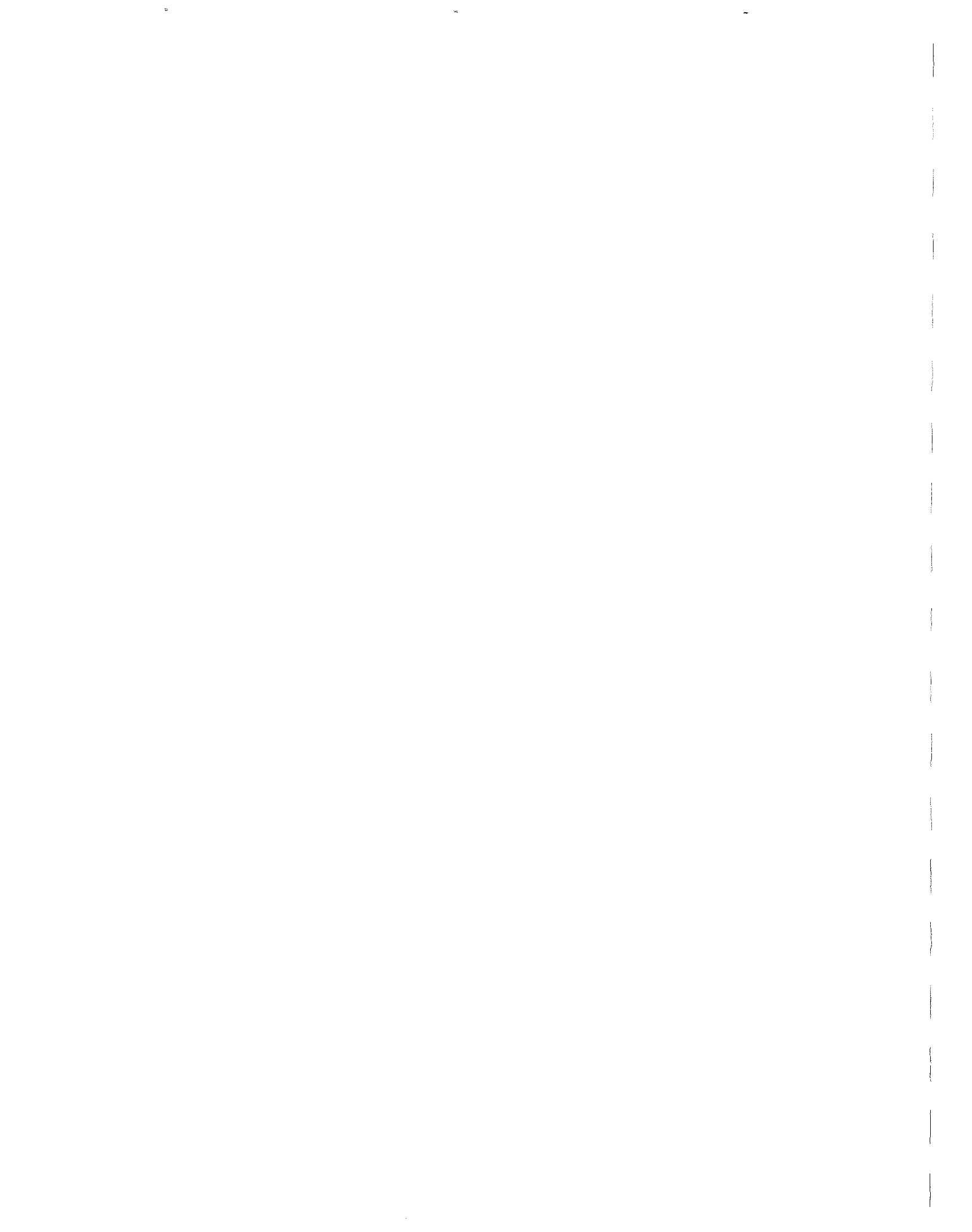
IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.



CERTIFICATE OF INSURANCE

TO BE FURNISHED

BY SUCCESSFUL BIDDER



NOTICE OF AWARD

TO: _____

PROJECT Description: The project includes but is not limited to, the construction of:

Contract No. 9 – Water Storage Tanks

The OWNER has considered the BID submitted by you for the above described WORK in response to its for Bids received _____, and Instructions for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, and Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 2008.

OWNER

BY: _____
Fred Ratliff

TITLE: Chairman

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by _____

this the _____ day of _____, 2008.

By: _____

Title: _____



NOTICE TO PROCEED

TO: _____
(Contractor)

DATE: _____

ADDRESS:

OWNER'S PROJECT NO. 03004
PROJECT Water Storage Tanks
OWNER'S CONTRACT NO. 9

You are hereby notified to commence WORK in accordance with the Agreement dated _____ on or before _____, and you are to complete the WORK within 240 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____.

Owner

By: _____

Name: Fred Ratliff

Title: Chairman

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

this the _____ day of _____, 2008.

By: _____

Name: _____

Title: _____

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

CHANGE ORDER

Order No. _____

Date: _____

Agreement Date: _____

NAME OF PROJECT: _____

OWNER: _____

CONTRACTOR: _____

The following changes are hereby made to the CONTRACT DOCUMENTS:

Justification:

Change to CONTRACT PRICE:

Original CONTRACT PRICE \$ _____

Current CONTRACT PRICE adjusted by previous CHANGE ORDER \$ _____

The CONTRACT PRICE due to this CHANGE ORDER will be increased by: \$ _____

The new CONTRACT PRICE including this CHANGE ORDER will be \$ _____

Change to CONTRACT TIME:

The CONTRACT TIME will be increased by _____ calendar days.

The date for completion of all work will be _____ [Date].

Approvals Required:

To be effective this Order must be approved by the Federal agency if it changes the scope or objective of the PROJECT, or as may otherwise be required by the SUPPLEMENTAL GENERAL CONDITIONS.

Requested by: _____

Contractor

Date

Recommended by: _____

Sisler-Maggard Engineering, PLLC.

