IOWA DEPARTMENT OF NATURAL RESOURCES

PROJECT MANUAL

LEWIS & CLARK STATE PARK

WATER TREATMENT SYSTEM REPLACEMENT

MONONA COUNTY, IOWA

PREPARED BY

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING BUREAU
502 E. 9TH STREET, WALLACE STATE OFFICE BUILDING
DES MOINES, IOWA 50319-0034

PROJECT N0. 13-01-67-01

Obtain complete sets of contract documents including Drawings, Specification, bid documents, bidders' list in electronic format at: *www.beelineandblue.com*

PROJECT MANUAL

FOR

WATER TEATMENT SYSTEM REPLACEMENT
LEWIS & CLARK STATE PARK

MONONA COUNTY, IOWA

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING BUREAU
DES MOINES, IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Shahid Hameed Date

My license renewal date is December 31, 2016.

Pages or sheets covered by this seal: ALL

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LEWIS & CLARK STATE PARK
WATER TREATMENT SYSTEM REPLACEMENT
MONONA COUNTY, IOWA
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LEWIS & CLARK STATE PARK
WATER TREATMENT SYSTEM REPLACEMENT
MONONA COUNTY, IOWA
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Notice to Bidders - Iowa Department of Natural Resources

Sealed bids will be received by the Iowa Department of Natural Resources, Engineering Bureau, at the Wallace State Office Building, 502 East 9th Street, Des Moines, Iowa 50319-0034 until **11:00 A.M., March 24, 2016** for the public improvement projects listed below, at which time they will be opened publicly. No bids shall be accepted by FAX. After the bid opening, information concerning bid results may be obtained by visiting the Department's website at www.iowadnr.gov.

> **Note:** The United States Postal Service (USPS) does not deliver mail or packages directly to the address provided above but rather to the Capitol Complex Mail Room. Extra time should be allotted for proposals sent by the USPS. The Iowa Department of Natural Resources shall not consider bids if they are not received by the Department of Natural Resources, either at its mail room or at its Fourth Floor Reception Desk, by the time and date described in this Notice to Bidders, regardless of whether the bid was mailed prior to that time and date or whether the bid was received at the Capitol Complex Mail Room or other state government location prior to that time and date.

Project documents, including drawings, specifications, proposal forms and addenda items for the project are available at Beeline and Blue, at 2507 Ingersoll Ave., Des Moines, Iowa 50312. Please visit www.beelineandblue.com or contact (515) 244-1611 for more information. Alternatively, Bid Documents can be viewed or printed online at https://programs.iowadnr.gov/engreal/projectlist.asp

The Department shall comply with all public improvement procurement laws, as outlined in the plans and specifications and including but not limited to: Iowa Code chapter 26 related to public construction bidding; Iowa Code chapter 73 related to preferences; Iowa Code chapter 573 related to labor and materials on public improvements; rules promulgated by the Department of Administrative Services – General Services Enterprise as they may apply; rules promulgated by the Department of Natural Resources and the Natural Resources Commission, as they may apply; and any federal statutes, rules and/or executive orders that may be associated depending on funding sources. Bidders shall comply with these laws to be considered and are encouraged to be familiar with public improvement procurement requirements and the bidding documents before submitting a bid.

Each bidder shall accompany the bid with a bid security as defined in Iowa code section 26.8. The bid security must be in an amount set forth in the bidding documents and made payable to the Iowa Department of Natural Resources. Failure to execute a contract for the proposed work and file an acceptable Performance Bond in an amount equal to 100% of the contract price and a certificate of liability insurance within thirty (30) days of the date of the award of the contract will be just and sufficient cause for the rescinding of the award and the forfeiture of the bid security.

SPECIAL NOTICE TO CONTRACTORS

CONTRACTOR IS RESPONSIBLE FOR CONTACTING STATE STORMWATER PROGRAM COORDINATOR (515/725-8417) FOR INFORMATION RELATING TO STORM WATER PERMIT THAT IS NECESSARY IF CONSTRUCTION ACTIVITIES DISTURB ONE ACRE OR MORE.

Direct questions concerning the Project Design, Drawings and Specifications to:

Mike Hameed
Facilities Engineer
DNR Central Office
Des Moines, IA 50319
Ph: (515) 725-8467

Direct questions concerning Site Review and Project Inspection to:

Jeff Felts, District Inspector
Hinton, Iowa
Telephone: 515/250-3712

Direct questions concerning Bidding and Contract Procedures to:

Kim Alliss, DNR Procurement
Wallace State Office Building
Des Moines, Iowa 50319-0034
Telephone: 515/725-0733

In accordance with House File 2622 implemented by Iowa Code Sections 442.42 (15) & (16) and 422.47.47(5), Contractors may purchase qualifying items for work on this contract exempt from sales tax. The DEPARTMENT will issue an authorization letter and exemption certificate to the prime contractor and each approved subcontractor." ***Complete information on qualifying materials and supplies can be found at www.state.ia.us/tax, the Iowa Department of Revenue and Finance (IDRF) Web site. Links are found in the Business Taxes and Local Government categories. 701 IAC 19.1-20 is found in Tax Research/Tax Research Library.***

Recorded bid results can be accessed at *https://programs.iowadnr.gov/engreal/projectlist.asp*. Printed bid tabs will not be available for 3 working days after the Letting date.

Time and Date of Letting **11:00 AM, March 24, 2016**

PROPOSAL

Project No. **13-01-67-01**

Project Description and Location

WATER TREATMENT SYSTEM REPLACEMENT
LEWIS & CLARK STATE PARK
MONONA COUNTY, IOWA

Proposal of: _____
(Name of Bidder)

Located at: _____ ( ) _____
(Address) (Area) (Telephone)

Amount of Proposal Guarantee	Specified completion date or Number of Working Days	Approx. or Specified Starting Date or Number of Working Days	Liquidated Damages Per Day
$10,000	JUNE 30, 2016	N/A	$300

The undersigned hereby agrees, if awarded the contract, to execute the proposed contract and to furnish an approved performance bond in a amount not less than 100 percent of the contract award within 30 days after the date of approval of award of the contract, and to provide all labor, materials, and equipment required to complete the project designated above, for the price hereinafter set forth, in strict compliance with the contract documents prepared by the Iowa Department of Natural Resources.

The undersigned agrees, if awarded the contract, to commence the work within a reasonable time after the preconstruction conference or by the specific starting date, if so specified, and to complete the work within the contract period, or to pay liquidated damages in the amount stipulated herein for each calendar day the work remains uncompleted after the expiration of the contract period or any authorized reduction thereof.

A proposal guarantee in the amount stipulated herein is included with this proposal, to be forfeited to the Iowa Department of Natural Resources if the undersigned fails to execute the contract and furnish an approved performance bond, if awarded the contract.

By virtue of statutory authority, preference will be given to products and provisions grown and coal produced within the state of Iowa, and also, a resident bidder shall be allowed a preference against a nonresident bidder from a state or foreign country which gives or requires a preference to bidders from that state or foreign country on projects in which there are no federal funds involved.

BY

_____ (Iowa Contractor Registration No.)

_____ (Signed) (Date)

_____ (FID/EIN/SSN)

_____ (Phone Number) (Fax Number)

_____ (Email Address)

THE FOLLOWING AFFIDAVIT MUST BE COMPLETED AND NOTORIZED, OR THIS BID WILL BE REJECTED.

- AFFIDAVIT-

The signatory. being duly sworn, does depose and say that the undersigned is an authorized representative of:

_____
(Name of Firm)

Located at: _____

Hereinafter referred to as "Bidder" and does hereby affirm to have personal knowledge that said bidder has examined the drawings and specifications, carefully prepared the proposal form, and has checked the same in detail before submitting; and that said bidder, or the agents, officers, or employees thereof, have not either directly or indirectly, entered into any agreement, participated in any collusion or fraud, or otherwise taken any action in restraint of free competitive bidding in connection with this bid.

_____ (Signed)

_____ Day of _____ , 20 _____

_____ (Signed Notary)

My Commission Expires _____ , 20 _____

SCHEDULE OF PRICES

Project Description and Location

WATER TREATMENT SYSTEM REPLACEMENT, LEWIS & CLARK STATE PARK, MONONA COUNTY, IOWA

Name of Bidder

THE "UNIT PRICE" AND "AMOUNT" COLUMNS MUST BE FILLED IN FOR THIS PROPOSAL TO BE CONSIDERED COMPLETE. IF THERE IS A DISCREPANCY BETWEEN UNIT BID PRICES, EXTENSIONS, OR TOTAL AMOUNTS OF BID, THE UNIT PRICES SHALL GOVERN.

Item No.	Description	Estimated Quantity	Unit Price	Amount
1	MOBILIZATION	1 LS		
2	CLEARING & GRUBBING	1 LS		
3	38' X 22' WATER TREAMENT BUILDING COMPLETE WITH GRADING	1 LS		
4	158 GALLONS WX-451 AMTROL PRESSURE TANK	2 EACH		
5	STORAGE BUILDING MANIFOLD: WATER METER, VALVES, PRESSURE SWITCH, PRESSURE GAUGE, SCH. 80 PVC PIING ETC.	1 LS		
6	CHLORINE FEED SYSTEM WITH ONE PUMP, 20 GALLON TANK AND SPILL PALLET COMPLETE	1 LS		
7	TRIPLEX MULTI-MEDIA IRON FILTER SYSTEM COMPLETE WITH CHLORINE INJECTION PUMP, COMPLETE	1 LS		
8	DUPLEX AUTOMAIC SOFTENER SYSTEM WITH BRINE TANK COMPLETE	1 LS		
9	ELECTRICAL SERVICE AND PUMP CONTROLS COMPLETE WITH LIGHTING , HEATER AND 200 AMP CONTROL PANEL AND OTHER ACCESSORIES SHOWN IN PLANS	1 LS		
10	NEW ELECTRICAL SERVICE TO THE BULDING FROM 70 FT. WITH DISCONECT.	1 LS		
11	SUMP AND SUBMERSIBLE PUMP INSIDE BUILDING, COMPLETE	1 LS		
12	3" DIA. HDPE (DR 11) WATERMAIN, BORED OR TRENCHED IN PLACE TO SETTLING BASIN	150 LF		
13	SETTLING BASIN	1 LS		
14	3" DIA. HDPE DR 11 WATERMAIN TRANCHED OR BORED IN PLACE	200 LF		
15	TRACER WIRE #12 OR 3" DETACTABLE "WATER " TAPE	350 LF		
16	SYSTEM DISINFECTION	1 LS		
	NEW 6" WATER SUPPLY WELL			
17	DRILL 12" HOLE, FURNISH 6" PVC SDR 21 WELL CASING PIPE AND PCC GROUT	80 LF		
18	6" DIA X 20' OF PVC SLOTTED WELL SCREEN WITH GRAVEL PACK IN 12" HOLE	20 LF		
19	2"X 60' SCH 120 PVC DROP PIPE	80 LF		

20	5 HP 3PH SUBMERSIBLE VARIABLE SPEED PUMP RATED TO PROVIDE 65 GPM AT 80 PSI AT SURFACE. INCLUDING 3PH WIRING TO THE VFD TO TREATMENT BUILDING	1 LS		
21	PITLESS ADAPTER UNIT	1 EA		
22	STATIC WATER PRESSURE LINE AND GUAGE	1 LS		
23	INSTALL WELL BELOW-OFF ASSEMBLY & PVC CL 160 WATER LINE FROM WELL TO BUILDING	1 LS		
24	DEVELOP WELL AND TEST PLUMBING	1 LS		
25	DISINFECTION AND CHEMICAL ANALYSIS	1 LS		
26	GRADE AREA AROUND WELL HEAD AS SHOWN AND SEED	1 LS		
27	DRILL 12” HOLE AND 6” PVC SDR 21 WELL CASING AND GROUT FOR ADDITONAL DEPTH	1 LF		
	ABONDON AND PLUG EXISTING WELL & DEMOLITION			
28	REMOVE PUMP & PLUG EXISTING WELL	1 LS		
29	DEMOLISH APPROX. 28’X28’ EXISTING TREATMENT BUILDING INCLUDING ASBESTOS ABATEMENT. REMOVE PRESSURE TANKS, MIXING TANKS, INTERNAL PIPING ETC. HAUL AND DISPOSE OFF SITE	1 LS		
30	DEMOLISH 28’X24’X6’ DEEP CONCRETE STORAGE TANK, HAUL AND DISPOSE OFF SITE	1 LS		
31	SEED ALL DISTURBED AREAS	1 LS		
		TOTAL		

Bidder Acknowledges Receipt of Any Issued Addenda Below (Number and Date)

PROPOSAL GUARANTEE BOND

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES

KNOW ALL MEN BY THESE PRESENTS:

That we,_____

of_____as PRINCIPAL,

and_____

of_____as SURETY(S),
are hereby held and firmly bound unto the state of Iowa in the penal sum of:

_____Dollars $_____
for the payment, whereof, the said PRINCIPAL and SURETY(S) bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the PRINCIPAL is herewith submitting to the state of Iowa, acting by and through the Iowa Department of Natural Resources, hereinafter called the DEPARTMENT, its sealed proposal for a contract for the _____

_____

_____

at_____in_____County, Iowa.

NOW THEREFORE,
the conditions of this obligation are such that, if said proposal is rejected by the DEPARTMENT, or if said proposal is accepted by the DEPARTMENT and the PRINCIPAL shall enter into a contract in the form specified by the DEPARTMENT in accordance with the terms of the proposal and shall furnish a bond for the faithful performance of said contract in the form specified by the DEPARTMENT, this obligation shall be null and void. Otherwise it shall remain in full force and effect.

In the event that the said proposal is accepted by the DEPARTMENT and the PRINCIPAL shall fail to enter into the contract as defined herein or shall fail to furnish the performance bond as noted above within thirty (30) days of the approval of the award, the PRINCIPAL and SURETY(S) agree to forfeit to the DEPARTMENT the penal sum herein mentioned, it being understood that the liability of the SURETY(S) shall in no event exceed the penal sum of this obligation.

IN WITNESS WHEREOF,
the above bounden parties have executed this instrument under their several seals this _____ day of _____, 20_____, the name and corporate seal of each party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

PRINCIPAL:	SURETY::
By_____	By _____
_____	_____
_____	_____
_____	_____

If a partnership all partners must sign.

PGB-1

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES

CONTRACT
(CAPITAL IMPROVEMENT)

WATER TREATMENT SYSTEM REPLACEMENT
LEWIS & CLARK STATE PARK
MONONA COUNTY, IOWA

THIS AGREEMENT, made this _____ day of, _____20_____by and between the state of Iowa acting through the Department of Natural Resources hereinafter called the **DEPARTMENT** and:

located at

hereinafter called the **CONTRACTOR**

WITNESSETH: That the **DEPARTMENT** agrees to pay the **CONTRACTOR** the contract price provided herein for the fulfillment of the work and the performance of the covenants set forth herein, and the **CONTRACTOR** agrees with the **DEPARTMENT** to commence and complete the project described as follows:

This project consists of drilling and developing a new well with a new treatment building and water treatment equipment, demolishing the old building along with an underground water storage tank and capping the existing well.

For the Sum of: **Dollars ($)**
and all extra work in connection therewith, all in accordance with the terms and conditions herein contained: and to furnish at the **CONTRACTOR'S** own proper cost and expense, all material, equipment, labor, insurance, and other accessories and services necessary to construct and complete, in a workmanlike manner, ready for continuous operation, the above mentioned project. The work shall be performed in accordance with the requirements and provisions of the following documents, all of which are made a part hereof and collectively evidence and constitute the contract:

1. Notice to Bidders.
2. Instructions to bidders.
3. IDNR Standard Specifications and Current Supplemental Specifications
4. Project Specifications Including Addenda Number _____ Through _____
5. Drawings, Sheet Number 1(A.01) Through 13(D.03) Inclusive
6. Contractor's Proposal.
7. Proposal Guarantee Bond.
8. Performance Bond.
9. This Instrument.
10. Modifications or Change Orders pursuant to IDNR Standard Specifications
11. Resident Bidder Preference Certification on Non-Federal-Aid Projects

The parties to this contract understand that time of completion of the work under this contract is the essence to the contract. The **CONTRACTOR** hereby agrees to commence work under this contract in accordance with Section 1108 of the IDNR Standard Specifications and to complete all the work by June 30th, 2016

The **CONTRACTOR** hereby agrees that liquidated damages in the amount of Three hundred Dollars $ 300.00

shall be retained or assessed against the CONTRACTOR for each day and every day the completion of the work is delayed beyond the time specified herein, not as a penalty, but as a mutually agreed to, predetermined amount to reimburse the **DEPARTMENT** for salaries of engineers and reviewers, clerk hire, interest charged during the period for delays and loss of use.

It is understood that the **CONTRACTOR** consents to the jurisdiction of the courts of Iowa, to hear, determine and render judgment as to any controversy arising hereunder, and that this contract shall be governed by, and construed according to, the laws of the state of Iowa.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, in the day and year first above mentioned.

FOR THE DEPARTMENT:

_____
Deputy Director

This contract was approved by the **NATURAL RESOURCES COMMISSION** at its meeting held on

_____
(Date)

FOR THE CONTRACTOR:

_____
(Signature and Title)

_____
(Firm)

_____
(Address and Zip Code)

Seal if by a Corporation:

Identification Number _____

Soc. Sec. No. _____

Or Fed. I. D. No. _____

PERFORMANCE BOND

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES

KNOW ALL MEN BY THESE PRESENTS:

That we,_____

of_____as PRINCIPAL,

and_____

of_____as SURETY(S),
are hereby held and firmly bound unto the state of Iowa in the penal sum of:

_____Dollars $_____
for the payment, whereof, the said PRINCIPAL and SURETY(S) bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the PRINCIPAL entered a certain contract, hereto attached, and made part, hereof to the state of Iowa, acting by and through the Iowa Department of Natural Resources, hereinafter called the DEPARTMENT,

dated _____ for the _____

at_____in_____County, Iowa.

NOW THEREFORE,
the conditions of this obligation are such that, if the DEPARTMENT, shall faithfully perform the contract in accordance with the plans, specifications and contract documents, and shall fully indemnify and save harmless the state of Iowa from all cost and damage which the state of Iowa may suffer by reason of the PRINCIPAL's default or failure to do so and shall fully reimburse and repay the state of Iowa all outlay and expenses which the state of Iowa may incur in making good any such default, then this obligation shall be null and void, otherwise it shall remain in force and effect.

In the event that the PRINCIPAL is in default under this contract as defined herein, the DEPARTMENT shall by written notice inform the PRINCIPAL that this contract is in default. And may, at its option, without process or action at law:

1. Take over all or any portion of the work and complete it either by day labor or reletting the work. The DEPARTMENT may retain all material, equipment and tools on the work, at a rental which it considers reasonable, until the work has been completed.
2. Allow the surety to take over the work within fifteen (15) days and assume completion of said contract and become entitled to the balance of the contract price.
3. Allow the PRINCIPAL to complete the contract.

As required by Chapter of the Code of Iowa.

1. The PRINCIPAL SURETY(S) on this bond hereby agree to pay all persons, firms or corporations having contracts directly with the PRINCIPAL or with subcontractors, all just claims due them for labor performed or material furnished, in the performance of the contract on account of which this bond is given, when the same are not satisfied out of the portion of the contract price shall have been established as provided by law.

2. Every Surety on this bond shall be deemed and held, any contract to the contrary notwithstanding, to consent without notices:
   a. To any extension of time to the contractor in which to perform the contract.
   b. To any change in the plans, specifications, or contract, when such changes does not involve an increase of more than 20 percent of the total contract price, and then only as to such excess increase.
   c. That no provision of this bond or any other contract shall be valid which limits less than one year from the time of the acceptance of the work, the right to sue on this bond for defect in workmanship or material not discovered or known to the DEPARTMENT at the time such work was accepted.

No provision of this bond or any other contract shall be valid which limits to less than five years after the acceptance of the work, the right to sue on this bond for defects in workmanship or material in connection with paving or concrete work.

IN WITNESS WHEREOF,
the above bounden parties have executed this instrument under their several seals this _____ day of _____, 20_____, the name and corporate seal of each party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

PRINCIPAL:	**SURETY:**
By_____	By_____
_____	_____
_____	_____
_____	_____
_____	_____

If a partnership all partners must sign.

This bond approved by the Iowa Department of Natural Resources this _____ day of _____, 20 _____

By _____
Director

IOWA DEPARTMENT OF NATURAL RESOURCES
GENERAL COVENANTS AND PROVISIONS
SECTION NO. 00700
JANUARY 1993 (Revised 11/06/12)

This section consists of the general provisions applying to all types of construction and maintenance as set forth in the following sections

Part 1100. Definitions
Part 1101. Instructions to Bidders
Part 1102. Bidder Qualifications
Part 1103. Award and Execution of Contract
Part 1104. Scope of Work
Part 1105. Control of Work
Part 1106. Control of Materials
Part 1107. Legal Relations and Responsibilities to the Public
Part 1108. Prosecution and Progress
Part 1109. Measurement and Payment

PART 1100. DEFINITIONS

1100.01 GENERAL

A. Whenever in these specifications or in other contract documents, the following definitions, or terms or both, or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

B. In order to avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever anything is, or is to be done, if, as, or, when, or where "contemplated, required, determined, directed, specified, authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, approval, approved, disapproved, acceptable , unacceptable, suitable, accepted, satisfactory , unsatisfactory, sufficient, insufficient, rejected, or condemned," it shall be understood as if the expression were followed by the words "by the Engineer" or "to the Engineer."

C. The titles or headings of the sections and articles herein, or referred to on the plans, are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

D. Working titles and pronouns used for any person referred to in these specifications may be used with a masculine gender for the sake of brevity and are intended to refer to persons of either sex.

1100.02 DEFINITIONS OF ABBREVIATIONS

A. Whenever the following abbreviations are used in these specifications or on the plans, they are to be construed the same as the respective expressions represented.