Date

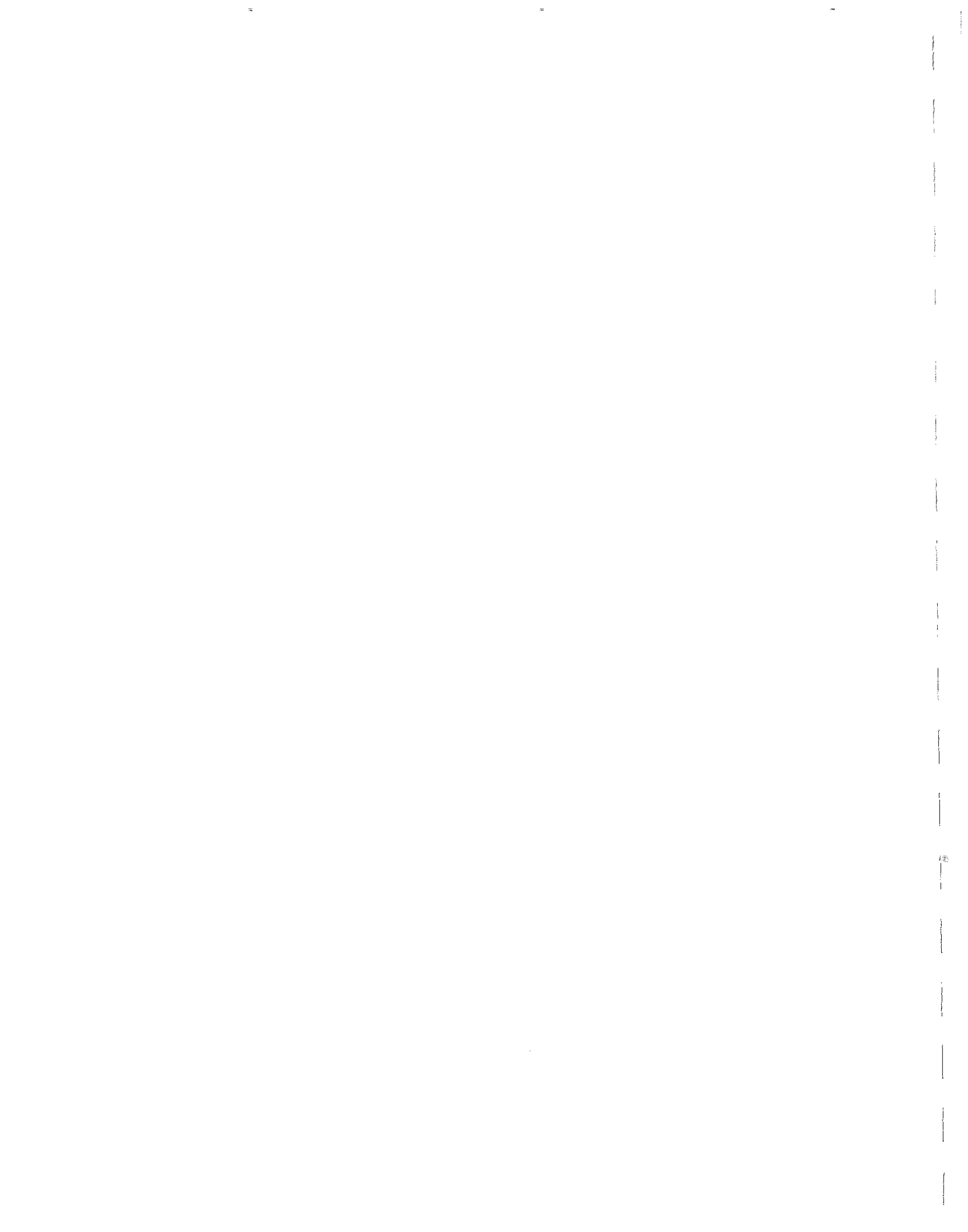
Approved by: _____

Hyden-Leslie County Water District

Date



**PAY REQUEST FORM
WILL BE FURNISHED ON DISC
BY THE ENGINEER
AT PRE-CONSTRUCTION CONFERENCE**



CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER's Project No: _____ ENGINEER's Project No.: 03004
Project Contract No. 9 – Water Storage Tanks

CONTRACTOR
Contract For _____

This Certificate of Substantial completion applies to all Work under the Contract Documents or to the following specified parts thereof:

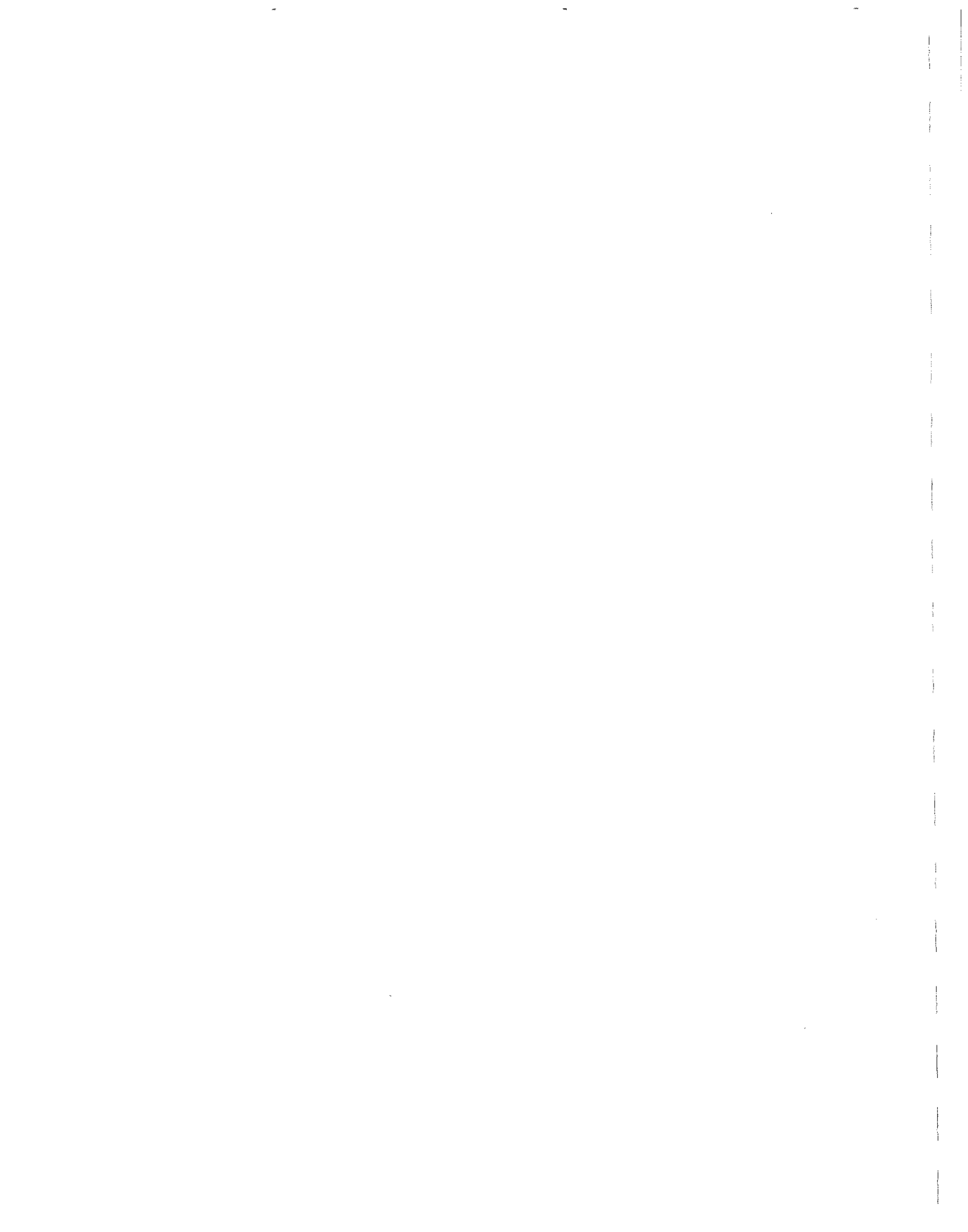
To _____
OWNER

And To _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.



The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance, and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____ 2008

Sisler-Maggard Engineering, PLLC

ENGINEER

By: _____

Joseph F. Sisler, P.E., P.L.S., President

CONTRACTOR accepts this Certificate of Substantial Completion on _____ 2008

CONTRACTOR

By: _____

OWNER accepts this Certificate of Substantial Completion on _____ 2008

Hyden-Leslie County Water District

OWNER

By: _____

Fred Ratliff, Chairman



FORM OF WAIVER AND RELEASE OF LIEN

(General Contractor)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned has performed or furnished, is performing, or furnishing, or will perform or furnish labor or material, fuel, equipment, tools, etc., in connection with the construction of *

_____ for** _____
_____ at** _____
_____.

NOW, THEREFORE, THESE PRESENTS WITNESS, that the undersigned, for a good and valuable consideration to the undersigned well and truly paid at or before the signing and delivery hereof, the receipt whereof is hereby acknowledged, does hereby waive, release and relinquish any and all claims, liens and rights and claims of liens which the undersigned now has, or may hereafter have, on or against the said premises and the building, plant, equipment and machinery of their Owner, ***

*** _____, or on or against*** _____
_____, on account of labor performed or to be performed or material, fuel, equipment, tools, etc., furnished or to be furnished by the undersigned for use in or in connection with the construction and erection of said project; so that*** _____, its successors and assigns, shall and may have, hold and enjoy the same freed and discharged now has or might or could have if these presents had not been made.

IN WITNESS WHEREOF, the undersigned has hereunto set his hand and seal this _____ day of _____, 2008.

Name of General Contractor

By _____
Signature of Officer or Partner

Title or Officer

WITNESS:

- *Insert name of building or project
- **Insert address of building project
- ***Insert name of Owner



FORM OF WAIVER AND RELEASE OF LIEN

(Sub-Contractor)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned has performed or furnished, is performing, or furnishing, or will perform or furnish labor or material, fuel, equipment, tools, etc., in connection with the construction of *

_____ for**
_____ at**
_____.

NOW, THEREFORE, THESE PRESENTS WITNESS, that the undersigned, for a good and valuable consideration to the undersigned well and truly paid at or before the signing and delivery hereof, the receipt whereof is hereby acknowledged, does hereby waive, release and relinquish any and all claims, liens and rights and claims of liens which the undersigned now has, or may hereafter have, on or against the said premises and the building, plant, equipment and machinery of their Owner, ***

*** _____, or on or against*** _____, its successors and assigns, or on or against the General Contractor*** _____, his or its heirs, executors, administrators, successors and assigns, under the laws of the Commonwealth of Kentucky, on account of labor performed or to be performed, or material, fuel, equipment, tools, etc., furnished or to be furnished by the undersigned for use in or in connection with the construction and erection of said building; so that the said*** _____, its successors and assigns, shall may have, hold and enjoy same freed and discharged from all liens, claims and demands whatsoever which the undersigned now has or might or could have if these presents had not been made.

IN WITNESS WEREOF, the undersigned has hereunto set his hand and seal this _____ day of _____, 2008.