AAN - American Association of Nurserymen
AAR - Association of American Railroads
AASHTO (or AASHO) - American Association of State Highway and Transportation Officials
ACI - American Concrete Institute
AIA - American Institute of Architects
ANSI - American National Standards Institute
APWA - American Public Works Association
ARA - American Railway Association
AREA - American Railway Engineering Association
ASCE - American Society of Civil Engineers
ASLA - American Society of Landscape Architects
ASTM - American Society of Testing and Materials
AWPA - American Wood Preservers Association
AWS - American Welding Society

AWWA - American Water Works Association
CFR - Code of Federal Regulations
DNR - Iowa Department of Natural Resources
DOT - Iowa Department of Transportation
EEI - Edison Electric Institute
EPA - Environmental Protection Agency
FHWA - Federal Highway Administration
FSS - Federal Specifications and Standards
IEES - Institute of Electrical and Electronics Engineers
IES - Illuminating Engineering Society
ICEA (or IPCEA) - Insulated Cable Engineers Association
MUTCD - Manual on Uniform Traffic Control Devices
NEC - National Electrical Code
NECA - National Electrical Contractors Association
NEMA - National Electrical Manufacturers Association
NFPA - National Fire Protection Association
NRC - Natural Resource Commission
SBC - State Building Code
UBC - Uniform Building Code
UL - Underwriters Laboratories, Incorporated
UMC - Uniform Mechanical Code
UPC - Uniform Plumbing Code
US - United States
USC - United State Code

B. Abbreviations may be used for materials and classes of work:

AC - Asphalt cement
ACC - Asphalt cement concrete
ATB - Asphalt treated base
BSC - Bituminous seal coat
BTA - Bituminous treated aggregate
CTG - Cement treated granular
PCC - Portland cement concrete
SAS - Soil-aggregate subbase
SLS - Soil-lime subbase

1100.03 DEFINITIONS OF TERMS

1. Acceptable Work - Work in reasonably close conformance with the contract requirements.

2. Addendum or Addenda - Changes, revisions, or clarifications of the specifications of contract documents which have been issued to prospective bidders, prior to the time of receiving bids.

3. Advertisement - The public announcements, publications, or solicitations as required by the Contracting Authority, inviting bids for work to be performed.

4. Approval of Award - The acceptance by the Contracting Authority of a bid.

5. Approximate Starting Date - A calendar day shown on the proposal on which it is anticipated, at the time of the letting, that conditions will be such as to permit the Contractor to commence work.

6. Assignment of Contract -The written agreement whereby the Contractor sells, assigns, or transfers his rights in the contract to any person, firm, or corporation.

7. Award - The execution of the contract.

8. Bidder - An individual, firm, corporation, or joint venture submitting a bid for the advertised work.

9. Calendar Day - Every day shown on the calendar.

10. Change Order - A written order to the Contractor, signed by the Engineer, ordering a change which has been found necessary in the work from that originally shown by the plans and specifications. Change orders duly signed and executed by the Contractor constitute authorized modifications of the contract.

11. Channel - A natural or artificial water course.

12. Chief Engineer - An engineer appointed by the Iowa Department of Natural Resources as the head of the Construction Service Bureau.

13. Classes of Work - The divisions made for the purpose of measuring and paying for labor to be performed or materials to be furnished according to the methods of construction involved, as indicated by the items for which bids have been received for each specific contract.

14. Commencement of Work - Work will be considered commenced when the Contractor's operations are started on items of work covered by the contract documents and which require inspection, or when the Contractor notifies the Engineer, and the Engineer agrees, that the Contractor's equipment and personnel are available at the site, but his operations are prevented by weather or soil conditions.

15. Commission - The state Natural Resources Commission as constituted under the laws of the state of Iowa (which is the party of the first part in the contract, let in behalf of the State, of which these specifications are a part).

16. Commissioner - A member of the state Natural Resources Commission.

17. Contract (Also Contract Document) - The written agreement between the Contracting Authority and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment. The contract includes the notice to bidders, proposal, contract form, and contract bonds specifications, supplemental specifications, special provisions, all items covered on the table of contents, plans, notice to proceed, and any change orders and agreements which are required to complete the construction of the work in an acceptable manner, including authorized extensions thereof, all of which constitute one instrument.

18. Contract Item (Pay Item) - A specifically described unit of work for which a price is provided in the contract.

19. Contract Period (Also Contract Time) - The number of working days or calendar days allowed for completion of the contract, including authorized time extensions. In case a calendar date of completion is shown in the proposal, in lieu of or in addition to the working days, the contract shall be completed by that date.

20. Contract Sum - The aggregate sum obtained by totaling the amounts arrived at by multiplying the number of units of each class of work, as shown in the contracts by the unit price specified in the contract for that class of work.

21. Contracting Authority - The governmental body, board, commission, or officer having authority to award a contract.

22. Contractor - The individual, firm, corporation, or joint venture contracting with the Contracting Authority for performance of prescribed work.

23. Contractor Registration - The registration number issued by the Division of Labor Service, in accordance with Chapter 91C of the Code of Iowa.

24. Deficient Work - Work not in reasonably close conformance with the contract requirements, or otherwise inferior, but in the opinion of the Engineer, reasonably acceptable for its intended use and allowed to remain in place.

25. Department of Economic Development - As defined in Chapter 15, Code of Iowa.

26. Department of Labor Services - As defined in Chapter 91, Code of Iowa.

27. Department of Natural Resources (Department)- The Department of Natural Resources, as defined in Chapter 455A, Code of Iowa.

28. Department of Revenue and Finance - As defined in Chapter 421, Code of Iowa.

29. Department of Transportation -The Department of Transportation, as defined in Chapter 307, Code of Iowa.

30. Director - The duly appointed executive officer for the Department of Natural Resources.

31. Drainage Ditch -An artificially constructed, open depression, other than a road ditch, which is constructed for the purpose of carrying surface water runoff .

32. Drawings (or Plans) - The approved plans, profiles, typical cross sections, working drawings, and supplemental drawings, or exact reproductions thereof, including modifications, altered plan, revisions, and amendments, which show the locations characters dimensions, and details of the work to be done.

33. Employee - Any person working on the project, mentioned in the contract of which these specifications are a party, and who is under the direction or control, or receives compensation from, the Contractor or subcontractor.

34. Engineer - The Chief Engineer, or other Engineer of the Contracting Authority, acting directly or through a duly authorized representative, such representative acting within the scope of the particular duties assigned, or of the authority given.

35. Equipment - All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and tools and apparatus necessary for the proper construction and acceptable completion of the work.

36. Extra Work - Work not provided for in the contract, as awarded, but deemed essential to the satisfactory completion of the contract within its intended scope and authorized by the Engineer. Extra work shall not include additional materials, equipment, and labor used due to natural variations in the surface and subsurface conditions, except as specifically provided for elsewhere in the contract documents.

37. Extra Work Order - A change order concerning the performance of work or furnishing of materials involving additional work. Such additional work may be performed at agreed prices, or on a force-account basis, as provided elsewhere in these contract documents.

38. Independent Contractor - Any persons firms or corporation who contracts with the Contractor to perform a service for which the basis of payment is in terms of units of service rather than salary or wages.

39. Inspector - An employee of the Contracting Authority and who is the authorized representative of the Engineer, assigned to make detailed inspections of any or all portions of the work, or materials included in the work.

40. Instruction to Bidders - The clauses setting forth in detail the information relative to the proposed work and requirements for the submission of proposals.

41. Invitation for Bids - See Notice to Bidders.

42. Item -See Contract Item.

43. Joint Venture - Two or more individuals, films or corporations combining any equipment, personnel or finances for the purpose of submitting a single bid.

44. Laboratory - The testing laboratory of the Contracting Authority, or any other testing laboratory which may be designated or approved by the Engineer.

45. Lands Acquired for the Work - The land area, reserved or secured by the Contracting Authority, upon which to construct the work, or where to obtain material therefrom.

46. Major Item of Work - Any contract item (Pay item) for which the original contract amount plus authorized additions is more than 10% of the total original contract sum or $50,000 whichever is less.

47. Materials - Any substances specified for use in the construction of the project and its appurtenances.

48. Notice to Bidders - That portion of the contract documents, prepared and furnished by the Contracting Authority for the information of bidders submitting proposals, which notice specifies provisions, requirements, and instructions pertaining to the method, manner, and time of submitting bids.

49. Notice to Proceed - Written notice to the Contractor to proceed with the contract work including, when applicable, the date of beginning of contract time.

50. Official Publications - The official publications are the formal resolutions and notices relative to the proposed improvement that are required by law to be published in a prescribed manner and that have been published in accordance with the statutes relating to them. Official publications area by statutes vested with all of the force and effect of contract obligations.

51. Owner - The state of Iowa, acting through the Iowa Department of Natural Resources as constituted under the laws of the state of Iowa.

52. Performance Bond - The bond executed by the Contractor and its surety in favor of the owner, guaranteeing the faithful performance of the contract and the payment of all debts pertaining to the work.

53. Plans (or Drawings) - The approved plans, profiles, typical cross sections, working drawings, and supplemental drawings, or exact reproductions thereof, including modifications, altered plan, revisions, and amendments, which show the locations characters dimensions, and details of the work to be done.

54. Project - One or more correlated improvements which constitute the complete improvement of a designated park, recreational reserve, state monument, lake, reserve, game area, fish hatchery, parkway, or other area under jurisdiction of the Department of Natural Resources.

55. Project Engineer - The representative of the Department of Natural Resources, regardless of actual title, directly in change of the work.

56. Proposal - The formal offer of a bidders on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

57. Proposal Form - The approved form on which the Contracting Authority requires formal bids to be prepared and submitted for the work.

58. Proposal Guarantee - The security furnished by the bidder with his/her proposal for a projects as guarantee he/she will execute the contract for the work if the proposal is accepted.

59. Reasonably Close Conformity - Reasonably close conformity means compliance with reasonable and customary manufacturing and construction tolerances where working tolerances are not specified. Where working tolerances are specified, reasonably close conformity means compliance with such working tolerances. Without detracting from the complete and absolute discretion of the Engineer to insist upon such working tolerances as establishing reasonably close conformity, the Engineer may accept variations beyond such tolerances, as reasonably close conformity, where they will not materially affect value or utility of the work and the interest of the State.

60. Right-of-Way - The land area, the right to possession of which is secured or reserved by the Contracting Authority for road purposes.

61. Road - A general term denoting a public way for vehicular travel, including the entire area within the right-of-way.

62. Shop drawings - See "working drawings".

63. Special Provisions - Additions and revisions to the standard and supplemental specifications covering conditions peculiar to an individual project, method and manner.

64. Specifications - The requirements contained herein and in any supplemental specifications, or special provisions applying to the contract, and pertaining to the method and manner of performing the work, or to the quantity and quality of the materials to be furnished under the contract.

65. Specified Completion Date - The date specified in the proposal for completion of the work. After work has commenced or if the completion date is not specified, the last day of the contract period shall be the completion date.

66. Specified Starting Date - A calendar day shown on the proposal on which date commencement of the work is expected.

67. State - The State of Iowa acting through its authorized representative.

68. Station - One hundred lineal feet.

69. Subcontractor - Any individual, firm, or corporation to whom the Contractor, with the written consent of the Contracting Authority, sublets any part of the contract.

70. Superintendent - The Contractor's authorized representative in responsible charge of the work.

71. Supplemental Agreement - Written agreement between the Contractor and the Contracting Authority, modifying the original contract.

72. Surety - The corporation, partnership, or individual, other than the Contractor, executing a bond furnished by the Contractor.

73. Targeted Small Business - Any enterprise, located in the state of Iowa, which is operated for profits under a single management, and which is 51 percent owned, operated, and actively managed by one or more women or minority persons, and has been certified by the Iowa Department of Economic Development.

74. Unacceptable Work - Work not in reasonably close conformance with the contract requirements and ordered to be removed and replaced.

75. Unauthorized Work - Work neither contemplated by the contract documents nor authorized by the Engineer, and work done contrary to the instructions of the Engineer.

76. Work - Work shall mean the furnishing of all labor, materials, equipment, and other incidentals, as detailed in the plans, specifications, and by the Engineer, necessary or convenient to the successful completion of the project and the carrying out of all the duties and obligations imposed by the contract.

77. Work Order - A written order, signed by the Engineer, of contractual status, requiring performance by the Contractor without negotiation of any sort, and which may involve starting, resuming, or the suspension of work. (Not to be confused with extra work order.)

78. Working Day - Prior to commencement of work, beginning on the date designated in the notice to proceeds or beginning on the specified starting date, or as soon thereafter as provided in the specifications, a day other than Saturday, Sunday, or another recognized legal holiday. Any weekdays exclusive of Saturdays, Sundays, or a recognized legal holidays on which weather or other conditions not under control of the Contractor, will permit construction operations to proceed for not less than 3/4 of a normal workday in the performance of a controlling item of work. If such conditions permit operations to proceed for at least 1/2 but less than 3/4 of the normal working hours, 1/2 of a working day will be counted. The days counted will exclude Saturdays, Sundays, and recognized legal holidays the Contractor does not work, but will include Saturdays, Sundays, and recognized legal holidays the Contractor does work. Nonproductive work that does not require inspection may be done on Saturdays with no time charged. Working days will not be charged for the day before or after a holiday when the contract documents specifically prohibit work and the Contractor does not work. Working days will not be counted during periods of suspension of work ordered by the Engineer, except when the suspension is a result of a violation of terms of the contract.

79. Working Drawings - Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data which the Contractor is required to submit to the Engineer for approval. Also referred to as "shop drawings". After approval by the Engineer the working drawings became a part of the plans.

PART 1101. INSTRUCTIONS TO BIDDERS

1101.01 GENERAL

A. These instructions are intended to serve as a guide to the requirements with which the bidder must comply prior to and in submitting a proposal, including various "conditions" affecting the award of the contract. They do not in themselves inform the bidder of all the requirements that must be complied with under the contract.

B. The time for bid openings shall be the prevailing Central Standard or Daylight Savings time in force at Des Moines, Iowa on the date set forth in the Notice to Bidders.

C. Before submitting a bid, the bidder shall examine all the drawings and specifications enumerated in the table of contents of this project manual. The successful bidder will be required to do all the work that is shown on the drawings, mentioned in the specifications, or reasonably implied as necessary to complete this contract.

D. The bidder shall visit and examine the site to become acquainted with the adjacent areas, means of approach to the site, conditions of the actual job site, and the facilities for delivering, storing, placing, and handling of materials and equipment.

E. Failure to visit the site or failure to examine any and all contract documents will not relieve the successful bidder from the necessity of furnishing any materials or equipment, or performing any work that may be required to complete the work, in accordance with the drawings and specifications. Neglect of the above requirements will not be accepted as reason for delay in the work or additional compensation.

1101.02 DRAWINGS AND SPECIFICATIONS

A. The drawing and specifications, which are part of this contract, are enumerated in the table of contents of this project manual.

B. It is the responsibility of the bidder to examine the plans, proposal form, specifications, supplemental specifications, special provisions, the site of the works and the state of the work of other contractors on the project to assure that all requirements of the contract and the plans are fully understood. It is the bidder's responsibility to satisfy herself/himself as to the nature of the work and all reasonably ascertainable conditions that may affect his/her performance under the contract.

1101.03 INTERPRETATION

A. Nonverbal explanation or instructions will be given in regard to the meaning of the drawings or specifications during the bid period. Bidders shall bring all inadequacies, omissions, or conflicts to the Engineer's attention, at least ten days before the date set for the bidding. Prompt clarification will be supplied to all bidders of record by addendum.

B. Neither the Department of Natural Resources nor the Engineer will be responsible for verbal instructions.

C. Failure to request clarification or interpretation of the drawings and specifications will not relieve the successful bidder of responsibility. Signing of the contract will be considered as an implicit indication that the Contractor has thorough understanding of the scope of the work and comprehension of the contract documents.

1101.04 CONTENTS OF PROPOSAL FORMS

A. Bidders will be furnished with proposal forms stating the location and description of the proposed work, the approximate quantities of work to be performed or materials to be furnished, the form and amount of the required proposal guarantee, and the contract period.

B. The statement, "By virtue of statutory authority, preference will be given to products, provisions grown and coal produced within the state of Iowa where applicable," which is on the face of the proposal form shall not be applicable to contracts involving Federal-aid participation in construction.

C. The following bidding and letting regulations shall apply to all construction projects for which the Department receives bids.

1. Contracts will be recommended for approval for award on the basis of the greatest total savings in the public interest. The determination of which projects are to be awarded will be based on the approval by the appropriate Commission or other contracting agency.

2. Contractors shall not be permitted to tie projects or to designate on the bidding proposal the limit of the amount they will accept.

1101.05 PREPARATION OF PROPOSALS

A. Only signed proposals, submitted on forms furnished by the Contracting Authority, will be considered, and the bidder will be assumed to have familiarized himself with the requirements of all applicable contract documents. To insure consideration, the bidder shall specify a unit price in figures for each pay item for which a quantity is given and shall also show the products for the respective unit prices and quantities, written in figures in the column provided for the purposes and the total amount of the proposal obtained by adding the amounts of the several items. All the unit price figures shall be in ink or typed. If there is a discrepancy between unit bid prices, extensions, or total amounts of bid, the unit bid prices shall govern.

B. If the proposal is made by a partnership or corporations the name of the partnership or corporations its agents and its principal place of business shall be shown. The proposal shall be signed by an authorized agent of the partnership of corporation.

C. If the proposal is made on the basis of a joint bid, the proposal shall be signed by each of the joint bidders, or in the case of a firms' partnerships or corporations by an authorized agent for such firms' partnerships or corporations and the principal place of business for each shall be shown.

D. For work let by the DNR, the sworn affidavit on the proposal shall be executed by the bidder of an agent thereof, on behalf of each person, firm, association, partnership, or corporation submitting a proposals certifying that such person, firm, association, partnership, or corporation has not, either directly or indirectly, entered into any agreements participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contracts and is not under debarment currently by the Federal government for a criminal violation which is reasonably related to bidding and contracting procedures.

E. The attention of the bidders for the work covered by a proposal and referred to as this work, is directed to the fact that contracts for work other than the work covered in this proposal may have been awarded, are being advertised for letting on the same date as this work, or may be awarded in the future.

F. Completion of work covered by this proposal may be contingent upon certain work covered by other contracts being performed on the project in advance of this work, likewise, completion of work covered by other contracts may be dependent upon completion of work covered by this proposal.

G. The contract documents will list types of work involving other contracts anticipated to be let on the same letting date or same time within the contract period anticipated for this work. The contract documents will also list other governmental agencies, railroads, utilities, or other parties who will have work with which it is known that this work must be coordinated.

H. The bidder is expected to be familiar with work already in progress or previously let on this project, the contract periods, the progress being made, and any other conditions regarding that work which may affect his/her bid or his/her performance under this contract.

I. Cooperation and coordination of all contractors and other agencies authorized to do work on the project will be required.

J. The bidder for this work acknowledges these facts and agrees that it is in the public interest to have the work of certain contracts and agencies performed concurrently rather than consecutively. The bidder further agrees to cooperate and coordinate his work with that of other contractors or agencies to the mutual interest of all parties doing work on the project, whether by contract with the State, County, or City or necessary work being done by governmental agency or utility force.

K. By the submission of a bid on this works the bidder acknowledges and agrees that an investigation and inquiry has been made regarding the contracts for work with which this work must be coordinated.

L. In the event disputes arise between contractors or other agencies, or both, doing work on the project as to their mutual rights or obligations, the Contracting Authority or its authorized representative will, when requested to do so or upon his own motion, act as referee and define the rights of all interested parties with regard to the conduct of the work, which decision shall be final as provided in 1105.01.

M. If a prospective bidder, for a project for which the Department is the Contracting Authority, is in doubt as to the true meaning of any part of the contract documents, he may submit to the Contracting Authority a request for additional information, explanations, or interpretations. Interpretations may be in the form of an addendum to the proposal. The Contracting Authority will not be responsible for any information, explanation, or interpretation from any other source.

1101.06 IRREGULAR PROPOSALS

A. Proposals will be considered irregular and may be rejected for any unauthorized changes in the proposal form or for any of the following reasons:

1. If on a form other than that furnished by the Contracting Authority, or if the form is altered or any part thereof is detached.

2. If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.

3. If the bidder adds any provisions reserving the right to accept or reject an award because he is low bidder on another project in the same letting,

4. If the bidder adds any provisions reserving the right to accept or reject an award or to enter into contract pursuant to an award.

5. If a bid on one project is tied to a bid on any other project, except as specifically authorized on the proposal form by the Contracting Authority,

6. If the proposal does not contain a unit price for each pay item listed, except in the case of authorized alternate pay items.

1101.07 ESTIMATE OF QUANTITIES

A. For all work let on a unit price basis, the Engineer's estimate of quantities, as shown in the notice to bidders and the proposals is understood to be approximate only, and will be used only for comparing bids except as otherwise provided in the basis of payment for the various classes of work.

1101.08 SUBMISSION OF PROPOSALS

A. All proposals shall be submitted on the standard proposal form prepared specifically for this projects an example of which is bound in this specification volume. One separate, unbound copy of the standard proposal forms which has been specifically prepared for this projects is supplied by the Department of Natural Resources with the contract documents. Only proposals which are submitted on this form will be considered.

B. One copy of the proposal shall be submitted.

C. No proposa1 for any subdivision or any subclassification of the work, except as indicated, will be accepted. Any conditional bid, amendment to the proposal form, or the inclusion of any correspondence, written or printed matter, or details of any essential provision of the contract documents, or required consideration of unsolicited material or data in determining the award of the contracts will disqualify the proposal.

D. The bid amounts shall be inserted in the spaces provided on the proposal form, setting forth clearly and concisely, all designations and prices. Erasures or other changes on the proposal form must be explained or noted over the signature of the bidder.

E. Addenda issued during the time of bidding shall become part of the contract documents. Bidders shall acknowledge receipt of each addendum in the appropriate space provided on the proposal form. If no addenda are issued, the word "none" is to be entered in the space provided.

F. When samples are required, they must be submitted by the bidder so as to arrive at the designated office prior to the hour set for opening the proposals. Samples shall be furnished free of expense to the Department of Natural Resources, properly marked by identifications and accompanied by a list when there is more than one sample. The Department of Natural Resources reserves the right to mutilate or destroy any samples submitted whenever it may be considered necessary to do so for the purpose of testing. Samples not so mutilated or destroyed, when no longer required to be retained in connection with the award or delivery of supplies, will be returned at the bidder's expense, if such return is requested in the proposal.

G. All proposals must have the affidavit portion of the proposal completed and notarized affirming that the bidder is not guilty of collusion or fraud in connection with his proposal.

H. All proposals must state the full business address of the bidder and be signed with the bidders usual signature. Proposals by partnerships must state the full names of all partners and must state the name of the partnership followed by the signature and designation of one of the members of the partnership or an authorized representative. Proposals by corporations must state the legal name of the corporation and the name of the state of incorporation followed by the signature and designation of the president, secretary, or other person authorized to bind the corporation to the proposal. Contractors are required to include the Iowa Contractors registration number assigned to them by the Iowa Division of Labor Services. The name of each person signing the proposal shall be typed or printed below the signature.

   1. A proposal by a person who affixes to their signature the word "president", "secretary", "agent", or any other designation without disclosing their principals may be held to be the proposal of the individual whose name is signed thereon. When requested by the Department of Natural Resources, satisfactory evidence of the authority of the officers signing in behalf of the corporation shall be furnished.

I. The proposal, with the proposal guarantee, must be securely sealed in an envelope plainly marked as to its contents on the outside of the envelope. Sample envelope forms can be viewed and downloaded on the DNR website **https://programs.iowadnr.gov/engreal/bid_envelope.doc.** The bidder shall be responsible for the sealed envelope being delivered to the place designated for the bid opening on or before the date and time specified in the notice to bidders. The officer whose duty it is to open the proposal will decide when the specified time has arrived. Proposals received thereafter will not be considered and will be returned unopened.

J. No bidder shall submit more than one proposal for identical work for the same project.

1101.09 WITHDRAWAL OF PROPOSALS

A. Proposals may be withdrawn by written or telegraphic request received from the bidder or authorized representative prior to the time fixed for opening of bids, without prejudice to the right of the bidder to file a new proposal. No proposals may be withdrawn by telephone request. Withdrawn proposals will be returned unopened. Negligence on the part of the bidder in preparing the proposal confers no right for withdrawal of the proposal after it has been opened.

1101.10 TAXES

A. The bidder shall include in the proposal all applicable federal and state taxes required by law. See Sales Tax Exemption below.

B. For the purposes of retail sales tax and use tax, general construction contractors, special construction contractors, and construction subcontractors are regarded as consumers or users of all tangible personal property which they purchaser acquire, or manufacture for use in complying their respective construction contracts.

C. Iowa retailers making sales, within the state of Iowa, of tangible personal property to a construction contractor for such use, are making sales at retail, the receipts of which are subject to retail sales tax. This means that a construction contractor should pay retail sales tax to his Iowa suppliers when purchases of tangible property are made within the state of Iowa. If a Contractor uses tangible personal property in completing the constructions which the Contractor has manufactured or fabricated, the tax will be 5% of the cost of manufacture.

D. This likewise means that any construction contractor purchasing, acquiring, or manufacturing tangible personal property outside the state of Iowa, for such use in Iowa, owes use tax on such out-of-state purchases, measured at the rate of 5% of the purchase prices or in the case of a product manufactured by the Contractor, the Contractor owes 5% of the cost of manufacture.

E. The use tax is to be paid by the Contractor directly to the Iowa Department of Revenue and Finance, using the retailers sales and use tax return, unless the out-of-state vendor from whom purchased is registered with the Use Tax Section of the Iowa Department of Revenue and does bill and collect the Iowa Use Tax for the state.

F. In accordance with Iowa Code Section 442.42 (15) & (16) and 422.47 (5), the DEPARTMENT will issue a Sales Tax Examption Certificate to CONTRACTOR and each approved contractor which will permit the material suppliers to sell material which will becomes an integral part of the structure exempt from Iowa sales tax and some applicable local option taxes and school infrastructure local option sales taxes.

G. The CONTRACTOR is responsible for keeping records identifying the materials and supplies purchase and verifying they were used as an integral part of the structure governed by this Contract. Any material purchased tax free and not used on this project are subject to taxes payable within the same quarter as the project completion date.

H. The Sales Tax Exemption Certificate must not be used to claim exemption for tax items not used on this project or thst do not qualify for exemption under the provisions of the Iowa Code Sections listed above. Such misuse will result in civil or criminal penalties.

I. Bidders should enticipate that the sale and use tax couild increase the cost of non-exempted services and material by at least 5% andmake the necessary llowance before submitting a bid.

J. The Department will reclaim sales taxes, after receiving a Contractor's Statement of Sales Tax for those projects for which a Tax Exemption Certificate was not issued.

1101.11 WORK BY THE DEPARTMENT OF NATURAL RESOURCES

A. Unless specifically provided in the contracts the Department of Natural Resources will not furnish any labor, materials, or supplies necessary to complete the work under this contract.

1101.12 PREFERENCE FOR LABOR AND MATERIALS

A. The Contractor shall observe all of the laws of the state of Iowa with regard to preference for labor and materials, except that preference for Iowa labor and materials shall not apply when federal funding is to pay for any part of the project. When a project is federally funded it is indicated in the notice to bidders.

1101.13 PROPOSAL GUARANTEE

A. All proposals submitted by bidders must be accompanied by a proposal guarantee in the form of a certified check, cashier's check, or a proposal guarantee bond prepared on the standard proposal guarantee bond form furnished to the bidder by the Department of Natural Resources, an example of which is bound in this specification volume.

   1. The proposal guarantee shall be made payable to the Department of Natural Resources in the amount specified in the notice to bidders and on the proposal form.

   2. If the bond form is utilized in lieu of certified check or cashier's checks it must be executed by a surety company authorized by the Commissioner of Insurance for the state of Iowa to do business in Iowa and which has filed its certificate of authority with the Clerk of Court. One copy of the proposal guarantee bond form is furnished by the Department of Natural Resources with the contract documents. Only one executed copy must be submitted with the bid proposal.

B. Any bid which is not accompanied by a proposal guarantee will be considered no bid and will not be read at the bid opening.

C. All proposal guarantees submitted by unsuccessful bidders will be returned as stated in Section 1103.03 of the General Covenants and Provisions.

1101.14 AWARD OF THE CONTRACT

A. It is the intent of the Owner to award a contract to the lowest responsible Bidder provided the Bid has been submitted in accord with the requirements of the Bidding Documents, is judged reasonable, and does not exceed the funds available. Award of this contract will be at the place and at the time of the first regularly scheduled meeting of the appropriate commission of the Department of Natural Resources following the opening of the proposals, except for reasonable delays as provided in Section 1103.02 of the General Covenants and Provisions.

B. The Department of Natural Resources reserves the right to reject all bids or any proposal or to waive informalities in any proposal or to accept any proposal which will best serve the interests of the state of Iowa.

C. If, at the time this contract is to be awarded, the lowest proposal submitted by a qualified responsible bidder is in the best interest of the state of Iowa, the contract will be awarded, and the bidder to whom the award is made will be promptly notified after the Department of Natural Resources meeting.

D. The Owner shall have the right to accept Alternates in any order or combination and to determine the low bidder on the sum of the Base Bid and the Alternates accepted.

1101.15 EXECUTION OF THE CONTRACT

A. The successful bidder shall, within thirty calendar days after the date of the award of the contract, enter into a written contract with the Department of Natural Resources on the forms furnished by the Department for the performance of the awarded work.

1101.16 PERFORMANCE GUARANTEE BOND

A. Simultaneously with delivery of the signed contracts, the Contractor shall furnish a performance guarantee bond prepared on the standard performance guarantee bond form furnished to the Contractor by the Department of Natural Resources, an example of which is bound in the specification volume.

1. The bond must be executed by a surety company authorized by the Commissioner of Insurance of the State of Iowa to do business in Iowa and which has filed its Certificate of Authority with the Clerk of Court.

2. A copy of the performance guarantee bond form will be attached to a copy of the contract furnished by the Department of Natural Resources to the Contractor after award of the contract. One executed copy of the bond must be returned to the Department of Natural Resources with the signed contract, one copy of the bond may be retained by the surety company for its own records.

1101.17 CERTIFICATE OF INSURANCE

A. On or before execution of the contracts the Contractor shall furnish to the Department of Natural Resources a certificate of liability and property damage insurance.

1. The bidder is directed to examine the insurance coverage limits section of this specification volume to determine the coverage limits which apply to this project. Insurance certificates furnished to the Department of Natural Resources showing inadequate limits of coverage will be rejected, thus delaying final execution of the contract. See Sections 1103.04, 1107.02, and 1107.03 of the General Covenants and Provisions.

1101.18 COMMENCEMENT AND COMPLETION

A. The Contractor shall not commence work before the preconstruction meeting to be held after execution of the contract by all parties. The Contractor will be responsible for contacting the project Inspector to set up a time for the preconstruction meeting at the project site.

B. The Contractor must agree to complete the work by the date specified, or within the number of working days indicated if so specified in the contract. Should it be found impossible to complete the work on or before the time specified for completion, a written request may be submitted for a time extension, setting forth the reasons believed to justify the granting of such requests.

1101.19 APPEAL OF CONTRACT AWARD

A. If a Contractor who submitted a timely proposal disagrees with an award decision, it may appeal that decision by submitting a written appeal to department's director or the director's designee detailing the factual and legal basis for the challenge within five calendar days of the Notice of Intent to Award. The Issuing Officer may submit a written response to the Contractor's written appeal within five business days after receipt of the appeal. The department's director or designee will issue a written decision within seven business days of receipt of the Issuing Officer's written response.

PART 1102. BIDDER QUALIFICATIONS

1102.01 COMPETENCY AND OF BIDDERS

A. Bidders submitting proposals must be recognized contractors, engaged in the class of work provided for in the plans and specifications, and must possess sufficient resources to complete the work. Before the contract is awarded, the bidder may be required to furnish evidence to the satisfaction of the Contracting Authority of the ability to perform and complete the contract.

1102.02 QUALIFICATIONS OF THE BIDDER

A. Before award of the contract can be approved, the Department of Natural Resources shall be satisfied that the bidder involved:

1. Maintains a permanent place of business.
2. Has adequate equipment to do the work properly and expeditiously.
3. Has suitable financial status to meet the obligations incident to the work.
4. Has appropriate technical experience.
5. Has satisfactorily completed past projects.
6. Is not ineligible due to discrimination in employment.

B. The Engineer will make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Engineer all such information and data for this purpose as the Engineer may request.

1. The Department of Natural Resources reserves the right to reject a bid if the evidence submitted by, or an investigation of, such bidder fails to satisfy the Department of Natural Resources that the bidder is responsible and qualified to carry out the obligations of the contract and to complete the work contemplated therein.

C. Targeted small business set-aside projects.

1. All contractors submitting proposals for set-aside projects shall meet the "Targeted Small Business" definitions and be capable of being certified by the Department of Economic Development within thirty (30) days after the bid letting date. Failure of the low bidder to become certified within this time will be just and sufficient cause for the denial of the award.

2. Contractors eligible for "Targeted Small Business" designation but not currently certified as such by the Department of Inspections and Appeals, should do so immediately by contacting the Targeted Small Business Officer, Lucas State Office Building, Des Moines, Iowa 50319 -0083.

1102.03 REDUCTIONS IN BIDDER QUALIFICATIONS RESTRICTIONS

A. The requirements and conditions for bidder qualifications may be reduced by the Contracting Authority either for contractors who have well established performance records in other fields or for contractors having adequate financial responsibility and experienced supervisory personnel available for the work that is under consideration or for both the above reasons.

B. Likewise, the requirements may be modified by the Contracting Authority for newly formed or reorganized firms or corporations whose basic organization is composed of individuals who are veterans of the construction industry, with proven records of satisfactory performance in the field in which they have elected to bid, provided, however, that they have adequate financial responsibility, equipment, and available experienced supervisory personnel.

1102.04 IMPOSITION OF INCREASE IN BIDDER QUALIFICATION REQUIREMENTS, SUSPENSIONS AND DISQUALIFICATION

A. The requirements and conditions for bidder qualification in 1102.01 may be imposed or re-imposed or increased, or a contractor may be suspended or disqualified.

B. The requirements and conditions for qualifications of a contractor may be imposed or re-imposed or increased if or when:

1. The Contractor seriously delays commencement or completion of any work within the contract period or any extension thereof under circumstances that would normally give rise to a right of the Contracting Authority for liquidated damages or declaration of defaults or;

2. The Contractor does any act or omits doing or performing any act which, in the judgment of the Contracting Authority, evidences a material change in the contractor's financial responsibility or work capability where, in the judgment of the Contracting Authority, the same will materially prejudice the

contractor's ability to successfully prosecute such public improvement contracts, or he knowingly submits false information concerning prequalification, or;

3. The Contractor takes or fails to take any action which the Contracting Authority deems to warrant an imposition of increase in bidder qualification requirements.

C. A contractor may be suspended from bidder qualification if or when:

1. The Contractor continually fails or refuses to remove and replace materials or work found by the Engineer not to be in reasonably close conformity with the contract documents or to correct such material or work so as to cause such materials or finished product to be reasonably acceptable work, or;

2. The Contractor continually and, in the judgment of the Engineer, without good cause therefor, fails to carry on the work in an acceptable manner, or refuses to comply with a written order of the Engineer within a reasonable time, or;

3. The Contractor fails to perform with his own organization the work as required in 1108.01, or otherwise assigns or disposes of work or the contract or any part thereof without approval of the Contracting Authority, or;

4. The Contractor forfeits a proposal guaranty and fails to enter into the contract upon an offer of award by the guarantee Contracting Authority in response to a prior advertisement for bids for the same project for which award is currently being considered, or;

5. The Contractor fails to comply with nondiscrimination requirements of the Standard Specifications or special provisions, or;

6. The Contracting Authority deems a suspension is appropriate for reasons stated in Paragraph A, above.

7. The Contractor is debarred from doing work for the federal government.

8. The Contractor knowingly submitted false or misleading information concerning qualifications.

D. A suspension is intended to be for an indefinite period of time or, in the case of Paragraph C4, for a specific project. A suspension shall continue until the contractor resolves, to the satisfaction of the Contracting Authority the problem for which the suspension was made.

E. A contractor may be disqualified from bidder qualification if or when:

1. Currently debarred by some other state or Federal agency, or;

2. Subcontracts, employs, or otherwise uses services, for work of the Contracting Authority, of one who is debarred by the Contracting Authority or disqualified according to Paragraph 1, except to fulfill agreements for work on existing contracts, or;

3. Is convicted of or pleads guilty or nolo contendere to a charge of engaging in any conspiracy, combination, or other unlawful act in restraint of trade or of similar charges in any Federal court or a court of this or any other state, or;

4. Has offered or given gifts or gratuities to employees of the Contracting Authority in violation of State law or has had as his employee a person who was at that time also an employee of the Contracting Authority, or

5. The Contracting Authority deems a disqualification is appropriate for reasons stated in Paragraph C. above.

F. A disqualification is intended to be for a specified time. A disqualification shall not exceed 36 months. The Contracting Authority will issue a written notice of any intent to disqualify or suspend a contractors except when suspended for a specific project according to Paragraph C4.

G. Should the Contractor believe that the increase in bidder qualification requirements, intended suspensions or intended disqualification is based on false, biased, or incomplete information or that the increase or intended action is severe or unwarranted, the Contractor may make a written request to the Contracting Authority for an opportunity to be heard in a contested case pursuant to Chapter 17A, Code of Iowa.

1. If notice is given, the written request for a hearing must be filed with the Contracting Authority within 10 days of receipt of the notice of intended agency action.

2. If the basis of the intended disqualification is a criminal violation which is reasonably related to bidding and contracting procedures, the intended disqualification may be applied to the organization, including a person, firm, association, partnership, or corporation, to an affiliated officer, representative, or employee thereof, and to any other such organization in which the organization or affiliate or the officer, representative, or employee has an interest as either officer or owner.

H. When a notice is given or when any action is contested, the Contracting Authority will issue a notice of the final action taken.

1102.05 FOREIGN CORPORATIONS

A. Before entering into a contract involving construction or maintenance work, corporations organized under the laws of any other state shall file with the Contracting Authority a certificate from the Secretary of State of the State of Iowa showing that they have complied with all of the provisions of Chapter 404 Code of Iowa, governing foreign corporations. For contracts involving only the furnishing of materials, the foregoing requirement does not apply.

B. When a contract not involving federal-aid participation for a public improvement is to be awarded to the lowest responsible bidder, a resident bidder shall be allowed a preference over a nonresident bidder from a state or foreign country which gives or requires a preference to bidders from that state or foreign county. The preference is equal to the preference given or required by the state or foreign country in which the nonresident bidder is a resident.

C. If another state or foreign country has a more stringent definition of a resident bidder, the more stringent definition is applicable to bidders from that state or foreign county.

D. Any joint venture that includes a nonresident bidder will be considered nonresident, and the preference rule will be used.

1102.06 INCOME TAX DEDUCTION ON NON-RESIDENT CONTRACTORS

A. Each nonresident person or firm doing business as an individual and each nonresident co-partnership will be required, as precedent to receiving an award, to file a certificate issued by the State Tax Commissions as provided in Section 422.17, Code of Iowa, releasing the Contracting Authority from withholding any and all sums required by the provisions of Section 422.17, Code of Iowa.

PART 1103. APPROVAL FOR AWARD AND AWARD OF THE CONTRACT

1103.01 CONSIDERATION OF BIDS

A. The Contracting Authority reserves the right to waive technicalities and to reject any or all proposals. Bidders may be denied a contract award for any one of the following reasons:

1. For failure to meet the Contracting Authority's requirements for qualification of bidders, as set forth in Section 1102.02 and in the special provisions for the project.

2. For failure to maintain satisfactory progress on work already under contract.

3. For failure to meet promptly financial obligations undertaken in connection with other work under contract.

4. For filing more than one proposal at any letting for the same work under the same or different names.

5. For an unsatisfactory record of performance and cooperation on previous contracts.

6. For submitting an obviously unbalanced bid.

7. For having sublet or otherwise assigned work without the approval of the Contracting Authority.

8. For forfeiture of a proposal guarantee and failure to enter into contract upon an offer of an award by the Contracting Authority in response to a prior advertisement for bids for the same project or any combination of projects involving the project for which award is currently being considered.

9. For failure to file and maintain with the Contracting Authority a current Certificate of Insurance meeting the requirements of 1107.02.

10. For failure to provide a current Iowa contractor's registration number according to the provisions of Chapter 91C of the Code of Iowa.

1103.02 APPROVAL FOR AWARD

A. In the approval for award of contracts consideration will be given not only to prices bid but also to the mechanical and other equipment available to the bidders the financial responsibility of the bidders and his ability and experience in performance of like or similar contracts.

B. Approvals for award will be made as promptly as practical after bids have been opened and read. The Contracting Authority reserves the right to delay the approval for award for such time as is needed for consideration of bids and for receipt of concurrence in recommended approvals for award from other governmental agencies whose concurrence may be required.

1103.03 RETURN OF PROPOSAL GUARANTEE

A. Proposal guaranties will be returned to the unsuccessful bidder by mail promptly after the approval for award has been made. Return to the successful bidder will be made promptly after the filing of the contract documents.

1103.04 CERTIFICATE OF INSURANCE

A. The Contractor's certificate of liability and property damage insurance described in 1107.02 shall be filed with the Contracting Authority on or before the execution of the contract and shall be maintained throughout the prosecution of the work and until final acceptance and completion of the contract. A separate verification shall be required for contracts awarded on the basis of joint bids.

1103.05 REQUIREMENT OF CONTRACT BOND

B. In compliance with Section 573 of the Code of Iowa, the Contractor shall, at the request of the Contracting Authority, on all contracts amounting to five thousand ($5,000.00) dollars or more, file an acceptable bond in an amount not less than 100 percent of the contract sum with the Contracting Authority.

1. The bond shall be executed in on the standard form of the Contracting Authority, contractor shall provide one (1) original. This bond shall be held to cover all work included in the contracts whether performed by the Contractor or under a subcontract or assignment. The bond shall be executed by the Contractor and by a surety company authorized to do business in the state of Iowa.

2. The Contractor shall not begin work on any contract before he is notified, in writing, that the required bond has been approved and accepted, or until the signed contract is returned to him.

C. Prime contractors that are certified through Iowa Department of Economic Development as a targeted small business may request a performance bond waiver.

1. The waiver shall be applied only to a prime contract where the project does not exceed $50,000.00, not withstanding Section 573.2 of the Iowa Code.

2. The waiver shall only apply to those contractors which are able to demonstrate the inability of securing a bond because of a lack of experience.

3. A waiver shall not apply to business with a record of repeated failure of substantial performance or material breach of contract in prior circumstances. The granting of a waiver shall in no way relieve the business from its contractual obligations and shall not preclude the Contracting Authority from pursuing any remedies under the law upon default or breach of contract.

1103.06 EXECUTION OF CONTRACT

A. The bidder to whom a contract is being awarded shall execute and file four copies of such contract with the Contracting Authority.

1103.07 FAILURE TO EXECUTE CONTRACT

A. Unless the time limit is modified by special provisions failure to execute a contract and file an acceptable bond within 30 days of the date of the approval for awards herein provided, will be just and sufficient cause for annulment of the approval for award and for forfeiture of the proposal guarantee to the Contracting Authority.

1103.08 SUBCONTRACTORS

A. The bidder to whom a contract is being awarded shall file a list of subcontractors and a copy of each subcontract with the Contracting Authority within 30 days of the date of the approval for award. All subcontracts must comply with the provisions of 1106.01.

1103.09 MATERIAL SUBSTITUTION

A. The bidder to whom a contract is being awarded shall file all requests for materials substitutions within 30 days of the approval of award of the contract.

PART 1104. SCOPE OF WORK

1104.1 INTENT OF PLANS AND SPECIFICATIONS

A. The intent of the plans and specifications is to provide for the construction and completion of every detail of the work described therein. It shall be understood that the Contractor shall furnish all labor, material, tools, transportation, and supplies required for all or any part of the work to make each item complete in accordance with the spirit of the contract. It is understood that the apparent silence of the specifications as to any detail or the apparent omission of a detailed description concerning any point shall be regarded as meaning that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used.

B. For the purpose of design and the preparation of the Engineer's estimate, the Contracting Authority or its representatives may perform a reasonable amount of exploratory work to gain information relative to surface and subsurface conditions relating to types of soils moisture content, and types and extent of rock strata.

1. This information, when shown on the plans, represents a summary of conditions as of the date the survey was made, it is only an approximate estimation of the site conditions made merely to be suggestive to the Contracting Authority of construction conditions and quantities and classes of work. This information may be used as the bidder sees fit. The appearance of this information on the plans or specifications will not constitute a guarantee that conditions other than those indicated will not be encountered at the time of construction.