Name of Sub-Contractor

By _____
Signature of Officer or Partner

Title or Officer

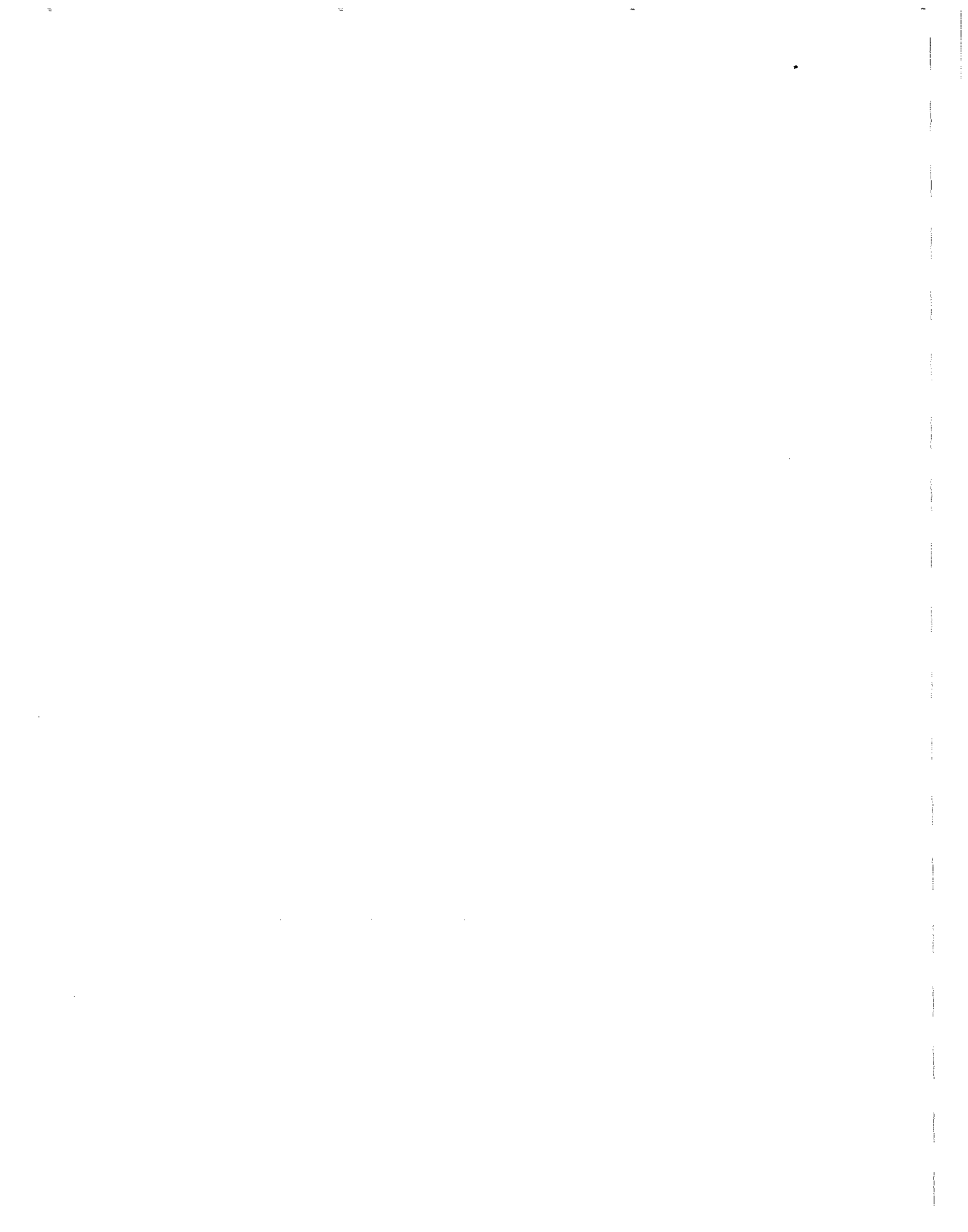
WITNESS:

*Insert name of building or project

**Insert address of building project

***Insert name of Owner

****Insert name of General Contractor



SECTION 8

BID FORMS AND BID BONDS

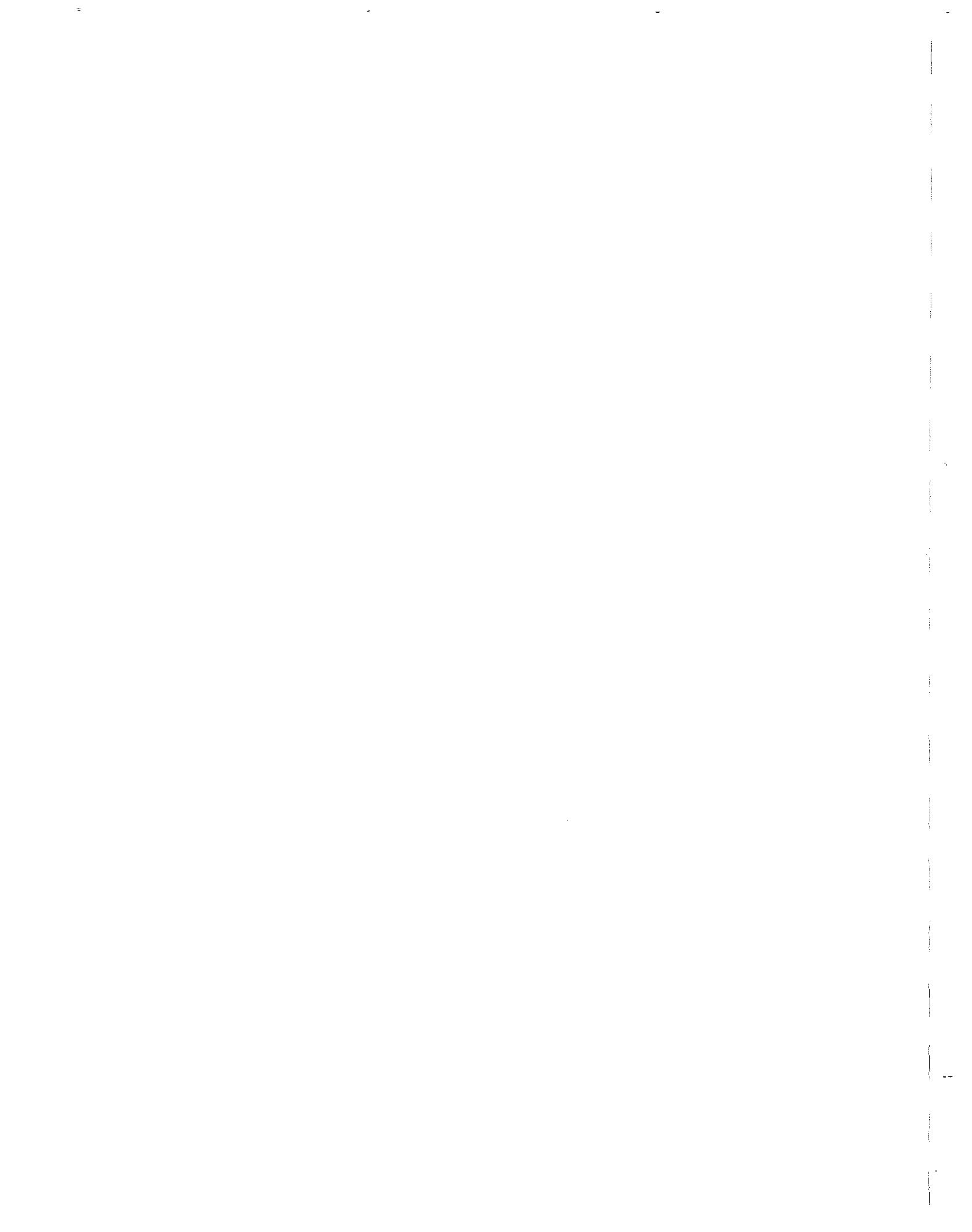
BID FORMS INCLUDING SUBCONTRACTORS & MANUFACTURERS LIST

BID BOND WITH POWER OF ATTORNEY

BIDDER'S QUALIFICATIONS STATEMENT

**Forms presented in this Section 8 must be used. No Substitutes will be allowed.
An extra set of the above forms will be furnished to each plan holder for preparation of bids.**

All of the above forms must be submitted with bids on each contract.



BID FORM

HYDEN-LESLIE COUNTY WATER DISTRICT
CONTRACT NO. 9 – WATER STORAGE TANKS

BIDDER'S PROPOSAL

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____, doing business as (a partnership, or a corporation, or an individual) _____, to Hyden-Leslie County Water District (hereinafter called "OWNER").

In compliance with the Advertisement for Bids, BIDDER hereby proposes to furnish all equipment, materials, and labor for the work required to construct the Contract No. 9 – Water Storage Tanks in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

BID SCHEDULE

ITEM DESCRIPTION	APPROX. QUANTITY	UNIT COST	TOTAL COST
1. 50,000 Gallon Ground Storage Tank (Leeco Road) and appurtenances	1	LS	_____
2. 150,000 Gallon Ground Storage Tank (Rockhouse) and appurtenances	1	LS	_____
TOTAL AMOUNT BID			_____

BIDDER agrees to perform all of the Work described in the Specifications and shown on the Plans for the bid price of : _____ Dollars and _____ Cents (\$_____). (Amount shall be shown in both words and figures. The Unit Price shall govern. The Owner will make corrections in extensions and additions to determine the Total Bid Amount for Award.

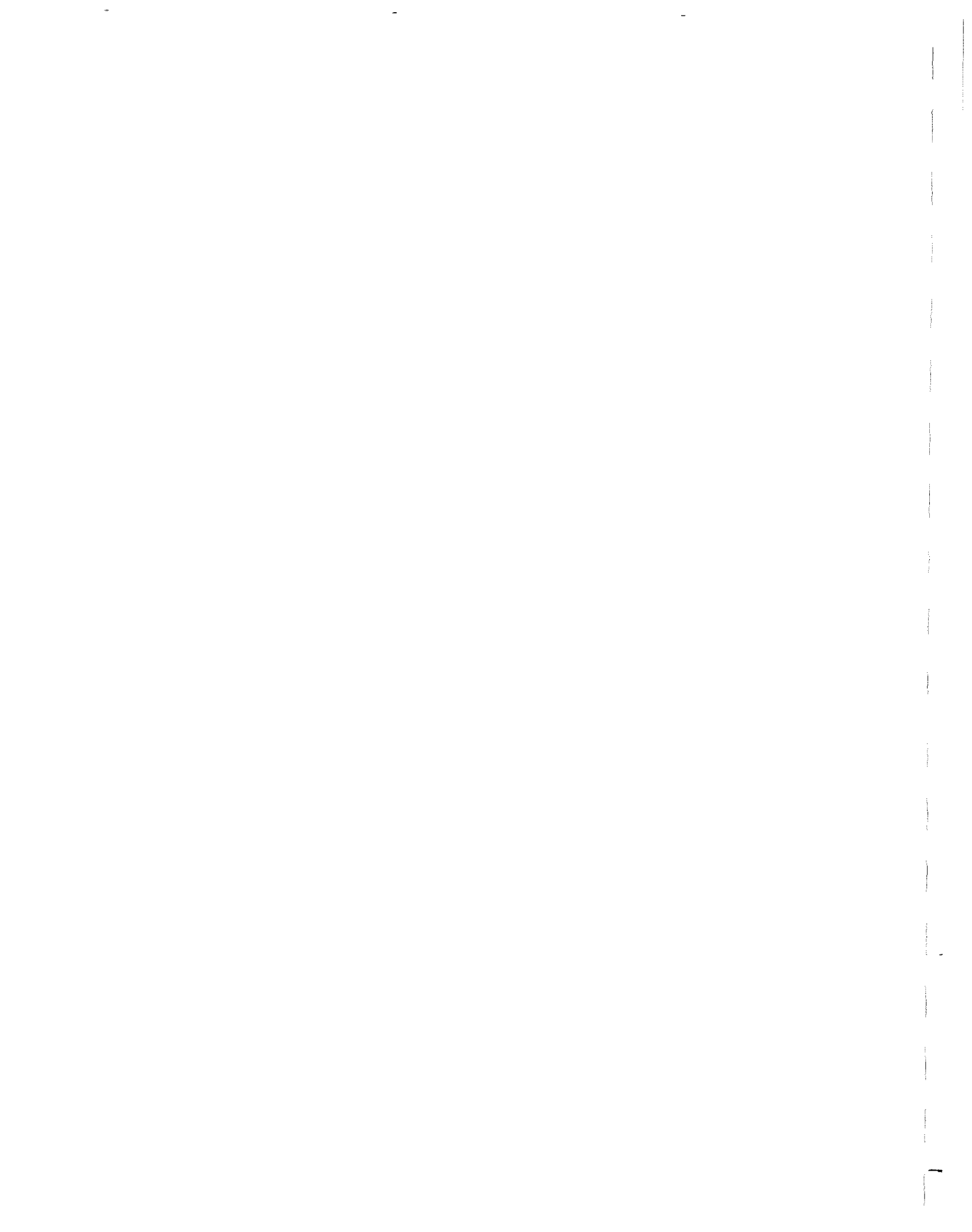
The quantities of each item on the bid, as finally ascertained at the close of the contract, will determine the total payments to accrue under the contract.

No bid will be considered unless all items in the Bid Schedule are priced, and only one contract will be awarded.

The bid will be awarded in the aggregate total of the Bid Schedule.

The above price shall include all labor, materials, overhead, profit, insurance, and other costs necessary to cover the finished work of the several kinds called for including incidentals not set out as specific bid items and in accordance with Basis for Payment (Section 01740 of Specifications). The price per foot for pipe installation includes all labor, materials, excavation backfill, clean-up, seeding, testing etc., for a finished product. Changes shall be processed in accordance with Article 14 of the General Conditions.

By submission of this Bid, the BIDDER certifies, and in the case of a joint Bid, each party thereto



certifies as to its own organization, that this Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid, with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project within 240 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$500.00 for each consecutive calendar day thereafter as provided in Article 13 of the General Conditions.

Accompanying this Proposal is a certified check or standard Bid Bond in the sum of Dollars (\$ _____) in accordance with the Information for Bidders to the OWNER that the amount of the bid security deposited with this Bid fairly and reasonably represents the amount of damages the OWNER will suffer due to the failure of this BIDDER to fulfill his agreements as provided in this Proposal.

BIDDER acknowledges receipt of the following Addenda:

Addenda #1	Dated	Addenda #4	Dated
Addenda #2	Dated	Addenda #5	Dated
Addenda #3	Dated	Addenda #6	Dated

BIDDER agrees that the OWNER reserves the right to delete the whole or any part of the Project from the Contract.

BIDDER understands that the OWNER reserves the right to reject any or all Bids and to waive any informalities in the Bidding.

BIDDER agrees that this Bid shall be good and may not be withdrawn for a period of forty four (45) calendar days after the actual date of bid opening.

Within ten (10) calendar days after receiving written notice of the acceptance of this Bid by the OWNER, the Bidder will execute and deliver to the OWNER six (6) copies of the Agreement and such other required Contract Documents.

BIDDER: _____

BY: _____

TYPED NAME: _____

TITLE: _____

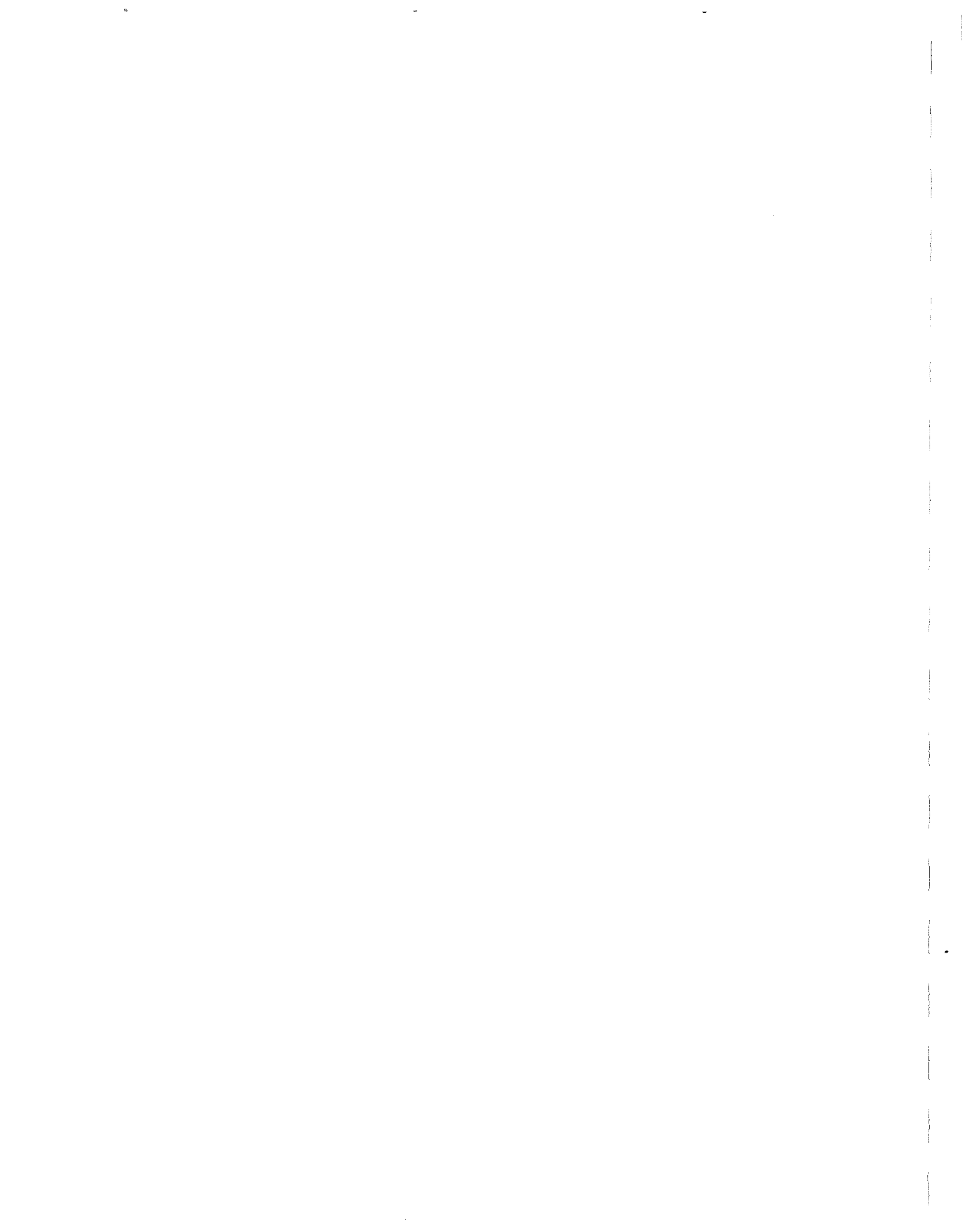
(Seal - If bid is by a corporation)