2. The bidder is advised that all information concerning the project, compiled by the Contracting Authority preceding the design, is available for examination at the Contracting Authority's headquarters. The prospective bidder shall conduct an examination as provided in 1102.06 to satisfy himself as to the character of the work to be done, the probable construction conditions, and any other

reasonably ascertainable conditions and the potential effect these could have on the performance of work under the contracts which shall be the basis for the bid to be prepared.

C. Any bidder interested in the work is authorized to make whatever additional investigation he consider advisable. In making such additional investigation, the bidder is directed to the Engineer for information relating to available right-of-way. If there are, at that time, any parcels of land over which the Contracting Authority does not have jurisdiction, right of entry must be secured by the prospective bidder from those authorized to grant such permission.

1. All such additional investigation work shall be performed without costing or obligating the Contracting Authority in any way.

1104.02 SPECIAL WORK

A. Any conditions not covered by these standard specifications are stated in the special provisions.

1104.03 INCREASED OR DECREASED QUANTITIES

A. The Contracting Authority reserves the right to make such increase or decrease in the quantities of the work shown on the plans as may be considered necessary to complete fully and satisfactorily the construction included in the contract. The compensation to the Contractor for such changes will be as provided in 1109.04.

B. Except as provided in 1109.05, no significant change in quantities, as defined in 1109.17, shall be made by increasing or decreasing the project area to be improved as shown on the plans and described in the proposal forms unless the Contractor gives written consent to such increase or decrease. However, such consent will not be required for maintenance or restoration work ordered by the Engineer.

1. For the purpose of this article a material change shall be defined as an increase or decrease of more than 20 percent in the measured quantity of any item in the contract.

1104.04 EXTRA WORK

A. The Contracting Authority reserves the right to order, in writing, the performance of work of a class not contemplated in the proposal but which may be considered necessary to complete satisfactorily the work included in the contract. Such extra work will be paid for as provided in 1109.04B.

1104.05 MAINTENANCE OF DETOURS

A. Unless so required by the plans or the special provisions, the Contractor will not be required to assume any responsibility in connection with the maintenance or marking of suitable detours.

1104.06 REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS

A. The contractor for bridge and culvert work shall remove any existing structure, or part of structure, that in any way interferes with the new construction. If specific payment for such work has not been provided in the contract, it will be paid for as extra work.

B. The contractor for road work shall remove any materials or structures found on the right-of-way which are not designated to remain in place or which have not been designated for use in the new construction.

1. The removal and disposal of pipe culverts will not be paid for directly but shall be considered as incidental works and the cost of such removal and disposal shall be considered to be included in the contract price for other items. Pipe culverts designated for salvage shall be removed by methods that will cause a minimum of damage to the pipe culverts.

2. The removal and disposal of bridges or other masonry or monolithic concrete construction will be paid for. If the contract does not contain an item for such work, it will be paid for as extra work.

1104.07 RIGHTS IN AND USE OF MATERIALS FOUND ON THE RIGHT-OF-WAY

A. Unless stated to the contrary in the contract documents, all materials, such as stone, gravel, sand, timber, and structures or parts of structures, found on the right-of-way or on land acquired for the work, are the property of the Contracting Authority or the owner of the fee title to the land.

1. If such materials are to be removed but use or salvage is not designated on the plans, they shall become the property of the Contractor, and shall be disposed of by the Contractor.

2. When the Contractor is permitted to use materials found on the right-of-way, any excavations that are made below the grade elevations shall be backfilled with other suitable materials so that the finished road conforms to the grade shown on the plans. No extra compensation will be allowed for such backfilling.

1104.08 FINAL CLEANING UP

A. Before final acceptance of the work, the Contractor shall remove all unused material and rubbish from the site of the work, remedy any objectionable conditions the Contractor may have created on private property, and leave the project site in a neat and presentable condition. The Contractor shall make no agreement which allows salvaged or unused material to remain on private property within view of the project except when consistent with previous land use.

B. All ground occupied by the Contractor in connection with the work, which is within view of or adjacent to a road, shall be restored. Restoration shall include appropriate smoothing to its original condition and may include making the area suitable for cultivation and, where vegetation has been disturbed, seeding of the area.

1. Unless otherwise provided for, the Contractor shall be responsible for securing waste privileges on private property. The general Contractor shall be responsible for cleanup of subcontractors at the completion of all work.

C. This article is not intended to restrict burning in accord with applicable regulations.

D. Final clean up shall be subject to approval of the Engineer.

1104.09 RIGHT-OF-WAYS OR LANDS ACQUIRED FOR THE WORK

A. Access to the construction site will be over designated routes of travel, on land owned or made available by the Contracting Authority for the specific use of the Contractor.

B. Right-of-way or lands will be provided without cost to the Contractor, and it is contemplated that all of the needed right-of-way or lands will have been acquired for the work placed under contract.

1. Whenever it is necessary to secure additional right-of-way or land, performance of the work affected thereby is contingent upon the securing of such right-of-way or land. No claims will be allowed for loss or damage occasioned by delays in securing right-of-way or lands.

1104.10 PERMITS AND ARRANGEMENTS WITH OTHER GOVERNMENTAL AGENCIES

A. Whenever the work involves construction with which federal, state, or local governmental agencies are concerned, the performance of the work is contingent on arrangements and/or permits with those concerned agencies.

1. The Contracting Authority shall secure all necessary permits, certificates, and licenses required to prosecute the work, except specifically designated permits, local building permits, and any cost for inspections required by local authorities, which shall be paid for and secured by the Contractor.

2. No additional compensation will be allowed for any delays, inconvenience, or damages sustained by the Contractor due to actions of those concerned agencies with respect to any arrangements or permits they may require.

1104.11 RAILROAD CROSSINGS

A. Whenever the work involves construction with which railroad companies are concerned, the performance of the work is contingent upon arrangements with the railroad companies for the proposed construction.

1. The performance of the work shall be in accord with arrangements established by the Contracting Authority. The Contractor may make additional arrangements.

2. No claim will be allowed for loss or damage caused by failure of the railroad to comply with provisions of the agreement with the Contracting Authority. Upon notice given, the Contracting Authority will institute necessary legal action to enforce the conditions of its agreement with the railroad company.

1104.12 PUBLIC UTILITIES

A. The Contracting Authority will notify all utility companies, all pipeline owners, or other parties affected, and will endeavor to have all necessary adjustments of the public or private utility fixtures, pipelines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.

B. The Contractor shall be responsible for notification concerning work near pipelines, required by Section 479.47, Code of Iowa, and for conducting his work as required therein.

C. Waterlines, gaslines, wirelines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, except as otherwise provided for in the special provisions or as noted on the plans.

D. It is understood and agreed that the Contractor has considered in the bid all of the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him/her due to any interference from the utility appurtenances or their operation or relocation.

1104.13 DRAWINGS AND SPECIFICATIONS

A. Unless otherwise provided in the contract documents the Contracting Authority shall furnish to the Contractor, awarded the contract, free of charge, all copies of drawings and specifications reasonably necessary for the execution of the work.

1104.14 THE CONTRACTING AUTHORITY'S RIGHT TO OCCUPY

A. The Contracting Authority shall have the right to enter the building or work site and store or attach such fixtures or furniture as it may elect, or to do such other work providing that such storage or work will not interfere with the completion of the Contractor's work. Such occupancy by the Contracting Authority shall in no way imply final acceptance of any portion of the Contractor's work.

1104.15 CONTRACTOR'S UNDERSTANDING

A. It is understood and agreed that the Contractor has, by careful examination, satisfied him/herself as to the nature, character and location of the work, conformation of the ground, character, quality and quantity of the materials to be encountered, character of the equipment and facilities needed, preliminary to and during the prosecution of the work, general and local conditions and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agency, or employee of the Contracting Authority, either before or after the execution of the contracts shall affect or modify any of the terms or obligations herein contained.

1104.16 HISTORICAL AND ARCHEOLOGICAL

A. If during the course of construction evidence of deposits of historical or archeological interest is found, the Contractor shall cease operations affecting the find and shall notify the Iowa Department of Natural Resources and the state Historic Preservation Officer. No further disturbance of the deposits shall occur until the contractor has been notified by the agency that he/she may proceed. The agency will issue a notice to proceed only after the state official has surveyed the find and made a determination to the Iowa Department of Natural Resources.

B. Compensation to the contractor, if any, for lost time or changes in construction to avoid the finds shall be determined in accordance with changed conditions or change order provisions of the specifications.

PART 1105. CONTROL OF WORK

1105.01 AUTHORITY OF ENGINEER

A. The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress of the work, all disputed and mutual rights between contractors, all plans and specifications, and all questions as to the acceptable fulfillment of the contract on the part of the Contractor. Except as provided in Section 1109, the Engineer's decisions will be final.

B. For authority to temporarily suspend work see 1105.08 and 1108.06.

1105.02 PLANS

A. The official plans, profiles, and cross sections, on file in the office of the Contracting Authority, show the location, typical construction details, and dimensions of the work contemplated. The work shall be performed in conformity therewith, except in case of error or unforeseen contingency.

B. The plans are made from careful surveys and represent the foreseen construction requirements. Any appreciable deviation from the plans made necessary to expedite construction, or because of errors shall be called to the attention of the other party, in writing, by the party discovering such conditions. If necessary, revised plans will be provided.

1105.03 WORKING DRAWINGS

A. The plans will be supplemented by such working drawings as are necessary to adequately control the work. Working drawings shall be furnished by the Contractor, as required by the specifications or the plans.

1. When certification by a professional structural or civil engineer registered in Iowa is required, it will be so designated on the plans or in other contract documents.

2. Working drawings may include shop drawings of fabricated materials, erection plans, falsework plans, cofferdam plans, or other supplemental plans or data. Contractor submitted shop drawings for steel structures shall show fully detailed dimensions and sizes of all component parts of the structure, descriptions of drains, etc.

   a. Prior to review of working drawings, any work done or material ordered shall be at the Contractor's risk.

3. The Contractor shall expressly understand that the Contracting Authority's review of working drawings submitted by the Contractor covers only requirements for strength and arrangement of component parts.

4. The Contracting Authority assumes no responsibility for errors in dimensions and assumes the Contractor will use material complying with requirements of the contract documents, or, where not specified, those of sound and reasonable quality, and will erect the subjects of such working drawings in accord with recognized standards of first-quality workmanship or, when specified, in accordance with standards of the contract documents.

5. If unanticipated and either unusual or complex construction procedures or site conditions occur, the Engineer may require the Contractor to submit such working drawings as, in the judgment of the Engineer, are necessary to satisfactorily complete the proposed construction.

1105.04 ALTERATION OF PLANS OR CHARACTER OF WORK

A. The Engineer will have the right to make alterations in plans or character of work as may be considered necessary or desirable during the progress of the work to satisfactorily complete the proposed construction. Such alteration will neither waive any conditions of the contract nor invalidate any of the provisions thereof.

1105.05 CONFORMITY WITH AND COORDINATION OF SPECIFICATIONS, PLANS AND SPECIAL PROVISIONS

A. Discrepancies within contract documents:

1. In case of any discrepancy between the drawings on the plans and the figures written thereon, the figures, unless obviously incorrect, are to govern.

2. In case of any discrepancy between the plans, including plan notes, and the general or supplemental specifications, the plans are to govern.

3. In case of a discrepancy between the general specifications and supplemental specifications, the supplemental specifications are to govern.

4. In case of any discrepancy between the general or supplemental specifications and the special provisions or between the plans and the special provisions, the special provisions shall govern.

B. The Contractor shall not take advantage of any apparent error or omission in the plans, specifications, or of any discrepancy between the plans or specifications. The Engineer shall be permitted to make such correction in interpretation as may be deemed necessary for the fulfillment of the intent of the plans and specifications, subject to compensation as provided in 1109.03, 1109.05, and 1109.06.

C. The plans shall not be so changed as to materially affect the cost or the difficulty of performing any item or work for which the contract amount is more than 20 percent of the total contract sum, except with the consent of the Contractor.

D. All work performed and all materials furnished shall be in reasonably close conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the plans or indicated in the specifications.

E. If the Engineer finds the material, or the finished product in which the material, is used is not within reasonably close conformity with the plans and specifications, but that reasonably acceptable work has been produced, the Engineer shall determine, based on engineering judgment, if the work shall be accepted and remain in place.

1. In this events the Engineer will document the basis of acceptance and supplement it by contract modification which will provide for an appropriate adjustment in the contract price for such work or materials as deemed necessary to conform to the Engineer's determination.

F. If the Engineer finds the material, the finished product in which the material is used, or the work performed is not in reasonably close conformity with the plans and specifications and has resulted in an inferior or unsatisfactory product, the work or material shall be considered unacceptable and shall be removed and replaced, or otherwise corrected, as acceptable to the Engineer, by and at the expense of the Contractor.

1105.06 SUPERVISION BY CONTRACTOR

A. The Contractor, when absent from the construction site, shall have on site at all times, as its agent, a competent superintendent, capable of reading and thoroughly understanding the plans, specifications, and other contract documents and who shall be thoroughly experienced in the type of work being performed.

1. The superintendent shall supervise, direct, and control the Contractor's operations, personnel, work, and subcontractor's operations. The superintendent shall have full authority to execute orders or directions of the Engineer, without delays, and to promptly supply such materials, equipment, tools, labor, and incidentals as may be required.

2. The Contractor shall give the Engineer written notification of the name of the superintendent. The superintendent shall not be replaced, except with the consent of the Engineer, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in the Contractors employ.

1105.07 CONSTRUCTION STAKES AND BENCH MARKS

A. The Contractor shalle be responsible for all labor, equipment and material necessary to complete the work covered by this contract. The cost of this work shall be considered incidental to other items of work and will not be paid for separately.

B. The Contractor shall be held responsible for the preservation of stakes and marks. If, in the opinion of the Engineer, any of the survey stakes or marks have been carelessly or willfully destroyed or disturbed by the Contractor, the cost of replacing them shall be charged against the Contractor.

C. The Contractor shall provide and keep constantly upon the work site, first-class instruments for use in establishing the various lines, levels and grades for the construction and shall have a superintendent on the work who is thoroughly familiar with their use. The Contractor shall provide and maintain a permanent bench mark at the construction site for the use of mechanics and other subcontractors.

1105.08 AUTHORITY AND DUTIES OF INSPECTOR

A. The Contracting Authority may appoint inspectors to represent the Engineer in the inspection of all materials used in and all work done under the Contract. Such inspection may extend to any part of the work and to preparation or manufacture of materials to be used.

1. The inspector will not be permitted to modify in any way the provisions of the contract documents or to delay the work by failing to inspect materials and work with reasonable promptness. An inspector is placed on the work to keep the Engineer informed as to its progress and the manner in which it is being performed. The inspector will not be authorized to approve or accept any portion of the work.

2. Results of inspection tests and examinations will be available to the Contractor on an informational basis. Absence or presence of representative test data does not alter the Contractor's responsibility for plan and specification compliance in accordance with 1104.01.

3. The inspector will not act as foreman or perform other duties for the Contractors nor improperly interfere with management of the work.

4. In case of dispute between the Contractor and inspector as to quality of materials or manner of performing the works the inspector will have authority to reject materials or suspend the work until the question at issue can be decided by the Engineer. Written notice of suspension of work will be given to the Engineer and Contractor by the inspector.

1105.09 INSPECTION OF WORK

A. The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether the work is being performed in conformance with the contract documents. At any time before acceptance of the works upon request of the Engineer, the Contractor shall remove or uncover such portions of finished work as the Engineer may direct. After examination has been made, the Contractor shall restore such portions of the work to the standard required by the contract documents.

1. If work thus exposed or examined proves acceptable, the uncovering or removing and replacing of coverings or the restoring of parts removed, shall be paid for as extra work, except that no payment will be made for work involved in checking smoothness of concrete surfaces.

2. If work thus exposed and examined proves unacceptable, the Contractor shall replace the defective work in accordance with the specifications.

3. If work thus exposed and examined proves either unacceptable or deficient, the Contractor will be paid only for work as finally accepted.

4. Work done without the Engineer having been afforded ample opportunity to provide suitable inspection, or unauthorized work, may be ordered removed and replaced at the Contractor's expenses or may be excluded from the quantities measured for payment.

B. If the specifications, Engineer's instructions, laws, ordinances, or any public authority require any work and/or materials to be specially tested or approved, the Contractor shall give the Engineer timely notice of readiness for review. If the review is to be made by authority other than the Engineer, the Contractor shall notify the Engineer of the date fixed for review. Reviews by the Engineer will be promptly made and, where practicable, at the source of supply.

1105.10 REMOVAL OF DEFECTIVE WORK

A. Any defective work shall be removed and replaced at the Contractor's expense.

B. Should the Contractor fail or refuse to remove defective work when so ordered by the Engineer, the Engineer shall have authority to order the Contractor to suspend further operations, and may withhold payment on estimates until such defective work has been removed and replaced in accordance with the plans and specifications.

1. Continued failure or refusal on the part of the Contractor to correct defective work promptly shall be sufficient cause for the Contracting Authority to declare the contract in default and to complete the work in accordance with 1108.11.

1105.11 UNAUTHORIZED WORK

A. Unauthorized work and work done in excess of that provided by the lines and grades shown on the plans or as given by the Engineer, or any work done without the authority of the Engineers will be considered as unauthorized and will not be paid for.

1. Unauthorized work may be ordered removed and replaced at the Contractors expense.

1105.12 OTHER CONTRACTS

A. The Contracting Authority reserves the right to do, or to contract for other work adjacent to, or in the vicinity of, the work herein described.

B. The Contractor agrees to permit such other work to progress and to arrange for joint occupation of the site under such provision as the Engineer determines necessary. If in the judgment of the Engineer, such joint occupation of the site impedes progress on the work herein described, the Contracting Authority will proportionally extend the time for completion of the work.

1. The Contractor hereby waives any claim for damages or extra compensation by reason of such interference with his work.

1105.13 FINAL INSPECTION

A. Upon notification, by the Contractor or his authorized representative, that the work is completed, the Engineer shall make prompt final inspection of each item of work included in the contract. If the work is found not to be in accordance with the contract documents, the Contractor will be advised as to the particular defects to be remedied before final acceptance can be made.

1105.14 RESTRICTIONS ON MOVING AND USE OF HEAVY EQUIPMENT

A. The following restrictions shall apply to the moving and use of heavy equipment:

1. Movement of equipment to and from the project shall be in compliance with the laws governing the operation of vehicles on the highways of Iowa. Movement and operation of equipment over completed portions of pavements, bituminous surfaces, base courses, and structures which are a part of the project shall be with legal axle loads, except as modified in this article.

2. In the case of earthwork and shouldering to be done in connection with either rigid or flexible pavement, or pavement widening and resurfacing, no tractor-drawn, earth-moving equipment shall be operated, or driven on or across the pavements, except at designated crossovers, as authorized by the Engineer.

a. When crossovers are specifically permitted, the Contractor will designate, before use, the location and number of crossovers to be used. The Engineer will not approve crossovers in areas of limited sight distance, near structures, railroad crossings, or at any other location which will place safety of the traveling public in jeopardy. At these crossovers, equipment having axle loads greater than the maximum permitted by law may be used.

b. Crossovers shall be 30 feet in length measured along the centerline and shall not be closer than 300 feet to each other.

c. For each crossover used, the Contractor shall, at the Engineer's option, either replace the pavement or pay the Contracting Authority at the rate of five thousand ($5,000.00) dollars on the basis of a two-lane pavement.

d. In lieu of the surface crossover, approved hauling bridges may be used. The hauling bridge shall accommodate two lanes of public traffic, and it shall be removed from the roadway at the close of each day's operations. When a hauling bridge is used, no payment will be required.

e. The provisions of the Supplemental Specification for Traffic Controls in effect on the contract letting date, shall apply.

3. No dragline, cranes or power shovel shall be operated with any part of the machine resting upon a pavement, bituminous surface, base course, or structure except with approval of the Engineer and in accord with restrictions in that approval.

4. Under no conditions shall machines equipped with metal lugs or similar projections on the treads be operated on the surface of a pavement, bituminous surface or base course.

5. For building shoulders, on completed pavements of any type, the maximum axle load used for equipment operating on pavement shall not exceed the legal axle load, as defined herein.

6. Crawler-type tractors shall not be moved on or off a pavement or base course except at places where the compacted earth adjacent to slab is at least 2 inches higher than the surface of the pavement or base course. Whenever heavy, crawler-type equipment, such as a crane or mixers is moved on or off the edge of a pavement or base course, a substantial timber approach shall be built, at the edge of slab, to prevent overloading or otherwise injuring the edge of the slab.

7. Compacting equipment having axle loads greater than 20,000 pounds may be used on the work under the following provisions:

   a. The equipment shall be transported to and from the work and across the bridges on the work in compliance with laws of the State of Iowa.

   b. For compaction of subbase, the weight of equipment used shall not be greater than that of compaction equipment used in correction of the roadbed for grade and cross section.

   c. For compaction of base course, the weight of equipment used shall not be greater than the weight of equipment used in compaction of the subbase on which the base is placed.

   d. For compaction of surface courses, the weight of equipment shall not be greater than that of equipment used in compaction of the base on which the surface course is placed.

8. For grading or any other type of work, no rollers or other equipment, having an axle load greater than 50,000 pounds or a total weight in excess of 60,000 pounds shall be operated over a culvert, except as may be authorized by the Engineer, and then, in strict compliance with prescribed precautionary measures.

1105.15 PLACEMENT OF FILL MATERIAL IN STREAMS AND WATERBODIES

A. The placement of fill material in streams is regulated by Federal law. The intent of this specification is to require contractor operations in streams and other waterbodies and adjacent swamps, marshes, bogs, or similar areas, to be in compliance with Federal regulations.

B. Fill material shall mean; any material used for the primary purpose of replacing an aquatic area with dry land, or of changing the bottom elevation of a waterbody.

C. Fill material shall consist of clean, suitable, naturally occurring material, free from toxic pollutants in other than trace quantities.

D. Temporary stream crossings shall be bridged or culverted so as not to restrict expected high flows or disrupt the movement of aquatic life native to the stream or waterbodies. Expected high flows are those flows, which the Contractor expects to experience during the period of time that the crossing is in place.

1. Temporary stream crossings shall:

a. Not extend over 100 feet into any swampy, bogy, marshy, or similar area that is adjacent to the stream or waterbody.

b. Be maintained to prevent unnecessary erosion and other nonpoint sources of pollution.

c. Be removed after they are no longer needed.