ADDRESS: _____

DATE SIGNED: _____

PHONE NO.: _____

FAX NO.: _____







BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto _____ as OWNER in the penal sum of _____ (\$ _____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed, this ____ day of, _____, 2008. The Condition of the above obligation is such that whereas the Principal has submitted to a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing for the

Contract No. 9 – Water Storage Tanks

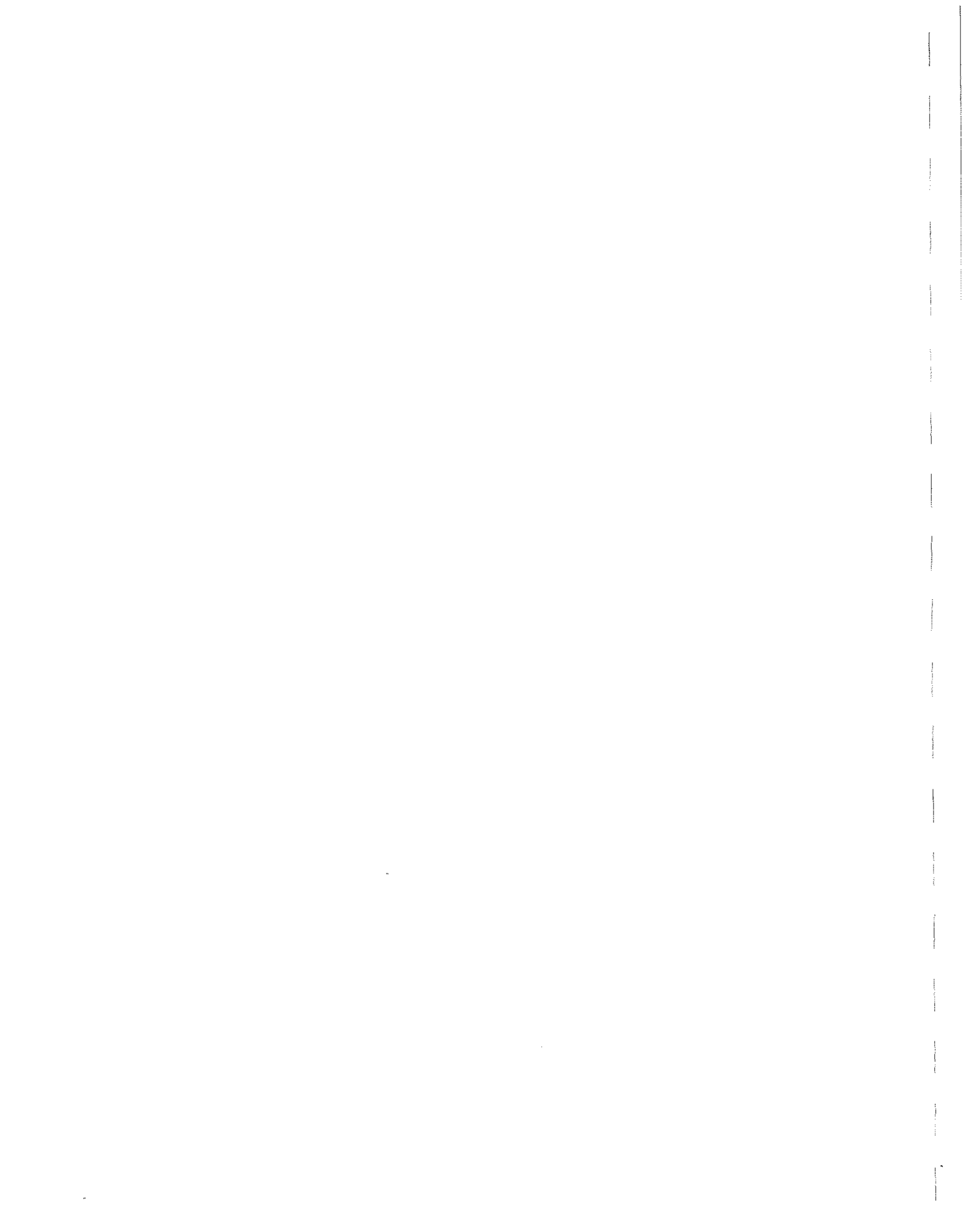
NOW THEREFORE,

- (a) If said BID shall be rejected, or in the alternate.
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then the obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by an extension of the time within which the OWNER may accept such BID, and said Surety does hereby waive notice of any such extension.

IN WITNESS HEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.



Principal: _____

Surety: _____

BY: _____

Signature: _____

Typed Name: _____

DATE: _____

PHONE: _____

FAX: _____

IMPORTANT:

Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.