1105.16 COST REDUCTION INCENTIVE

A. The Contractor may submit to the Engineer, in writing, proposals for modifying the plans, specifications, or other contract requirements for the sole purpose of reducing the total cost of construction.

1. The proposals shall not impair, in any manner, essential functions or characteristics of the projects, including but not limited to, service life, economy of operation, ease of maintenance, desired appearance, or design and safety standards.

B. Proposals shall contain the following changes:

1. Existing requirements and proposed changes,

2. Contract requirements that must be changed if the proposal is adopted,

3. A detailed cost estimate of performing the work as stipulated and as proposed,

4. The time within which the Engineer must make a decision thereon,

5. The items of work affected by the proposed changes, including any quantity variation attributable thereto.

C. The provisions of this article shall not be construed to require the Engineer to consider any cost reduction proposal which may be submitted hereunder.

1. Proposed changes in basic design of a bridge or pavement type will not be considered an acceptable proposal.

2. The Contracting Authority will not be liable to the Contractor for failure to accept, or act upon, any proposal submitted pursuant to this article, or for any delays to the work attributable to any such proposal.

3. If a proposal is similar to a change in plans or specifications under consideration by the Contracting Authority for the project at the time said proposal is submitted, or if such a proposal is based on, or similar to, standard specifications, special provisions, or plans adopted by the Contracting Authority after the advertisement for the contract, the Engineer will not accept such proposals and the Contracting Authority reserves the right to make such changes without compensation to the Contractor under provisions of this article.

D. The Contractor shall continue to perform the work in accordance with contract requirements until a change order, incorporating the cost reduction proposal, has been issued. If a change order has not been issued by the date on which the Contractor's cost reduction proposal specifies that a decision thereon should be made, or such other date as the Contractor may subsequently have specified in writing, such proposal shall be deemed rejected.

E. The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in construction costs from adopting all, or any part of, such proposal. In determining the estimated net savings, the right is reserved to disregard the contract bid prices if, in the judgment of the Engineer, such prices do not represent a fair measure of the value of work to be performed or to be deleted.

F. The Contracting Authority reserves the right, where it deems such action appropriate, to require the Contractor to share in the Contracting Authority's costs of investigating a cost reduction proposal. Where such a condition is imposed, the Contractor shall indicate his acceptance thereof in writing, and such acceptance shall constitute full authority to deduct amounts, payable to the Contracting Authority from any money due, or that may become due, to the Contractor under the contract.

G. If the Contractor's cost reduction proposal is accepted in whole or in part, such acceptance will be by change order, which shall specifically state that it is executed pursuant to this article. Such a change order shall incorporate the changes in the plans and specifications which are necessary to permit the proposal, or such part of it as has been accepted, to be put into effects and shall include any conditions upon which the Contracting Authority's approval is based, if the approval is conditional.

   1. The change order shall also set forth the estimated net savings in the cost of performing the work attributable to the proposal effectuated by the change order, and shall further provide that the Contractor be paid 50 percent of said estimated net savings amount.

H. Acceptance of the cost reduction proposal and performance of the work thereunder shall not extend the time of completion of the contract, unless specifically provided for in the change order authorizing use of the proposal.

I. The amount specified to be paid to the Contractor in the change order which effectuates a cost reduction proposal shall constitute full compensation to the Contractor for the proposal and performance of the work thereof pursuant to the said change order.

J. The Contracting Authority expressly reserves the right to adopt a cost reduction proposal, for general use on contracts administered by the Contracting Authority, when it determines that said proposal is suitable for application to other contracts.

   1. When an accepted proposal is adopted for general use, only the contractor who first submitted such proposal will be eligible for compensation pursuant to this article, and in that case, only to those contracts awarded to him/her prior to submission of the accepted proposal and as to which such proposal is also submitted and accepted.

   2. Cost reduction proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under provisions of this article, if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the Contracting Authority.

   3. Subject to the provisions contained herein, the State or any other public agency shall have the right to use all, or any part of any submitted cost reduction proposal without obligation or compensation of any kind to the Contractor.

PART 1106. CONTROL OF MATERIAL

1106.01 QUALITY OF MATERIALS

A. It is the intent of the specifications that first-class materials shall be used throughout the work, and that these first-class materials shall be incorporated in such a manner as to produce completed construction

which is acceptable in every detail. Only materials conforming to the requirements of these specifications, approved by the Contracting Authority, shall be incorporated into the work

B. When more than one kind of manufacture of a material is specified, the option will be with the Contractor, but the choice shall be confined to the materials mentioned.

C. Whenever in any of the contract documents, an item of material or equipment is defined by describing a proprietary product or by using the name of a manufacturer or vendor, the terms "or equivalent", or "or equal", if not inserted, shall be implied. This specific item of material or equipment mentioned shall be understood as establishing a standard of type, function, efficiency, minimum basis of design, and quality desired. Other manufacturer's products of comparable quality, design and efficiency, and suitable for the service intended will be considered, but no change will be made without written approval of the Contracting Authority.

D. Requests for materials substitutions must be submitted in duplicate, or in the quantities required elsewhere in the specifications, and meet the requirements of 1103.09

E. **1106.02 SOURCE OF MATERIALS**

A. At the option of the Engineer, the source of supply of each material shall be approved by the Contracting Authority before the delivery is stated.

1. If requested by the Contracting Authority, representative preliminary samples, of prescribed character and quality, tested in accordance with the methods referred to under samples and tests, shall be submitted by the contractor or producer for examination.

2. All materials proposed to be used may be inspected or tested at anytime during their preparation and use.

3. If, after trial, it is found that sources of supply which have been approved do not furnish a uniform product or if products from any source do not meet the specifications, at any time, the Contractor shall furnish approved material from other approved sources. No material which, after approval has in any way become unfit for use, shall be used in the work.

1106.03 SAMPLES AND TESTS

A. Each consignment of materials required by the Engineer, shall be tested or inspected before being incorporated into the work and approved by the same Engineer before it is used.

1. The contractor shall afford facilities for collecting and forwarding samples as the Engineer may require.

2. Unless otherwise designated in the standard, supplemental specifications, or instructional memorandums, the inspection, sampling, testing, and basis of acceptance of materials shall be in accordance with the current AASHTO "Standard Specifications for Sampling and Testing of Transportation Materials" including published interim standards.

1106.04 STORAGE OF MATERIALS

A. The Contractor shall be responsible for care and storage of materials delivered for the work or purchased for use thereon. Material which has been delivered and has become damaged before actual incorporation in the work may be rejected by the Engineer even though it may have been previously acceptable. Stored materials shall be located to facilitate thorough inspections.

1106.05 UNACCEPTABLE MATERIALS

A. All materials not conforming to requirements of the specifications at the time they are to be used shall be considered unacceptable, and all such materials will be rejected and shall be removed immediately from the work site, unless otherwise instructed by the Engineer. No rejected materials the defects of which have been corrected shall be used until approval has been received.

PART 1107. LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

1107.01 LAWS TO BE OBSERVED

A. The Contractor is presumed to be familiar with all laws, ordinances, and regulations that may, in any manner, affect those engaged or employed by the Contractor, the materials or equipment used, or which may in any way, affect the conduct of the Contractor's work. The Contractor shall conduct his work to avoid conflict with any such laws, ordinances, or regulations, and shall save harmless the Contracting Authority and its representatives against any claim arising from violation thereof.

B. The Contractor shall give preference to Iowa domestic labor, in accordance with the provisions of Chapter 73 of the Code of Iowa, and this provision is hereby specifically made a part of any contract of which these contract documents are a part. A person shall be deemed a domestic laborer of this state if he/she is a citizen and has resided in this state for more than six months.

C. The provisions of Chapter 73 of the Code of Iowa concerning preferences for Iowa products and labor shall not apply to contracts involving work financed wholly, or in part, by the federal government.

D. The Contractor and all subcontractors shall have on file with the Contracting Authority, a valid state of Iowa contractors registration number, issued by the Iowa Department of Labor Services, in accordance with Chapter 91C of the Code of Iowa.

1107.02 LIABILITY INSURANCE

A. It shall be the Contractor's responsibility to have liability insurance covering all of the construction operations incident to completion of this contract. The Contractor must have on file, with the Contracting Authority, a current "Certificate of Insurance" prior to award of contract. The certificate shall identify the following: insurance company firm name and address, contractor firm names policy period, type of policy, limits of coverage, and scope of work covered, (single project or statewide).

   1. This requirement shall apply with equal forces whether the work is performed by -- (1) persons employed directly by the Contractors (2) by a subcontractor or his employees, or (3) by an independent contractor.

B. In addition to the above, the Contracting Authority shall be included as an insured party, or a separate owner's protective policy shall be filed showing the Contracting Authority as an insured party.

C. The liability insurance shall be written by an insurance company (or companies) qualified to do business in Iowa. For independent contractors engaged solely in the transportation of materials, the minimum coverage provided by such insurance shall not be less than required by Chapter 327, Code of Iowa, for truck operators or contract carriers as defined therein. For all other contractors, subcontractors, and independent contractors, the minimum coverage by such insurance shall be as follows:

   Public Liability Insurance
   Per person - $100,000.00
   Each occurrence - $300,000.00
   Property Damage Insurance
   Each occurrence - $50,000.00

D. Failure on the part of the Contractor to comply with the requirements of this article will be considered sufficient cause to suspend the work, withhold estimates, and to deny the Contractor from receiving further contract awards, as provided in 1103.01.

1107.03 PATENTS AND ROYALTIES

A. The Contractor shall be responsible for all claims for infringement of patents, or for royalties on tools, machinery, appliances, devices, or materials used in construction and completion of the work, except as are specifically required by the contract documents.

1. The Contractor agrees that the Department may retain out of the money that is or may become due the Contractor an amount to cover all such claims and to retain the same, until all such claims are paid or adjusted.

B. The Contracting Authority assumes responsibility for payment of claims for damages from patent or copyright infringement or for royalties on material processes, specifications, or types of construction that are required by the contract documents.

1107.04 RESTORATION OF CONSTRUCTION WORK OPENED BY PERMIT

A. Prior to final acceptance, if any repairs to the work constructed hereunder are made necessary by construction or repair of drains or sewers, laying or repairing of pipes or conduits for telegraphy, telephone or electric wires, or from any other disturbance of said work under permission issued by the Contracting Authority, the Contractor shall, upon notification by the Engineer, immediately make necessary repairs in conformity with the specifications.

1. Such repairs shall be paid for as extra work, however, no compensation will be allowed when such repairs are made necessary by the Contractor's negligence or carelessness.

B. The Contractor shall not authorize any person or persons to make alterations or additions to the construction work unless a permit duly authorized by the Contracting Authority is presented.

1107.05 FEDERAL PARTICIPATION

A. The attention of the Contractor is called to the provisions of the Acts of Congress known as the "Land and Water Conservation Fund Act", the "Federal Aid in Wildlife Restoration Act", the "Federal Aid in Fish Restoration Act", the "Boating Safety Act", the "Superfund Amendments and Reauthorization Act ", the " Clean Water Act" and amendments thereto, and any other acts of congress providing for fish and wildlife of conservation improvements.

1. When the United States Government is to pay for all or any portion of the cost of an improvement or project, the construction work, although it is under the direct supervision of the Contracting Authority and subject to the laws of the State of Iowa, is also subject to the above mentioned Acts of Congress and all rules, regulations, and reimbursements that may be imposed by the federal authority thereunder. Such construction work will, therefore, be subject to inspection by the duly authorized agents of the federal government, but such inspections will not make the federal government a party to the contract.

B. On all contracts involving Federal aid, all steel products incorporated into the work must have been manufactured in the United States. The Engineer may allow minimal amounts of these materials from foreign sources, provided the cost does not exceed 0.1 percent of the contract sum or $2,500 whichever is greater.

1107.06 SAFETY, HEALTH, POLLUTION AND SANITATION

A. In the performance of his contract, the Contractor shall comply with all applicable laws, rules, regulations, and ordinances governing safety, health, pollution, sanitation, noise control, and disposal of waste materials, and shall make available such additional safeguards, safety devices, protective equipment, and take such actions as are reasonably necessary to protect life and health of employees and the public.

1. The Engineer will not act as an enforcement agent for compliance of rules and regulations governing industrial safety. However, violations of properly promulgated laws, rules, regulations, and ordinances reported to the Engineer by responsible agencies may result in the issuance of a suspension order until such time as the violation is corrected.

B. The Contractor shall make adequate provisions satisfactory to the Engineer for safety of inspectors, particularly at sampling locations. Provisions shall include guards for moving belts, pulleys, and wheels near the sampling point and a stable platform to be used when sampling is to be done from an elevated location.

C. There shall be suitable retention dams, in areas where approved liquid asphaltic material, or asphalt cement are stored and used, to minimize pollution of nearby areas from effect of normal rains. The Contractor shall take other necessary precautions to prevent pollution of streams, lakes, ponds, reservoirs, and other areas with fuels, oily bitumens, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

D. The disposal by open burning of landscape waste originating on the construction site shall be permitted unless prohibited by local ordinances or regulations. However, the burning of landscape waste produced in clearing, grubbing, and construction operations shall be limited to areas located at least one-fourth mile from any inhabited buildings. Rubber tires will not be used to ignite landscape waste.

E. The Contractor shall be specifically responsible for adhering to all local burning ordinances or regulations, and to ascertain what the local burning restrictions consist of in addition to the regulation stated above and to see that all subcontractors comply with those restrictions.

F. All internal combustion engines, used for any purpose on the job, or related to the job, should be equipped with a muffler of the type recommended by the manufacturer. No internal combustion engine will be operated without a muffler. Faulty or damaged mufflers must be replaced. Machinery must be properly maintained at all times in order to limit engine noise, as well as other extraneous noise.

G. When directed by the Engineer, the Contractor shall apply moisture to the construction area and haul routes, as necessary, to prevent the spread of dust, at no expense to the Contracting Authority.

1107.07 PUBLIC CONVENIENCE AND SAFETY

A. The Contractor shall conduct the work as to assure the least possible obstruction to access by the residents along the project. The Contractor should schedule and conduct the work in such a way as to provide for their safety and convenience.

1. Work and materials required by the Engineer for public convenience and safety in excess of that provided for in the contract, shall be considered as provided for in 1109.03.

1107.08 BARRICADES AND WARNING SIGNS

A. The Contractor shall take every reasonable precaution to prevent the public from interfering with the work, and to prevent the work from interfering with the public, for providing for safety of the general public traveling to, through, within, along, and across the project, and shall take such precautions, measures, or acts as are required herein and as specifically required by the contract documents or by the Engineer. In additions the Contractor shall provide such additional safeguards as deemed necessary to protect equipment, the work, and the public at the Contractors own expense.

B. The Contractor shall erect and maintain suitable barriers, and at night, such lights, as will prevent accidents to persons or property in and around the area of work.

C. The Contractor shall provides at his own expense, such security guards as are necessary to protect equipment and to maintain proper lighting. Security guards that may be necessary for the protection of the public shall be provided by the contractor on written order from the Engineer.

D. Whenever the work is under the Contractor's control, the Contractor shall be held responsible for any damage to the newly completed portions of the work resulting from public misuse.

1107.09 USE OF EXPLOSIVES

A. When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property. The Contractor shall be responsible for all damage resulting from use of explosives.

B. All explosives shall be stored in a secure manner in compliance with all laws and ordinances and in quantities maintained at a practical minimum. Storage places shall be clearly marked. Where no local laws

or ordinances apply, storage shall be provided, satisfactory to the Engineer and, in general, not closer than 1,000 feet from the road or from any building, camping area , or place of human occupancy.

C. The Contractor shall notify each public utility company, having structures in proximity to the site of the work, of the intent to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury.

1107.10 PROTECTION AND RESTORATION OF PROPERTY

A. The Contractor shall replace or renew fences, sidewalks, or other property damage by reason of the work or the negligence of the Contractors employees. The Contractor shall take suitable precautions to prevent damage to telephone, telegraphy, and electric transmission lines along the highway and to pipes, conduits, and other underground structures. The Contractor shall carefully protect from disturbance all land monuments and property marks until an authorized agent has witnessed or otherwise referenced their locations and shall not remove them until so directed.

1. The Contractor shall be responsible for damage or injury to property resulting from the prosecution of his work, however, responsibility shall not extend to damage to fences, telephones, telegraph, or electric lines occupying the right-of-way unlawfully, provided due caution has been used in removing them. The Contractor's responsibility shall not be released until the work under the contract is completed and accepted.

1107.12 RESPONSIBILITY FOR DAMAGE CLAIMS

A. The Contractor shall indemnify and save harmless the state of Iowa, the Contracting Authority and other agencies which have concurred in the award of contract, their officers and employees, from all suits, actions, or claims of any character brought because of any injuries or damage received or sustained by any person, persons, or property because of any act, omissions or neglect in safeguarding or performing the work, or through use of unacceptable materials in constructing the work, and so much of the money due the said Contractor, under and by virtue of the contract, as may be considered reasonable and necessary by the Contracting Authority for such purpose, may be retained for the use of the State, or in case no money is due, the surety may be held until such suit or suits, action or actions, claim or claims for injuries or damages, as aforesaid, shall have been settled and suitable evidence to that effect furnished to the Contracting Authority, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence of adequate protection by public liability and property damage insurance.

1. Notwithstanding the above, it is specifically agreed between the parties executing this contract that it is not intended by any of the provisions of any part of the contract documents to create in the public or member thereof a third party beneficiary hereunder, or to authorize anyone not a party to this contract to maintain a suit for personal injuries or property damage pursuant to the terms of provisions of this contract.

2. The duties, obligations, and responsibilities of the parties to this contract with respect to third parties shall remain as imposed by law. It being the intention of the parties that indemnity herein provided shall not extend to acts of omission, of negligence for which the Contracting Authority is solely responsible. But indemnity shall extend to all claims in which the Contractor and the Contracting Authority are found to be either jointly or concurrently negligent.

B. Responsibility of the Contractor for providing warning devices, required by 1107.08 to avoid damages or injuries on any portion of the work covered by the contract, shall not cease until the work on such portion has been released by the Engineer.

1. A release shall be construed to mean a written statement by the Engineer to the effect that the Contractor may cease to maintain barriers and lights, that the work may be opened to the publics and that the Contractor is relieved of further maintenance of that portion of the work. Such release shall not constitute an acceptance of the work.

C. The Contractor's responsibility for maintenance of lights on any individual structure shall cease upon final acceptance of such structure, or when specifically released in writing by the Engineer.

1107.13 OPENING OF SECTION OF CONSTRUCTED WORK TO THE PUBLIC

A. When any substantial portion, part, or feature of a contract is completed to the extent that its stability and integrity is not dependent upon completion of the other item, or work required in the contract, that portion, part, or feature may be released by the Engineers after conferring with the Contractor, and opened to traffic or received for public usage prior to final approval and acceptance of all work involved in the contract.

   1. The Contractor will not be responsible for damages due to the elements or the ordinary use of the public to those portions, parts, or features of the work which have been released by the Engineer.

   2. The Contractor will be responsible for any damages which may be caused by defective work or failure to comply with the contract documents.

B. The above provisions relating to a release by the Engineer will be applicable only to those portions, parts, or features of the contract for which the Engineer has furnished to the Contractor a written release.

1107.14 CONTRACTOR'S RESPONSIBILITY FOR WORK

A. The Contractor shall be responsible for the care and maintenance of partially completed and furnished work on any portion of the project until released by the Engineer from such responsibility. It will be the Contractor's responsibility to adjust the Contractor's operation or method of operation to prevent any damage of any nature to any portion of the partially completed or completed work. Repair work shall be done promptly upon being so ordered by the Engineer.

1107.15 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES

A. At points where the Contractor's operations are adjacent to properties of railway, telegraph, telephone, and power companies, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience. Work shall not be commenced until all arrangements necessary for the protection thereof have been made.

B. The Contractor shall cooperate with owners of underground or overhead utility lines in their removal and rearrangement operations, in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

C. In the event of interruption to water or utility services, as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with said authority in restoration of service.

   1. If water service is interrupted, repair work shall be continuous until service is restored.

   2. No work shall be undertaken around fire hydrants until provision for continued service has been approved by the local fire authority.

1107.16 PERSONAL LIABILITY OF PUBLIC OFFICIALS

A. In carrying out any of the provisions of the contract, or in exercising any power or authority granted to any agency or representative of the Contracting Authority thereby, there shall be no liability upon such agent or representatives including the Engineer or authorized agents, either personally or as an official of the Contracting Authority, it being understood that in such matters the agent acts as the agency and representative of the Contracting Authority.

1107.17 NO WAIVER OF LEGAL RIGHTS

A. The Contracting Authority shall not be precluded or stopped by any measurement, estimate, or certificate made, either before or after the completion and acceptance of the work and payment therefor, from showing the true amount and character of the work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate, or certificate is untrue or incorrectly made, or that the work or materials do not, in fact, conform to the contract.

B. The Contracting Authority shall not be precluded or stopped, notwithstanding any such measurement, estimate, or certificate, and payment in accordance therewith, from recovering from the Contractor and the Contractor's sureties such damages as it may sustain by reason of the Contractor's failure to comply with the terms of his contract.

C. Neither acceptance by the Contracting Authority, or any representative of the Contracting Authority, nor any payment for or acceptance of the whole or part of the work, nor any extension of time, nor any possession taken by the Contracting Authority, shall operate as a waiver of any portion of the contract, or for any power herein reserved, or any right to damages herein provided. A waiver of any breach of contract shall not be held to be a waiver of any other or subsequent breach.

PART 1108. PROSECUTION OF PROGRESS

1108.01 SUBLETTING OF CONTRACT

A. The Contractor shall perform, with his/her own organization, work amounting to not less than 30% of the total contract cost, however, any items designated in the contract as "specialty items" may be performed by subcontracts and the cost of any such specialty items so performed by subcontract may be deducted from the total cost before computing the amount of work required to be performed by the Contractor with his/her own organization.

B. Any items that have been selected as "specialty items" for the contract are listed as such in the special provisions found elsewhere in the contract documents.

C. At the time specified by the contract documents or when requested by the Engineer, the Contractor shall submit, in writing to the Contracting Authority, for approval the names of the subcontractors proposed for the work. Subcontractors may not be changed except at the request of and with the approval of the Contracting Authority.