BIDDER'S QUALIFICATIONS

The Bidder's Qualifications are required by the Owner to be submitted as set forth herewith:

1. Name of Firm : _____
2. This Firm is Corporation or _____Partnership or _____Proprietorship.
3. A permanent place of business is maintained at:

Street	City	State	Zip Code
--------	------	-------	----------

4. The following construction plant and equipment will be made available for use on this contract:

5. In the event the contract is awarded the undersigned, surety bonds will be furnished by:

6. Experience of Contractor on other similar work:

Total Contract	Client Name & Address	Phone	Reference
----------------	-----------------------	-------	-----------

Contract No. _____

Type _____ \$ _____ _____

Contract No. _____

Type _____ \$ _____ _____

Contract No. _____

Type _____ \$ _____ _____

Contract No. _____

Type _____ \$ _____ _____



7. We now have the following jobs under contract and bonded:

Total Contract	Percent Completed	Client Name & Address	Phone	Name of Reference
Contract No. \$ _____				
Location _____				
Contract No. \$ _____				
Location _____				
Contract No. \$ _____				
Location _____				
Contract No. \$ _____				
Location _____				

8. **FINANCIAL STATEMENT: SEE ATTACHED BALANCE SHEET**

Statement of Assets and Liabilities as of _____, 2007.

This Statement should be prepared by applicant, his bookkeeper, or accountant. Audit report by CPA or licensed accountant may be required.

ASSETS	LIABILITIES
Cash in Bank	Notes Payable
Cash on Hand	(a) Banks
	(b) Material men
	(c) Other
Accounts Receivable (Including Retentions)	
(a) Completed Contracts	
(b) Uncompleted Contracts	
Accounts Payable	(a) Sub-Contractors
Unbilled Job Costs	



(b) Material men

 Other Accounts Receivable

 Marketable Securities

 Billings in Excess of Job Costs

 Materials in Stock Not
Included in Items above

 Current Debt
(Due in 1 Year)

 (a) For Jobs underway

 (a) Equipment

 (b) Other

 (b) Real Estate

 Income Tax

 (a) Current

 Automobiles

 Sub-Total Current Assets

 Sub-Total Current Liabilities

 Notes Receivable

 Equipment Debt-Over 1 year

 Cash Value Life Insurance

 Real Estate Debt-Over 1 year

 Equipment at Book Value

 Real Estate at Book Value

 (a) Business

 (b) Homestead

 (c) Investment

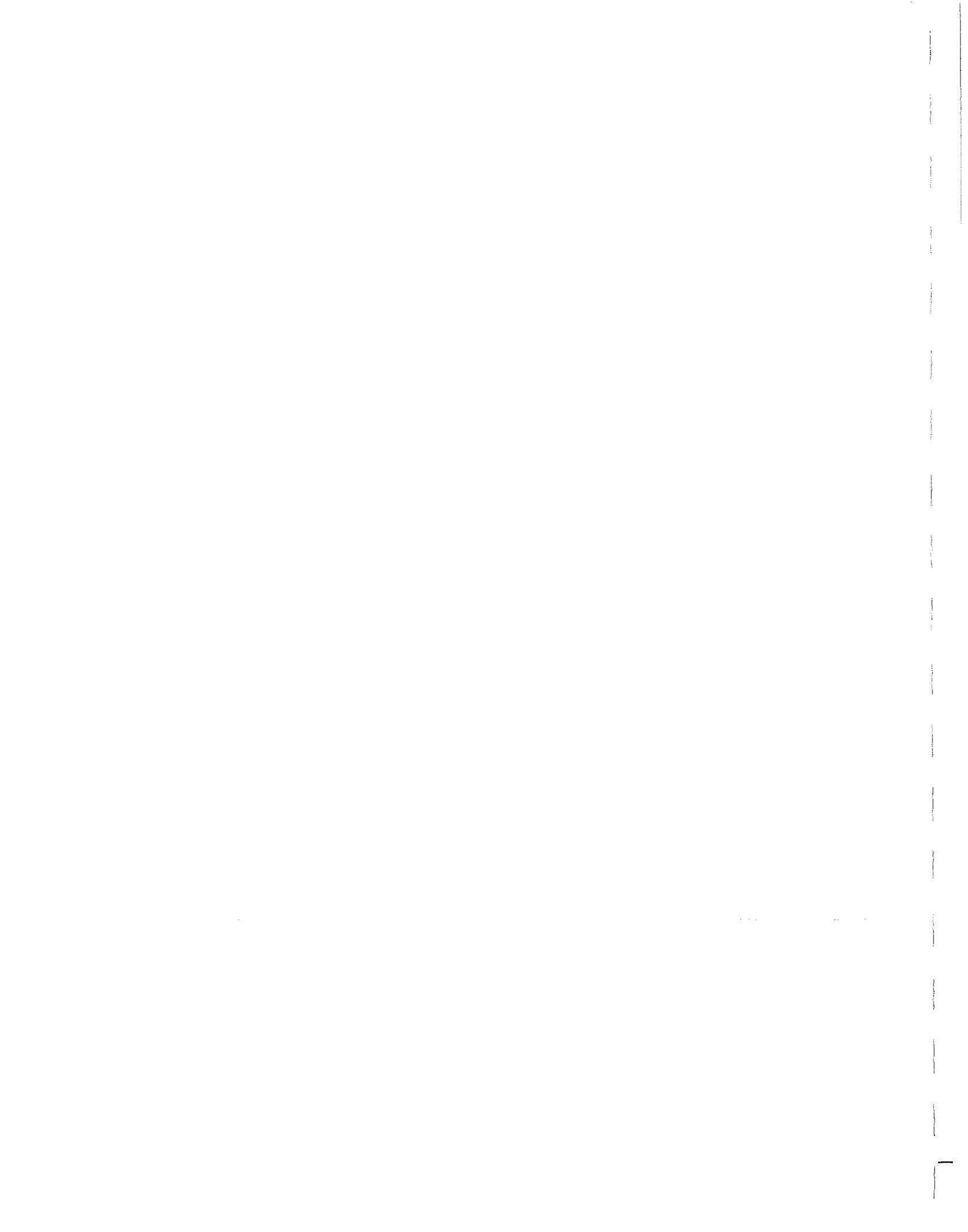
 Automobiles

 Furniture & Fixtures

 Capital Stock
Surplus & Undivided Profits

 Total Assets

 Total Liabilities



TOTAL ASSETS MUST EQUAL TOTAL LIABILITIES

Respectfully Submitted: _____

Company Name

Signature Address

Name Typed

Title Date

Phone Fax

ATTEST: _____