1. The Contractor is responsible to the Contracting Authority for the acts and omissions of the subcontractors, and of their direct and indirect employees, to the same extent as the Contractor is responsible for the acts and omissions of its own employees.

2. The contract documents shall not be construed as creating any contractual relation between the subcontractor and the Contracting Authority.

D. The Contractor shall bind every subcontractor and every subcontractor agrees to be bound by the terms of the contract, the contract documents, the plans, the general conditions of the contract, the supplementary general conditions, the special conditions, and the specifications as far as applicable to the subcontractors work.

E. The subcontractor shall be bound to the Contractor by the terms of the contract, the contract documents, the plans, the general conditions, and specifications, and to assume toward the Contractor all the obligations and responsibilities that the Contractor, by those documents, assumes towards the Contracting Authority.

1. The Contractor agrees to be bound to the subcontractor by all the same obligations that the Contracting Authority assumes to the Contractor under the terms of said documents, and by all the provisions thereof affording remedies and redress to the Contractor from the Contracting Authority.

F. The Contractor shall not assign, sublet, or transfer in whole or part any of the work herein specified without the written consent of the Contracting Authority. Any such assignment, subletting, or transfer shall not in any manner relieve the Contractor from any of the responsibilities assumed herein.

G. For convenience of reference and to facilitate the letting of contracts and subcontracts, the specifications are separated into title sections. Such separations shall not, however, operate to make the Engineer an arbitrator to establish limits to the contracts between Contractor and subcontractors.

H. This article shall further be applicable to contracts involving Federal-aid participation in construction insofar as they are consistent with the required provisions for Federal-aid contracts attached to the contracts,

and shall be additional specifications insofar as they cover matters not covered by the required provisions for Federal-aid contracts.

1108.02 PROSECUTION OF WORK

A. The proposal form may designate the contract period by either completion date, approximate starting date, of specified starting date.

B. Intermediate contract periods may be designated for completion of certain portions of the contract. The contract period for each portion and the liquidated damages, if any, will be listed in the special provisions.

C. The return of the signed and executed contract to the Contractor shall serve as notice to the Contractor that the contract bond is acceptable, that the contract is in force, and that the Contractor may complete arrangements for materials and other work in accordance with the contract documents.

D. Should delay become apparent before or after the work is started, the Engineer will immediately notify the Contractor, in writing, that work on the contract will be delayed and, if possible, the approximate duration of such delay. For delays exceeding 2 weeks, new construction dates may be established by the Engineer after consulting with the Contractor.

1. Specified Starting Date: When a starting date is specified, working days will be charged to the Contractor starting on the specified starting date or 10 days after execution of the contract, whichever is later. Starting work prior to the specified date will be considered upon request, and working days will be charged when work starts.

2. Approximate Starting Date:

   a. Site available immediately, as determined by the Engineer: Anytime after execution of the contract and on or after the approximate starting date, the Contractor may work, weather and specifications permitting. Working days will be charged any time the Contractor is working on/or after the approximate starting date. Starting work prior to the approximate starting date will be considered upon request. If allowed, working days will be charged.

   b. Site Availability Date Unknown, as determined by the Engineer: It is expected the site will be available by the approximate starting date. If it appears the site will not be available by the approximate starting date, the Engineer will inform the Contractor of the delay and if possible the duration of the delay. The Contractor may commence work, weather and specifications permitting, any time after execution of the contract and on or after the approximate starting date provided the site has become available. If work is started under these conditions, working days will be charged. Starting work before the approximate starting date and before the site is available, will be considered only after the Contractor has submitted a signed waiver of any right to claim extra compensation for damages due to delays from any cause related to the early commencement. If approved, working days will not be charged when working prior to the date of site availability. If the Contractor is working on the project when the site becomes available, working days will be first charged on the following day.

3. Specified Completion Date: The Contractor may commence work any time after execution of the contract, weather and specifications permitting.

   a. Working days will begin to be charged whenever the Contractor starts work.

4. Winter Work: The proposal may require winter work on all or portions of the project, and working days will be counted as indicated therein. When not so specified, the Contractor may work, unless advised to the contrary be the Engineers between November 15 and April 1 with no working time charged. If the best interest of the Contracting Authority so dictates, the Engineer may require the Contractor to continue work after November 15.

   a. Working days will not be charged if working time remains on November 15, and working days may be charged for days worked if no working time remains on November 15.

5. Notice to Proceed: A notice to proceed will be issued when, in the opinion of the Engineer, considering the approximate starting date, site availability, and working days allowed, failure of the Contractor to commence work places the timely completion of the project in jeopardy. The starting date in the notice to proceed will not be less than 15 calendar days after the date of the issuance of the notice. Working days will be charged beginning with the starting date established by the notice or when the Contractor starts work if prior thereto. A notice to proceed will be issued, except:

    a. It will be assumed when a specified starting date is used.

    b. It will be assumed when a specified completion date is used, the number of working days allowed will be counted back from the specified completion date, exclusive of Saturdays, Sundays, and holidays, to determine the first day working days will be charged.

    c. It may be included as an agreed starting date at a preconstruction conference for projects with an approximate starting date.

    d. It will be assumed when the Contractor is working at the time for issuance of the notice.

    e. It will be assumed, if an early work waiver is approved, as having been issued at the time of site availability, as documented in the project records.

6. Weekly Report of Working Days: Whenever the Contractor is subject to being charged with working days, the Engineer will furnish the Contractor a weekly statement indicating the working days to be charged against the Contractor for that period. Should the Contractor believe the statement to be inaccurate, a statement should be submitted to the Engineer, in writing, stating the objection and reasons, within 10 calendar days after receipt of the statement. If the Contractor fails to submit an objection within that time, the original statement may be considered as accurate and final.

7. Work Progress: The progress of the work shall be at a rate sufficient to complete the contract within the time allowed. If it appears that the rate of progress is such that the contract will not be completed within the time allowed, or if the work is not being executed in a satisfactory and workmanlike manner, the Engineer may order the Contractor to take such steps as necessary to complete the contract within the period of time specified or to prosecute the work in a satisfactory manner.

    a. If the Contractor fails to comply with such order within 2 weeks after receipt of the order, the Contractor may be disqualified from receiving any additional bidding proposals, and the Contracting Authority shall have the right to declare the contract in default and to complete the work in accordance with 1108.11.

    b. Failure of the Contracting Authority to issue such order shall not alter the Contractor's responsibility under the contract.

    c. The Contractor's sequence of operations shall be such as to cause as little inconvenience to the general public as possible.

8. Schedule of Staging: On any project, or part of a project, on an existing road where the work may prohibit or restrict public or private access that has been previously available, the Contractor may be required to submit a schedule of staging for the Engineer's approval before work is started.

    a. Preliminary work may be required in stage construction, even though the work involved in these operations is similar, in order to minimize the inconvenience to the public and those to whom access has been previously available. This requirement will apply equally to work that is subcontracted.

9. Accelerated Work Schedule: An accelerated work schedule may be required by a note on the proposal. When required, the Contractor shall marshal the necessary forces, including but not limited to: extra crews, subcontractors, extra work hours, or other acceptable methods to insure completion of the projects or various stages of the projects within the contract period and in compliance with the specifications.

a. A work plan shall be submitted to the Engineer for review prior to commencement of work. Work will be permitted on a 24-hour-day basis and on Sundays and holidays when traffic interference exists, though work may be restricted during peak traffic periods. No credit will be allowed for delayed or slow delivery of materials. The special provisions may include other requirements or modifications for the accelerated work schedule.

10. Preconstruction Conference: The Engineer shall schedule and conduct a preconstruction conference. The Contractor and intended subcontractors shall participate in this conference. The Engineer will invite utilities and others having responsibilities or interest in the work.

1108.03 LIMITATIONS OF OPERATIONS

A. The Contractor shall conduct the work so as to create a minimum amount of inconvenience to the public. At anytime, when in the judgment of the Engineer, the Contractor has obstructed, closed, or is conducting his/her operations on a greater portion of the project vicinity than is necessary for the proper prosecution of the work, the Engineer may require the Contractor to finish the section on which work is in progress before work is started on any additional sections.

B. Whenever work which is being done by other contractors or subcontractors is contiguous to, or a part of the work included in this contract, the Engineer shall in case of dispute, determine and define the respective rights of the various interests involved, in order to secure the completion of all parts of the work in general harmony and with satisfactory results.

C. Except when an accelerated work schedule is required, no work will be permitted on Sundays, holidays observed by the Department of Natural Resources or within the time frame of dusk until dawn (as observed by current Farmer's Almanac) unless explicit permission from the Engineer has been obtained.

1. The Contractor should request a determination of the holidays to be observed at the beginning of each calendar year.

1108.04 METHODS AND EQUIPMENT

A. The methods, equipment, and appliances used shall produce a satisfactory quality of work and shall be adequate to maintain the schedule of progress specified. Equipment used on any portion of the project shall be such and its use so regulated that no serious or irreparable damage to the adjacent property, or highways will result from its use. If damage does occur to the highways suitable repairs shall be made.

B. When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the contract, the Contractor is free do use any methods or equipment that will accomplish the contract work in conformity with the requirements of the contract, as demonstrated to the satisfaction of the Engineer.

C. When the contract specifies that the construction be performed by use of certain methods and equipment, such methods and equipment shall be used, unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than specified in the contract, he/she may request approval from the Engineer to do so.

1. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing construction work in conformity with contract requirements.

2. If after trial use of the substituted methods or equipment the Engineer determines that the work produced does not meet contract requirements, the Contractor shall discontinue use of the substitute method or equipment and shall complete the remaining construction with the specified method and equipment.

3. The Contractor shall remove the defective work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment

for the construction items involved or in contract time as a result of authorizing a change in methods or equipment under these provisions.

1108.05 CHARACTER OF WORKERS

A. Any employee of the Contractor who is careless, incompetent, or disorderly, or who refuses or neglects to perform work in accordance with the specifications, or who shall commit trespass upon any public or private property in the vicinity of the work, shall be discharged upon the written request of the Engineer and shall not be reemployed on any of the work unless written permission is given by the Engineer.

1108.06 TEMPORARY SUSPENSION OF WORK

A. Work shall be suspended, wholly or in part when, in the opinion of the Engineer, weather or other conditions are unfavorable to its satisfactory prosecution.

1. Work shall also be suspended at the direction of the Engineer pending settlement of disputes arising of failure of the Contractor to comply with provisions of the contract. Written notice of suspension of work shall be given by the Engineer.

2. When the conditions causing suspension no longer exists, written notice to resume work will be given to the Contractor by the Engineer. Promptly after such written notices the Contractor shall resume prosecution of the work as provided in 1106.02.

B. The start of work may be delayed or work may be suspended upon request of the Contractor and with approval of the Engineer. The Engineer may require the request to be in writing and also may require the Contractor to include with the request a schedule for satisfactory completion of the work.

1108.07 EXTENSION OF CONTRACT PERIOD

A. An extension of the contract period will be granted by the Engineer for additional work requiring additional construction time and may result from a modification of the plans or extra work.

1. If any delay is caused by active interference by the Contracting Authority, the Contracting Authority will grant such an extension of time for completion of the contract as will, in the opinion of the Engineer, compensate for such delay. An extension of the contract period will be granted by the Contracting Authority for:

a. Additional work resulting from a modification of the plans for the project, or

b. Other reasons beyond the control of the Contractor which, in the Contracting Authority's judgment would justify such extension.

A. All claims for extension of the contract period shall be made in writing to the Engineer no more than thirty days after the occurrence of the delays otherwise they shall be waived. In the case of continuing cause of delays only one claim is necessary.

1108.08 LIQUIDATED DAMAGES

A. Time is an essential element of the contract and it is important that the work be pressed vigorously to completion.

B. For each calendar day that any work shall remain uncompleted after the end of the contract period, number of working days allowed, or any extension granted under 1108.07, the amount per calendar day specified in the proposal form will be assessed, not as a penalty, but as predetermined and agreed liquidated damages.

1. The Contracting Authority will prepare and forward to the Contractor an invoice for such liquidated damages.

2. The final payment will be withheld until payment shall have been made on this invoice.

C. Assessment of liquidated damages will be based only on the number of working days required to complete the work in excess of the specified working days allowed, plus authorized extensions thereto.

D. This provision for the assessment of liquidated damages for failure to complete work within the contract period does not constitute a waiver of the Contracting Authority's right to collect any additional damages other than time delays which the Contracting Authority may sustain by failure of the Contractor to carry out the terms of the contract.

1108.09 FAILURE TO COMPLETE WORK WITHIN CONTRACT PERIOD

A. If the Contractor fails to complete his work within the contract periods or any extension thereof, as provided in 1108.07, upon written notice to the Contractor and surety, said contract shall be in default. The Contracting Authority may, at its option, permit the Contractor or the Contractor's surety to complete the work included in the contracts or may proceed to complete the work in accordance with 1106.11. In either event, the Contractor or the Contractor's surety shall be responsible for all costs incident to the completion of the work, and also for the liquidated damages stipulated in the proposal form. The Contracting Authority may waive such portion of the liquidated damages as may accrue after the work is in condition for safe and convenient use by the public.

1108.10 CONTRACTS IN DEFAULT

A. The Contracting Authority may declare a contract in default for any one of the following reasons:

1. Failure to complete the work within the contract period or any extension thereof,

2. Failure or refusal to comply with an order of the Engineer within a reasonable time,

3. Failure or refusal to remove rejected materials,

4. Failure or refusal to correct any defective or unacceptable work,

5. Bankruptcy or insolvency, or the making of an assignment for the benefit of creditors,

6. Failure to carry on the work in an acceptable manner.

1108.11 COMPLETION OF CONTRACTS IN DEFAULT

A. If for any reason a contract is declared in default, the Contracting Authority shall have the right, without process or action at law, to take over all or any portion of the work and complete it, at its option, either by day labor or by reletting the work.

1. Written notice shall be given the Contractor by the Contracting Authority that the contract has been declared in default, and upon receiving such notices the Contractor shall peaceably relinquish possession of the said work or the parts thereof specified in the notice.

B. The Contracting Authority may, at its option and, at a rental which it considers reasonable, retain all material, equipment, and tools on the work until the work has been completed.

C. Neither the Contracting Authority nor any member or employee thereof shall be in any way liable or accountable to the Contractor or the Contractor's surety for the method by which the completion of said work, or any portion thereof, may be accomplished, or for the price paid therefor.

1. Should the cost of completing work be in excess of the original contract prices the Contractor and the Contractor's surety shall be held responsible for such excess cost.

2. Should the cost of such completion, including all proper charges, be less than the original contract price, the amount so saved shall be paid to the Contractor.

3. Neither by taking over the work nor by declaring the contract in default shall the Contracting Authority forfeit the right to recover damages from the Contractor or the Contractor's surety for failure to complete the entire contract.

1108.12 REMOVAL OF EQUIPMENT

A. In the case of cancellation of this contract before completion from any cause whatsoever, the Contractor, if notified to do so by the Contracting Authority, shall promptly remove any part or all of his equipment and supplies from the property of the Contracting Authority. In the event of failure of the Contractor to remove such equipment and supplies within thirty days after the issuance of the notification for removal, the Contracting Authority shall have the right to remove such equipment and supplies at the expense of the Contractor.

1108.13 ORDER OF COMPLETION AND USE OF COMPLETED PORTIONS OF THE WORK

A. The Contractor shall complete any portion or portions of the work in such order of time as the Engineer may require. The Contracting Authority shall have the right to take possession of, and use any completed or partially completed portion of the work at anytime, but such taking possession and use shall not be deemed as acceptance of the work so taken or used or any part thereof. If such prior use increases the cost or delays the work, the Contractor shall be entitled to such extra compensation or extension of time, or both, as determined by the Engineer.

1108.14 METHOD OF SERVING NOTICES

A. Any notice to be given by the Contracting Authority to the Contractor under this contract shall be deemed to be served if delivered to any office used by the Contractor, or foreman, or agent, at or near the work, or deposited in the post office, postpaid, addressed to the Contractor at the last known place of business.

1108.15 TERMINATION OF CONTRACTOR'S RESPONSIBILITY

A. The contract shall be considered completed when the work has been accepted in writing by the Contracting Authority.

   1. Such acceptance shall release the Contractor from all further obligation with respect thereto, except as to conditions and requirements set forth in the performance bond, and if, within one year after the final acceptance or a longer period of time, as may be prescribed by law or by the terms of any applicable guarantee required by the contract documents, any of the work is found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from the Contracting Authority to do so unless the Contracting Authority has previously given the Contractor a written acceptance of such conditions specifically starting the condition that is accepted.

   2. The Contracting Authority shall give such notice promptly after discovery of the condition. All such defective or non comforming work shall be removed from the site if necessary, and the work shall be corrected to comply with the contract documents without cost to the Contracting Authority.

B. The Contractor shall bear the cost of making good, all work destroyed or damaged by such removal or correction of separate contractors.

PART 1109. MEASUREMENT AND PAYMENT

1109.01 MEASUREMENT OF QUANTITIES

A. The work completed under the contract shall be measured according to United States standard measures. Payment will be based on the actual quantity of work performed under the various work classifications in the contract, unless otherwise provided below, or by the method of measurement for the various classes of work.

B. By written agreement between the Contractor and the Engineer, final settlement may be made on the basis of contract quantities without final field measurements. Such an agreement may be made before work is started or after work has been completed, if no material deviation from the original plans is involved.

1. Except for those items for which quantities cannot be accurately predetermined, the contract quantities have been accurately and properly estimated, but adjustments will be made for obvious errors or authorized changes.

2. The Engineer shall exercise such controls and make such measurements, as are necessary, to assure that each item of work is done in substantial compliance with the contract documents. The use of this agreement for payment shall not be considered as a change in the contract.

1109.02 SCOPE OF PAYMENT

A. The Contractor shall accept the compensation herein provided as full payment for furnishing all materials labor, tools, and equipment for performing all work under the contract or any extension thereof allowed under 1108.07, also, for all costs arising from the action of the elements or other natural causes, agreements, and performance, nonperformance, or delays involving other contractors and third parties, or injunctions or lawsuits resulting therefrom, or from any unforeseen difficulties not otherwise provided for in the specifications and which may be encountered during prosecution of the work and up to the time of acceptance thereof, except damage to the work due to acts of war. Nothing herein shall in itself be construed to prejudice or deny any claim filed under provisions 1109.12.

B. The contract price for any item shall be full compensation for acceptable work and for materials, equipment, tools, and labor for performance of all work necessary to complete the item in accordance with the plans and specifications, except as specifically exempt in the clauses covering the basis of payment for the item.

1109.03 ADJUSTMENT IN CONTRACT PRICE

A. When the measured quantity of any item varies by more than 20% from the estimated quantity specified in the contracts an adjustment in price may be made for such item of work, and the adjustment will be made on the full variance from the contract quantity. Such adjustment may be requested by either party to the Contract.

   1. If the contract sum for an item is less than five thousand ($5,000.00) dollars, the price of that item will not be subject to adjustment.

B. If the increase or decrease in quantity is due to an alteration in plans, any price adjustment shall be requested and agreed upon before the work is done. If the increase or decrease in quantity is not the result of an alteration in plans, but results from errors in original estimates, or unforeseen conditions, price adjustments may be requested after the work is completed.

C. In making price adjustments, consideration shall be given to the portion of the cost of the work that can be classified as fixed costs, independent of the exact quantity of work performed, such as transportation and installation costs on equipment, overhead costs, etc. Any price adjustment shall be arrived at from the standpoint that neither party to the contract shall be penalized by the increase or decrease in quantities which occasioned the price adjustment.

D. If changes or alterations, as outlined in 1105.04, result in a substantial increase or decrease in cost or difficulty of the work, appropriate modifications will be made in the contract by extra work order, regardless of the quantity.

E. All price adjustments shall be agreed to by the Engineer and the Contractor and shall be subject to the approval of the Contracting Authority.

1109.04 PAYMENT FOR WORK PERFORMED

A. All contract price adjustments approved by the Engineer shall be subject to the concurrence of the Contracting Authority.

B. The Contractor will receive and accept payment for work performed under his contract as follows:

   1. Items or Work Performed Which Are Covered by Definite Prices Stipulated in the Contract: For all items of acceptable work performed which are covered by definite unit prices or lump-sum amounts

specified in the contract, the Contractor shall receive and accept compensation at the rate specified in the contract, except as provided in 1109.03 and for items identified as that of "significant change" as provided in 1109.17.

2. Extra Work: Extra work ordered by the Engineer, of a quality or class not covered by the contract, will be paid for, either at an agreed price or on a force-account basis.

3. Agreed-Price Basis: For extra work ordered by the Engineer and performed on an agreed-price basis, the Engineer and the Contractor shall enter into a written agreement before such work is undertaken. This written agreement shall describe the extra work that is to be done and shall specify the agreed price or prices.

4. Force-Account Basis: Extra work performed on a force-account basis will be paid for in the following manner:

   a. For laborers, timekeepers, foremen, and superintendents, the Contractor shall receive the rate of wage shown on previous payrolls for the time they are actually engaged in the extra work, to which shall be added an amount negotiated up to 15% thereof, plus the amount of social security tax imposed by law upon the Contractor because of such force-account work, plus the cost of worker's compensation, public liability insurance, and employment security contributions. The percentage shall cover compensation for furnishing of necessary small tools for the work together with all other overhead expense items.

   b. The wage of the superintendent, timekeeper, or foreman who is employed partly on force-account work and partly on other work shall be prorated between the two classes of work according to the number of persons shown by the payroll, as employed on each class of work.

   c. For materials used on force-account work, the Contractor shall receive the actual cost of materials delivered on the work, including the freight and handling charges as shown by original receipted bills, to which cost shall be added an amount negotiated to 15% thereof.

   d. For machinery, tools, or equipment, fuel and lubricants therefor, except small hand tools which may be used, the Engineer shall allow the Contractor a reasonable rental rate to be agreed upon in writing before such work is begun. No profit percentage shall be added to the rate.

   e. Compensation, as herein provided, shall be accepted by the Contractor as payment in full for extra work done on a force-account basis. It will be assumed that such payment includes the use of tools and equipment for which no rate is allowed, overheads and profit.

   f. At the end of each day, the Contractor shall prepare payrolls in duplicate for labor furnished on a force-account basis, using the Contracting Authority's standard force-account forms. Both copies shall be signed by the inspector and Contractor's representative. One copy shall be furnished to the Engineer and one to the contractor.

   g. Claims for extra work performed on a force-account basis shall be submitted to the Engineer in triplicate. To the claims shall be attached such receipt or statements as the Engineer may require in support of such claims. Such claims shall be filed not later than the tenth day of the month following that in which the work was actually performed, and shall include all labor charges, rental charges on machinery, tools, and equipment, and all material charges insofar as they are available.

5. Deficient Work: Payment for work judged by the Engineer to be deficient work shall be made at the reduced rate specified in the contract documents or, if no such rate is specified, at a modification of the contract prices as determined by the Engineer.

1109.05 CANCELLED WORK

A. The Contracting Authority shall have the right to cancel any or all items from the contract when unforeseen circumstances, failure to secure permits, approvals, loss of funding, unanticipated design changes, or other reasons beyond the control of the Contractor prevent or unreasonably delay completion of the contract, or

of certain items of the contract, or when the Contracting Authority determines that cancellation is in the public or national interest.

B. The Contractor may be prevented from starting work on a contract, or an identified phase of a contract, as a result of a delay caused by the Contracting Authority or others.

C. When the contract period is defined by approximate starting date and the delay prevents the Contractor's starting work on the contract or an identified phase of the contract for 30 days beyond the date which, by notice to the Engineer, the Contractor proposed to start work, the Contractor may request cancellation by written notice to the Engineers stating the reasons.

D. In either case, within 30 days from the date of the request, the Engineer will eliminate or minimize, if possible, the cause for the delay and issue a notice to proceed, redefine the basis on which the work is to proceed, or cancel the contract or phase of the contract.

E. The Contractor shall not use delays that occur prior to starting work or an identified phase of the work as a basis of a claim against the Contracting Authority except for an extension of contract period.

F. Notices described in this article should be transmitted by certified mail.

G. For finished portions of items canceled, the Contractor will be paid at the contract unit prices, in accordance with the provisions of 1109.04. For finished portions of major items canceled, the Contractor will be paid as provided in 1109.17. For all items, materials ordered and delivered for the unfinished portion of such canceled, or omitted items, the Contracting Authority will pay cost plus 10 percent as an overhead charge. The Contractor's expense for work of handling or transporting such material shall be included in computing the cost.

H. The Contracting Authority will also pay any actual expenses sustained by the Contractor by reason of such cancellation or omission and not represented by work completed or material delivered. In computation of material cost or expenses sustained, no anticipated profit will be included.

   1. Material paid for shall become the property of the Contracting Authority and shall be disposed of as directed by the Engineer.

1109.06 PARTIAL PAYMENTS

A. If the work extends over a period of more than one month, the Engineer may, upon request from the Contractor, prepare monthly estimates based on the amount of work completed in an acceptable manner.

   1. On contracts for which the contract sum is $10,000.00 or more, monthly estimates may be allowed, based on 90% of invoiced value of processed or fabricated materials which have been delivered on the project site, provided the materials are of acceptable quality and the manner of storage is satisfactory to the Engineer.

   2. The Engineer's monthly estimates shall be partial payments on the contract, and the allowance of a monthly estimate by the Contracting Authority does not constitute final acceptance of the work upon which the estimates are based. Each estimate shall be filed by the Contractor in the form of a claim against the Contracting Authority and certified to by the Engineer on a payment request form supplied by the Contracting Authority.

B. Five percent (5%) of each progress estimate shall be deducted and held as a suspended payment. Payments may be made on the remainder of the progress estimate, except under circumstances which would prejudice the rights of those who have filed claims pursuant to Chapter 573, Code of Iowa.

   1. The retained percentage will not be due and payable for a period of at least 30 days after the date of final acceptance of the entire contract or following the release or adjudication of claims that may have been filed, or until the Contractor has filed the sworn final estimate and sales and use tax statement with the Contracting Authority.

2. Should a reasonable doubt arise as to the integrity of any part of the completed work, the estimate for that portion shall not be allowed until the cause for such doubt has been removed.

3. The progress estimates and payments are approximate only, and shall be subject to correction in the final estimate and payment.

C. Failure to make partial payment within 30 days after receipt and approval of the monthly estimate by the Engineer, will cause interest to accrue and additional payment therefor to be made in accordance with provisions of Chapter 573, Code of Iowa, subject to limitations included therein.

1109.07 SUPPLEMENTAL CONTRACT FOR WORK INTERRUPTED

A. After ninety-five (95%) of the work has been performed to the satisfaction of the Contracting Authority, including consideration of the contract period, and it is apparent that conditions beyond the control of the Contractor will delay the completion of the contract for more than 60 days, the Contractor may request a supplemental contract for the uncompleted portion of work on the same terms as those of the original contract.

1. If the Contracting Authority agrees, and the surety for the Contractors consents to the extension of the bond for the time required to complete the supplemental contract, the supplemental contact will be issued. After the contract has been entered into, full payment will be made for the work completed, except under circumstances which would prejudice the rights of those who have filed claims pursuant to Chapter 573, Code of Iowa.

B. The unpaid money, held by the Contracting Authority as a retainer of the original contract price, will be due and payable to the Contractor 30 days after the date of the Contracting Authority's approval of the supplemental contract, except as provided for the release and adjudication of claims in 1109.06.

1109.08 CERTIFIED STATEMENT OF SALES TAX AND USE TAX PAID

A. Unless the Contracting Authority has issue an authorization letter and a Sales Tax Exemption Certificate for this project, before final payment can be made on a contract, the Contractor and subcontractors shall file a certified statement on forms provided by the Contracting Authority, showing the amount of Iowa sales tax and use tax paid by them on all materials which have become a component part of the finished, completed contract and on such supplies for this construction as were actually consumed on this work.

B. These statements shall be submitted in duplicate to the Contracting Authority at the completion of the contract.

1109.09 ASSIGNMENT OF MONIES

A. The Contractor shall not assign, by power of attorney or otherwise, any of the monies to become due and payable under this agreement unless the Contractor has received written consent of the Contracting Authority.

1109.10 SUBMITTALS REQUIRED BEFORE FINAL PAYMENT

A. Before final payment can be made on this contract, the Contractor shall submit to the Engineer the following:

1. A request for prefinal and final payment.

2. One copy of any guarantees for products incorporated into the work.

3. Two copies of the operating instructions on each piece of equipment incorporated into the work.

4. Statements of Sales Tax from the Contractor and subcontractors, unless in receipt of an authorization letter and a Sales tax Exemption Certificate issued by the Contracting Authority fo this project.

1109.11 FINAL ACCEPTANCE AND PAYMENT

A. Final acceptance is stipulated to mean a written acceptance by the Contracting Authority. The Contracting Authority shall make final acceptance promptly upon the satisfactory completion of the work. Final payment shall be made as soon as possible following the expiration of statutory time for filing claims, or following adjudication or release of claims against the amount withheld.

B. Failure to make final payment within 70 days after completion of the work, and if all requirements of the contract are completed, will cause interest to accrue and additional payment therefor to be made in accordance with provisions of Chapter 573, Code of Iowa, subject to limitations included therein, however, this provision shall not apply when final payment includes a supplemental contract for work interrupted, as provided for in 1109.07.

C. Completion of the work will be considered as the date of approval and work acceptance by the Contracting Authority. When interest is to be paid, the date from which interest is to be calculated will be the thirty-first day after all required materials, certifications, and other documentation required to be submitted by the Contractor are received by the Engineer, however, the Contractor will be paid no interest if final payment is made within 70 days from the date of approval and work acceptance. The signed final payment request is not required documentation, but if not returned to the Engineer within 30 days, it will be considered required documentation.

D. Signing of the final payment request or acceptance of payment based thereon, shall not waive any rights of either party in the resolution of any claim filed in accordance with 1109.12.

E. The Contracting Authority shall satisfy itself as to the faithful completion of each part of the work, and may reject any portion found to be inconsistent with the terms of the contract.

1109.12 DISPUTED CLAIMS FOR EXTRA COMPENSATION

A. In any case where the Contractor deems that extra compensation is due for work or material not clearly covered in the contract and not ordered by the Engineer as extra work as defined herein, the Contractor shall notify the Engineer in writing of the intention to make a claim for extra compensation before beginning the work on which the claim is based.

B. The Contracting Authority shall be responsible for damages attributable to the performance, nonperformance, or delay of any other contractor, governmental agency, utility, firm, corporation, or individual authorized to do work on the project, only when such damage is a result from negligence on the part of the Contracting Authority, Engineer, or any of its officers or employees.

   1. In any case where the Contractor deems that extra compensation is due from the Contracting Authority as damages resulting from such performances, nonperformances, or delays, the Contractor shall notify the Engineer in writing at the time the delay occurs.

C. In either cases if such notification is not given, or if after such notification is given, the Engineer is not afforded facilities for keeping strict account of actual cost, as defined for force-account construction, the Contractor thereby agrees to waive the claim for extra compensation for such work. Such notice by the Contractors and the fact that the Engineer has kept account of the cost as aforesaid, shall not be construed as establishing the validity of the claim.

   1. The claims when filed, shall be in writing and in sufficient detail to permit auditing and evaluation by the Contracting Authority. Claims shall be supported by such documentary evidence as the claimant has available and shall be verified by affidavit of the claimant or other persons having knowledge of the facts.

   2. In the event the claimant wishes an opportunity to present the claim in person, then the claim shall be accompanied by a written request to do so.

   3. Where the claimant asks an opportunity to present the claim in person, the Contracting Authority, within a reasonable period of time after the filing of the claim, shall fix a time and place for a meeting between the claimant and the Contracting Authority or its designated representatives.

a. The Contracting Authority shall, within a reasonable time from filing of the claim or the meeting above referred to, whichever is later, rule upon the validity of the claim and notify the claimant in writing, of its ruling together with the reasons therefor. In case the claim is found to be just, in whole or in part, it shall be allowed and paid to the extent so found.

E. The Contractor shall not institute any court action against the Contracting Authority for the adjudication of any claims until such claim has first been presented to Contracting Authority pursuant to this articles and submitted to arbitration or a request for arbitration is denied pursuant to 1109.13.

1109.13 ARBITRATION

A. If a Contractor's claim, as outlined in 1109.12, has been disallowed, in whole or in part, then the Contractor may, within 30 days from the date the ruling of the Engineer is mailed to the Contractor, make a written request to the Engineer that the claim or claims be submitted to a board of arbitration.

1. The Engineer shall decide whether the matter is one which is subject to arbitration and shall, within 30 days of the receipt of the request for arbitration, grant or deny the request.

2. The Engineer's decisions shall be final.

B. Said board of arbitration shall consist of three persons, one to be chosen by the Engineer, one by the Contractor, and the third by the two arbitrators.

C. The arbitrators selected shall be persons experienced and familiar with construction or engineering practices in the general type of work involved in the contract, but shall not have been a regular employee or an individual retained by either party at the time involved in the controversy, or at the time of arbitration.

D. The board of arbitration shall make its own rules of procedure and shall have authority to examine records kept by the Engineer and the Contractor.

1. If the desired records are not produced within 10 days after they are requested, the board of arbitration shall proceed without them as best it may.

2. In determining the findings, or awards, or both, the majority vote of the board shall govern. Copies of the findings or awards or both, signed by the arbitrators shall be filed with the Engineer and the Contractor.

3. A majority report or minority report may be filed. The board of arbitration shall fix the cost of the proceedings, including a reasonable compensation to the arbitrators, and shall determine how the total cost shall be borne.

E. The board of arbitration shall have jurisdiction to pass upon questions involving compensation to the Contractor for work actually performed or materials furnished and upon claims for extra compensation which have not been allowed by the Engineer. Jurisdiction of the board shall not extend to:

1. A determination of quality of workmanship, or materials furnished, or to an interpretation of the intent of the plans and specifications, except as to matters of compensation.

2. Setting aside or modifying the terms or requirements of the contract.

F. The findings or awards or both, of the arbitration board, if acceptable to both parties to the contract, may become a basis for final payment.

G. If the findings of the arbitration board are unacceptable to either party to the contract, said findings may become the basis for further negotiations between the parties. If a solution agreeable to both parties has not been reached through the filing of a claims through arbitration, or if arbitration has been denied, either party may resort to whatever other methods for resolving the claim are available.

1109.14 CLAIMS AGAINST CONTRACTOR

A. The Contractor guarantees the payment of all just claims against him/her or any subcontractor, in connection with the work. If another contractor on the project submits a claim for alleged damages caused by delay due to the Contractor not having completed its work in a timely manner, the Contractor's bond shall remain in effect until payment of such claim is made, or until litigation is started, at which time the bond will be released.

1109.15 TIME LIMITS FOR FINAL ADJUSTMENT

A. The Contractor shall understand that the Contracting Authority will not be bound to consider applications for correction of estimates and payments after the Contractor has signed the final estimate, or after 30 days from the date when the final estimate is submitted to the Contractor for approval. Should an error be discovered as a result of the Contractor's annual audit, an application for corrections promptly made will be considered.

1109.16 NATIONAL EMERGENCY PROVISIONS

A. The Contracting Authority may, with written notice, terminate the contract, or a portion thereof, when the Contractor is prevented from proceeding with the construction contract as a direct result of an executive order of the President with respect to the prosecution of war, or in the interest of national defenses as provided in Chapter 573A of the Code of Iowa.

B. When contracts, or any portion thereof, are terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract unit prices or as mutually agreed for items of work partially completed or not started. No claim for loss of anticipated profits shall be considered.

   1. Reimbursement for organization of work (when not included in the contract) and moving equipment to and from the job will be considered where the volume of work completed is too small to compensate the contractor for these expenses under the contract unit prices, the intent being that an equitable settlement will be made with the Contractor.

C. Acceptable materials, obtained by the Contractor for the work, which have been inspected, tested, and accepted by the Engineer, and which are not incorporated into the work, shall be purchased from the Contractor at actual cost, as shown by receipted bills and actual cost records, at such points of delivery as may be designated by the Engineer.

D. Termination of a contract, or a portion thereof, shall not relieve the Contractor of its responsibilities for the completed work, nor shall it relieve the Contractor's surety of its obligation for and concerning any just claims arising out of the work performed.

1109.17 STANDARD CONTRACT CLAUSES

A. Differing site conditions.

   1. During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party, in writing, of the specific differing conditions before they are disturbed and before the affected work is performed.

   2. Upon written notification, the Engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly.

      a. The Engineer will notify the Contractor of his/her determination whether or not an adjustment of the contract is warranted.

3. No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

4. No contract adjustment will be allowed under this clause for any effects caused on unchanged work.

B. Suspension of work ordered by the Engineer.

1. If the performance of all or any portion of the work is suspended or delayed by the Engineer, in writing, for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the Contractor shall submit to the Engineer, in writing, a request for adjustment within seven (7) calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

2. Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or Subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment, excluding profit, and modify the contract in writing accordingly.

   a. The Engineer will notify the Contractor of his/her determination, whether or not an adjustment of the contract is warranted.

3. No contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed.

4. No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

C. Significant changes in the character of work.

1. The Engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work, as are necessary to satisfactorily complete the project.

   a. Such changes in quantities and alternations shall not invalidate the contract nor release the Surety, and the Contractor agrees to perform the work as altered.

2. If the alterations or changes in quantities significantly change the character of the work under the contract, whether or not changed by any anticipated profits, adjustments will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If such a basis cannot be agreed upon, an adjustment will be made either for or against the Contractor in such amount as the engineer may determine to be fair and equitable.

3. If the alterations or changes in quantities do not significantly change the character of the work to be performed under the contracts the altered work will be paid for as provided elsewhere in the contract.

4. The term "significant change" shall be construed to apply only to the following circumstances:

a. When the character of the work as altered, differs materially in kind or nature from that involved or included in the original proposed construction or;

b. When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity, any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work.

1109.18 INTEREST PAYMENTS

A. Interest on monthly payment estimates.

1. Interests shall be paid to the Contractor on any progress payment approved by the Chief Engineer under paragraph A of paragraph 1109.06 of these General Covenants and Provisions, which remains unpaid after thirty (30) days of the receipt by the Contracting Authority.

   a. Receipt by the Contracting Authority shall be defined as the date the Contracting Authority's central office mail staff receives the progress payment request and stamp it. All progress payment requests which are delivered directly to the central office by the Contractor or the Inspector of the Contracting Authority shall have a date of receipt entered by the mail room staff.

   b. Interest shall accrue on the 31st day after receipt by the Contracting Authority, if approved by the Chief Engineer, and shall end on the date the warrant is issued by the Iowa Department of Revenue. The rate of interest shall be the same as the rate of interest in effect under 453.6 of the Iowa Code, as the date interest begin to accrue.

B. Interest on retainage.

1. Interest shall be paid on any retained funds held under paragraph B of section 1109.06 of these General Covenants and Provisions. Interest shall be paid as outlined in Iowa Administrative Code section 561, Chapter 8.7.

END OF SECTION 00700

PART 0 - GENERAL

0.00 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

0.01 GENERAL:

A. The general conditions of the contract are the General Covenants and Provisions bound within.

1. These General Covenants and Provisions are herein modified or supplemented by this Supplementary Covenant and Provisions.

2. Articles of the General Covenant and Provision not directly affected by this section remains in full force as written unless exceeded in requirement herein or elsewhere in the Specifications.

0.03 DEFINITION OF TERMS:

A. Article 1101.03 "Definition of Terms" is supplemented and modified as follows:

1. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including Drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to the extent not stated more explicitly in another provision of Contract Documents.

2. Imperative Language: Used generally in Specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.

3. Chief Engineer: This term will apply to the Chief of the Engineering Bureau of the Department of Natural Resources.

4. Project Engineer: The Project Engineer will be the reviewing and approving authority for all equipment, material or systems to be used in the construction as specified herein. Unless otherwise specified, no material, equipment or systems or components of systems will be used or installed on this project without written approval. The Project Engineer will be the individual, regardless of the title actually used. listed in the special notice to bidders as the contact for questions concerning design, plans and specifications.

5. DNR Construction Inspector: The Department of Natural Resources Construction Inspector will be the direct representative of the department at the project location with the authority to verify compliance with the provisions of each and all divisions of this Project Manual. Contact the DNR Construction Inspector regarding questions on site review, inspections and project coordination.

6. Procurement Supervisor: The Procurement Supervisor will answer all questions regarding Bidding and Contract Procedures.

7. General Requirements: The provisions of requirements of Division-1 sections. General requirements apply to entire work of Contract and, where so indicated, to other elements which are included in project.

8. Indicated: The term "indicated" is a cross-reference to details, notes or schedules on Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

9. Directed, Requested, Etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "directed by Project Engineer," "requested by the Project Engineer," etc. However, no such implied meaning will be interpreted to extend Project Engineer's responsibility into Contractor's area of construction supervision.

10. Approve: Where used in conjunction with Project Engineer's or Project Inspector's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of the term "approved," will be held to limitations of responsibilities and duties as specified in General Covenants and Provisions and Supplementary Covenants and Provisions. In no case will "approval" be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.

11. Project Site: The space available to Contractor for performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of project site is shown on Drawings, and may or may not be identical with description of land upon which project is to be built.

12. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

13. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

14. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

15. Installer: The entity (person or firm) engaged by Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in portions of the work they are to accomplish.

PART 1 - INSTRUCTIONS TO BIDDERS

1.02 DRAWINGS AND SPECIFICATIONS:

A. Article 1101.02 "Drawings and Specifications" is supplemented and modified as follows:

1. The Drawings and Specifications, which are enumerated in the Index of drawings and Table of Content of this project manual, are part of this contract.

PART 4 - SCOPE OF WORK

4.10 PERMITS AND ARRANGEMENTS WITH OTHER GOVERNMENTAL AGENCIES:

A. Article 1104.10 "Permits and Arrangements with Other Governmental Agencies" is supplemented and modified as follows:

1. Contractor shall take out and pay for any building or construction permit which may be required, secure and pay for all permits, certificates and licenses required to prosecute the work, and shall arrange for and pay for all inspections required by local authorities.

2. Contractor is to apply and pay for NPDES Stormwater Discharge Permit for Construction Operations, as required by EPA regulations for work performed after March 10, 2003, for any land-disturbing activity which will disturb an area of one or more acres.

a. Permits are available from IDNR Stormwater Coordinator, Wallace State Office Building, Des Moines, Iowa 50319. (Tel. 515/281-7017)

b. Copies of Permit Application and Permit issued are to be furnished to DNR Construction Inspector prior to any construction operations.

4.13 DRAWINGS AND SPECIFICATIONS:

A. Article 1104.13 "Drawings and Specifications" is supplemented and modified as follows:

1. Contractor shall be responsible for distributing to all involved in this project, Drawings and Specifications in quantities reasonably necessary for the completion of the portion of work they are responsible for. No additional payment will be made for shortcomings resulting from misunderstanding of Contract Documents due to any shortage of information between General Contractor, subcontractors, and Material Suppliers.

PART 5 - CONTROL OF WORK

5.02 PLANS:

A. Article 1105.02 "Plans" is supplemented or modified as follows:

1. Plans for this project may be referred to as "Drawings, Project Drawings or Plans, Profiles and Cross Sections."

5.07 CONSTRUCTION STAKES AND BENCHMARKS:

A. Article 1105.07 "Construction Stakes and Benchmarks" is supplemented and modified as follows:

1. The contractor shall be responsible for providing all labor, equipment and material necessary to complete the work covered in paragraph A of the General Covenants and Provision of this contract. The Contractor or his/her assigned representative shall assume the function of the Engineer as described herein in addition to those assigned to the Contractor and be held responsible for such. The cost of this work shall be paid for as “Construction Survey” Bid Item.

PART 6 - CONTROL OF MATERIALS

6.03 SAMPLES AND TESTS:

A. Article 1106.03 "Samples and Tests" is supplemented and modified as follows:

1. All testing required by the contract documents or the DNR Construction Inspector shall be considered a part of the Contract and shall be paid for by the Contractor.

PART 9 - MEASUREMENT AND PAYMENTS

9.10 SUBMITTAL REQUIRED BEFORE FINAL PAYMENT:

A. Article 1109.10 "Submittals Required Before Final Payment" is supplemented and modified as follows:

1. Submit to the Engineer or the DNR Construction Inspector all submittals required in Section 01300 before final payment can be made, unless otherwise specified.

2. Other submittals may be required in other sections.

END OF SECTION 00811

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions and the Supplementary Covenants and Provisions.

1.02 SUMMARY OF WORK:

A. Work Covered by Contract Documents:

1. Name of the project is "Water Treatment System Replacement", Project Number 13-01-67-01. Drawings and Specifications are dated January 2016.
2. Briefly and without force and effect upon contract documents, work of the contract can be summarized as follows:

a. This project consists of drilling a new well, new water treatment building with iron removal, softening and chlorine injection system and demolishing of the old treatment building & tank and other incidental work as required by DNR construction inspector at Leis & Clark state park, Monona county, Iowa.

B. Occupancy:

1. Owner: The DNR shall have the right to enter the building or work site and store or attach such fixtures or furniture as it may elect, or to do other work providing that such storage or work will not interfere with the completion of the Contractor's work. Such occupancy by the DNR shall in no way imply final acceptance of any portion of the Contractor's work.

1.04 MEASUREMENT AND PAYMENTS:

A. Measurements and payments shall be in accordance with Section 01250 of these specifications.

B. Before ordering any fabricated material or doing any work, verify all measurements at the project site. No additional compensation will be allowed because of difference between actual dimensions and the measurements indicated on the drawings. Report any difference immediately to the DNR for instructions before proceeding with the work.

1.06 COORDINATION:

A. Project Coordination:

1. Take out and pay for any building permit which may be required, secure and pay for all permits, certificates and licenses required to prosecute the work, and arrange and pay for all inspections required by local authorities.

2. Visit the site, compare the Drawings and Specifications with any work in place, and verify all conditions, including other work, if any, being performed. Failure to visit the site will in no way relieve the Contractor from necessity of furnishing any materials or performing any work that may be required in accordance with Drawings and Specifications.

B. Job Site Administration: Take complete charge of work under this contract. Coordinate the work of all trades and all phases of general, structural, plumbing, mechanical, and electrical work.

1.07 FIELD ENGINEERING:

A. Provide such field engineering services as are required for a proper completion of the work.

1. Immediately upon entering project site for the purpose of beginning work:

a. Establish actual project location, set back and side yards, if any, with the DNR Construction Inspector.

b. Establish and maintain all lines and levels.

B. Additional requirements for field engineering may also be described in other sections of these specifications.

C. Verify all figures shown on Drawings before laying out work and report all discrepancies to the DNR Construction Inspector. Contractor will be held responsible for any error resulting from failure to do so.

1.09 ABBREVIATIONS AND SYMBOLS:

A. Reference to a technical society, institution, association, or government authority is made in the Specifications in accordance with the following abbreviations:

AAMA	Architectural Aluminum Manufacturers Association
AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AIA	American Institute of Project Engineers
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALS	American Lumber Standards
APA	American Plywood Association
ATI	Asphalt Tile Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Project Architectural Wood Work Institute
AWPA	American Wood Preservers' Association
AWS	American Welding Society

CS	Commercial Standard, U.S. Department of Commerce
FGJA	Flat Glass Jobbers Association
FS	Federal Specification
GA	Gypsum Association
IES	Illuminating Engineering Society
MIA	Marble Institute of America
MLMA	Metal Lath Manufacturers Association
MS	Military Specification
MSTD	Military Standard
NAAMM	National Association of Metal Manufacturers, The
NHLA	National Hardwood Lumber Association
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electric Code of NBFU
NFPA	National Fire Protection Association
NLMA	National Lumber Manufacturers Association
NTMA	National Terrazzo and Mosaic Association, Inc.,
NWMA	National Woodwork Manufacturers Association
SDI	Steel Deck Institute
SSPC	Steel Structures Painting Council
SCPI	Structural Clay Products Institute
SPR	Simplified Practice Recommendations, U.S. Department of Commerce
TCA	Tile Council of America
UL	Underwriters' Laboratories, Inc.
USA	United States of America Standards Association

1.13 PROJECT MEETINGS:

A. Preconstruction Conference: Soon after award of contract and prior to the start of construction, attend a preconstruction conference with the representative of the Owner to define the requirements for contract administration and construction operation.

1. Contact the DNR Construction Inspector who will determine the time, date and place of the conference.

B. Progress Meetings: The Contractor or the Contractor's representative shall be available at the job site to meet with the DNR Construction Inspector, as frequently and as arranged during the preconstruction conference, to discuss work progress.

1. Give verbal report of progress, discuss work schedule, and present all conflicts, discrepancies and other difficulties for resolution.

1.16 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS:

A. Definitions: Specific administrative and procedural minimum actions are specified in this section, as extension of provisions in other contract documents. These requirements have been included for special purposes as indicated. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this section will be recognized as an indication by Project Engineer that such temporary activity is not required for successful completion of the work and compliance with contract documents.

B. General: Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the work. Terminate use and remove facilities at earliest reasonable time, when no longer needed or when permanent facilities have replaced the need.

C. Temporary Utilities: The types of services required may include, but not by way of limitation, water, sewerage, surface drainage, electrical power and telephones. Where possible and reasonable, connect to existing franchised utilities for required services; comply with service companies recommendations on materials and methods, or engage service companies to install services. Locate and relocate services (as necessary) to minimize interference with construction operations.

1. Sanitary Facilities:

a. Temporary Toilets: When such or permanent facilities do not exist, provide and maintain toilets for use by workers. Keep toilets in sanitary condition.

b. Temporary toilet facilities shall meet OSHA requirements.

D. Security:

1. Protection of Work and Property:

a. Place and maintain such barricades as may be necessary to prevent public access to the project site at no cost to the Owner.

E. Options and Substitutions:

1. Bid shall include all equipment, materials, and services as specified, noted on the Drawings or required for a complete and proper installation.

1.19 CONTRACT CLOSEOUT:

A. Final Cleaning:

1. Remove waste material and rubbish caused by the Work and leave all work clean and free of debris of any kind.

2. Keep the site and access road reasonably clean and free of rubbish or waste material in order that the work may progress efficiently. Remove such rubbish or waste material entirely from the premises at each time of such cleaning.

3. When the Work is completed and ready to turn over to the Owner, leave such work clean. This applies to all areas affected by contract work.

4. On completion of the Work, thoroughly police and clean-up the premises surrounding the building.

B. Final Inspection:

1. Request a final inspection in writing, at least ten days prior to the anticipated date of completion, from the DNR Construction Inspector.

2. Work will not be considered ready for final inspection until all the work has been completed and the Contractor has certified that all items are properly operating and in strict compliance with the Contract Documents.

3. The Contractor or project supervisor shall be at the job site during the final inspection.

4. After the inspection, the DNR Construction Inspector will present the Contractor a list of items not meeting contract requirements which must be made acceptable before final payment is made.

END OF SECTION 01000

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 DESCRIPTION OF WORK:

A. Provide such field engineering services as are required for proper completion of the work including, but not necessarily limited to:

1. Establishing and maintaining lines and levels;

2. Structural design of shores, forms, and similar items provided as part of the Contractor's means and methods of construction;

3. Establishing finish grade stakes (including blue tops) as necessary;

B. Additional requirements for field engineering may also be described in other sections of these specifications.

1.03 REFERENCES:

A. Refer to Section 1105.07 "Construction Stakes and Bench Marks" of the General Covenants and Provisions for assignment of responsibilities for the Owner and Contractor.

1.04 SUBMITTALS:

A. Comply with pertinent provisions of Section 01300, if applicable.

1.05 PROCEDURES:

A. In addition to procedure directed by the Contractor for proper performance of the Contractor's responsibilities:

1. Locate and protect control points before starting work on the site.

2. Preserve permanent reference points during progress of the work.

3. Do not change or relocate reference points or items of the work without specific approval from the DNR Construction Inspector.

4. Promptly advise the DNR Construction Inspector of a lost, destroyed, or reference point-requiring relocation due to other changes in the work.

a. When directed by the DNR Construction Inspector, replace referenced stakes at no additional cost to the Owner.

B. Meet with DNR Construction Inspector to establish actual building location, set backs, and side yards, if required.

END OF SECTION 01050

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 LUMP SUM / UNIT PRICE BID:

A. Bid each item on a Unit Price basis or Lump Sum basis as required, including furnishing all labor, equipment and materials necessary to complete all the work indicated in the Contract Documents.

1.03 QUANTITIES:

A. Various estimated quantities are furnished within the Contract Documents to assist the Contractor in reviewing the Project prior to bidding. The estimated quantities are not intended to be used by the Contractor as sole basis for determining the scope and volume of the work. The Contractor is responsible for verifying all quantities necessary to submit bids for the construction of a proper and complete project.

1.04 MEASUREMENT:

A. The contractor is responsible for constructing the project to the final lines and grades shown. Owner will measure construction units only to ensure that at least minimum quantities have been properly installed.

1.05 SCOPE:

A. Each item in the Bidder's Proposal Schedule of Prices will be paid at the unit or lump sum price. The price for each item shall be considered full compensation for furnishing superintendence, overhead, bonds, insurance, mobilization, testing and profit necessary to complete the construction of the item of the project listed in the Bidder's Proposal.

B. It is not the intent of the Bidder's Proposal to itemize each and every item and system required. Items required for project completion and not specifically mentioned in Bidder's Proposal shall be included with items which they would be considered subsidiary.

1.06 ESTIMATED QUANTITIES:

A. The items and quantities described above, as well as others listed throughout the Contract Documents, are provided for the bidder's review and consideration. The quantities listed herein are not guaranteed by the owner or the Project Engineer to be totally accurate nor to include all items of work. They are provided for the bidder's

convenience to assist in the preparation of the bid. The bidder is responsible for preparing his own quantity takeoff and bid preparation.

END OF SECTION 01250

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 SUMMARY:

A. Provide submittals required in this Section, refer to technical specification for submittal requirements for each section of the work to be performed.

1.03 PROGRESS SCHEDULE:

A. Submit a project schedule to the Project Engineer for approval within 30 days after award of contract, but not later than the contract start date. The type of schedule required is at Contractor's option.

B. Prepare an approved, reproducible form and include the following:

1. Breakdown of work activities in categories so approved and segmented as necessary to allow close monitoring of progress of the work during construction.

2. Order of the work necessary to meet time for completion.

3. Breakdown of the work schedule of all subcontractors scheduled in cooperation with Contractor's work.

4. Anticipated monthly value for work completed.

5. Space for the additional display of actual performance on the schedule.

C. After necessary revisions have been made and approved, present one print of schedule to each subcontractor and three copies to the Owner.

D. Upon request, update the schedule to reflect changes required by actual conditions and indicate actual work completed. Provide same number of copies as required for original submission.

E. Payment will be withheld until progress schedule in acceptable form has been received by Project Engineer.

1.04 PRICE BREAKDOWN:

A. Within 30 days after award of contract, but not later than the contract start date, submit to the Project Engineer for approval a price breakdown of major lump sum bid items into smaller components for the purpose of determining monthly progress payments.

B. Include profit and overhead prices in each item.

C. Payment will be withheld until receipt of price breakdown.

D. Provide breakdown as follows:

E. Items listed above include, but are not limited to, the following:

1.05 SHOP DRAWINGS AND MANUFACTURER'S LITERATURE:

A. Prior to installation of any item specified as requiring submittal, submit two (2) copies for Owner's use plus the number required for return to the Contractor, of manufacturer's literature containing detailed specifications and performance data, or shop drawings fully describing the items showing fabrication, layout, setting or erection details, including erection plan and details as required.

B. Number all submittals consecutively . Resubmittals shall bear the original submittal number plus a letter suffix: Example - #30A is the first resubmittal of item #30; #30B is the second resubmittal, etc.

C. Shop drawings used at site must be approved by the Project Engineer.

D. Do not construe the approval of shop drawings to be a complete check. This approval will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the Contractor of the responsibility to comply with all terms and conditions of the plans and specifications. The Contractor shall be responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work.

1.06 SAMPLES:

A. Submit in Duplicate:

B. Provide samples of sufficient size to permit an accurate appraisal of color, texture, finish, workmanship, and other appropriate characteristics.

C. Submit samples with shop drawings when both are required.

D. Field Samples and Mock-Ups:

1. Erect mock-ups at location acceptable to the DNR Construction Inspector, at project site.

2. Construct each sample or mock-up complete to the dimension indicated, including work of all crafts required in finish work.

1.07 QUALITY ASSURANCE:

A. Coordination of Submittals:

1. Prior to submitting required material, carefully review and coordinate all aspects of each item being submitted.

2. Verify that each item and its submittal conform in all respects with the specified requirements.

3. Prior to sending submittals to Project Engineer, the stamp and sign each submittal, certifying that they conform in all respects with the specified requirements.

B. Substitutions:

1. The contract is based on the standards of quality established in the Contract Documents. Substitutions will be considered only when listed with the Project Engineer prior to the bid date, and when substantiated by Contractor's submittal of required data within 35 calendar days after award of contract.

2. The following products do not require further approval except for interface within the work:

a. Products specified by reference to standard specifications such as ASTM or similar standards.

b. Products specified by manufacturer's name and catalog model number for which another product is not substituted.

3. Do not substitute materials, equipment or methods unless such substitutions have been specifically approved in writing.

C. Or Equal:

1. Where the phrase "or equal," or "or equal as approved by the Project Engineer," occurs in the Contract Documents, do not assume that the materials, equipment or methods will be approved as equal unless the item has been specifically approved for this work by the Project Engineer.

2. The Project Engineer's decision shall be final.

1.08 RESUBMISSION REQUIREMENTS:

A. Shop Drawings:

1. Revise initial Drawings as directed and resubmit in accordance with submittal procedures.

2. Indicate on Drawings all changes which have been made in addition to those requested by the Project Engineer.

B. Product Data and Samples: Resubmit new data and samples as specified for initial submittal.

C. Make all resubmittals within 7 calendar days after date of Project Engineer's previous review.

1.09 DISTRIBUTION OF SUBMITTALS AFTER REVIEW:

A. Project Engineer will distribute copies of shop drawings and product data, after review, to:

1. DNR Construction Inspector (1 copy)
2. Project Engineer's File (1 copy)
3. General Contractor (remaining copies)

B. Project Engineer will distribute samples in accordance with requirements.

1.10 CONTRACTOR RESPONSIBILITIES:

A. Review shop drawings, product data, and samples prior to submission to the next level of control.

B. Verify:

1. Field dimensions.
2. Field construction criteria.
3. Catalog numbers and similar data.

C. Coordinate each submittal with requirements of:

1. The work.
2. The contract documents.
3. The work of other contractors.

D. Contractor's responsibility for errors and omissions in submittals is not relieved by Project Engineer's review of submittals.

E. Notify Project Engineer, in writing, of proposed deviations in submittals from contract requirements, prior to or at the time of submission.

F. Contractor's responsibility for deviations in submittals from contract document requirements is not relieved by Project Engineer's review of submittals.

G. Do not begin any work which requires submittals without having Project Engineer's stamp and initials or signature indicating approval.

1.11 REQUIRED SUBMITTALS:

A. Include, but do not limit to, the following submittals:

Spec. Section	Item Description	Shop Drawing	Product Data	Samples, Test Results, Certification
02260	Water Distribution	X	X	
15400	Plumbing	X	X	
16000	Electrical		X	
26100	Well Construction		X	X
26710	Water Well & Pitless		X	

1.12 RECORD DRAWINGS:

A. Provide and maintain at the project site, one complete set of prints of the project drawings. The drawings shall be kept in good, clean and readable condition.

B. The project site drawings shall have neatly inscribed all changes in work including relocation of lines, valves and fixtures, change in type of materials, etc. Changes shall be noted with red pencil or red ink.

C. Submit these corrected prints at time of final acceptance and prior to final payment. Note all data and changes on these record drawings in sufficient detail and clarity and provide information necessary for preparation of "as-built" drawings.

D. Final payment will be withheld until a set of corrected prints of the record drawings has been received by the Project Engineer/DNR Construction Inspector.

1.13 GUARANTEES, WARRANTIES AND CERTIFICATES:

A. Submit all guarantees, warranties and certificates prior to final payment.

B. Refer to Section 01700 of these specifications.

1.14 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Submit all operating and maintenance instructions to the DNR Construction Inspector prior to final payment.

B. Refer to Section 01700 of these specifications.

1.15 CHANGE ORDER PRICE QUOTES:

A. In the event of the need for change order, the DNR Construction Inspector will request a price quote from the Contractor for proposed changes to the contract.

B. For evaluation purposes, the Contractor's quote shall be broken down to show the costs of labor and materials for each proposed category of work included with the change, along with the total cost for Contractor's overhead, profit and bond for the proposed change.

C. All contract time extensions required as a result of a proposed change must be justified and supported in detail at the time of the proposal.

1.16 TEST REPORTS:

A. Refer to Section 01400 of these specifications.

1.17 DELIVERY TICKETS:

A. Submit to the DNR Construction Inspector one legible copy of each delivery ticket for all material delivered to the construction site.

B. The delivery ticket shall show brand name, catalog number and number of items received.

END OF SECTION 01300

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 SCOPE:

A. Supplementary tests and reports required in this section with any tests, reports, and other information that may be required additionally in any section of the specifications.

B. Inspection, sampling, and testing is required, but not limited to, the following:

1. Section 03300 – Cast In Place Concrete

C. Sampling and testing frequencies and requirements are to comply with IDOT IM-204.

1.03 TESTS BY INDEPENDENT TESTING LABORATORY:

A. Testing Laboratory:

1. Contractor to select and pay for an independent testing laboratory, acceptable to the Project Engineer, to perform specified services required by the contract.

2. Employment of testing laboratory will in no way relieve Contractor's obligations to perform work in accord with the contract.

3. Include in lump sum bid the cost for all testing services required. No separate payments will be made for testing. Include all associated costs in the various appropriate bid items. Project Engineer/DNR Construction Inspector will direct all tests. The Contractor shall pay the testing firm.

B. Contractor Shall:

1. Make available at no cost, all material to be tested.

2. Provide labor necessary to supply samples and assist in making tests.

3. Advise laboratory of the identity of material sources and instruct suppliers to allow inspections by laboratory.

C. Testing laboratory shall:

1. Submit written report promptly, covering each inspection and test to the Project Engineer, including:

a. Date issued.

b. Project title and number.
c. Testing laboratory name and address.
d. Name and signature of laboratory technician.
e. Date of inspection and sampling.
f. Record of temperature and weather.
g. Date of test.
h. Identification of product and specification section.
i. Location of project.
j. Type of inspection or test.
k. Observations regarding compliance with Contract Documents.

2. Promptly notify Project Engineer of irregularities or deficiencies of work which are observed during performance of testing services.

3. Perform additional services required by the Project Engineer/DNR Construction Inspector.

D. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on, contract requirements.

2. Approve or accept any portion of work.

3. Perform any duties of the Contractor.

E. Conduct tests in accordance with the requirements of the designated specifications or, where not specified, the latest appropriate standard of the American Society for Testing and Material.

1.04 LABORATORY SERVICES AND TESTS REQUIRED:

A. Concrete:

1. Secure samples of aggregates Contractor proposes to use and test for compliance with specifications.

2. Certify compliance with specification of cement proposed for use by the Contractor.

3. Review concrete design mix proportions for the required concrete strengths using materials Contractor proposes to use on the project. Incorporate specified admixtures and not less than amount of cement specified. Perform appropriate laboratory tests, including compression tests of cylinders and slump test to substantiate mix designs. Submit one copy of report to the Project Engineer, one copy to the DNR Construction Inspector, and one copy to the Contractor, clearly indicating the results of the mix design review.

4. When requested by the DNR Construction Inspector, inspect and test material during concrete work to substantiate compliance with specifications and mix requirements.

5. Slump Test: The DNR Construction Inspector will require slump tests to be performed as he desires in accordance with the provisions of these specifications.

6. Test Cylinders:

a. Each test shall consist of a set of three cylinders provided by the Contractor. Sampling and testing frequencies and requirements are to comply with IDOT IM-204.

b. Provide a minimum of one set of test cylinders each day concrete is placed.

d. The Contractor shall make and cure test cylinders in conformity with ASTM C-31.

e. Note on record drawings placement locations represented by test cylinders.

7. Perform compression tests in accordance with applicable sections of IDOT specifications.

8. Identify all test cylinders with symbols to indicate location on the job where concrete tests were made. Note on record drawings.

C. Aggregate gradation and compaction as per applicable specifications.

1.05 CONTRACTOR'S RESPONSIBILITIES:

A. Furnish product mix design to meet or exceed Contract Documents.

B. Cooperate with laboratory personnel and provide access to work, as well as to manufacturer's operations.

1. Monitor each inspection, sampling and test.

C. Provide to laboratory, preliminary representative samples of material to be tested, in specified quantities.

D. Furnish copies of mill test reports.

E. Furnish verification of compliance with contract requirements for material and equipment.

F. Furnish casual labor and facilities:

1. To provide access to work to be tested.

2. To obtain and handle samples at site.

3. To facilitate inspections and tests.

4. For laboratory's exclusive use for storage and curing of test samples.

G. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests. Notify DNR Construction Inspector when work is ready for testing. Schedule testing after approval of the DNR Construction Inspector. The Department of Natural Resources will not pay for any testing scheduled without the DNR Construction Inspector's specific authorization.

H. Correct work which is defective or which fails to conform to the Contract Documents in accordance with the general condition. Do not delay the project schedule or the work of other contractors with corrective work.

I. Pay all costs of re-testing when test results indicate non-compliance with contract requirements.

J. Patch all surfaces and areas disturbed by testing operations.

END OF SECTION 01400

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 WEATHER PROTECTION:

A. General:

1. Provide necessary protection against weather to maintain all materials, apparatus, fixtures, and work free from damage whether in shipment, in storage, or in place.

2. Do not perform wet work when temperature is below 40 degrees Fahrenheit or is forecast to be below 40 degrees Fahrenheit within the ensuing 48 hours, except when work is properly protected and sufficient heat is provided.

B. Heat Provision:

1. When heat is required for proper weather protection, provide temporary enclosures of work and acceptable means to provide sufficient heat to maintain a temperature of not less than 50 degrees Fahrenheit. Provide higher temperatures when required by these specifications.

2. Use only heating apparatus and fuels of approved safe types. Keep equipment and surroundings in a clean, safe condition. Use flame resistant tarpaulins and other materials for temporary enclosure of space. Use vented heaters only.

1.03 TEMPORARY UTILITIES:

A. Electricity, Lighting and Heating:

1. Provide such temporary service as may be required for construction purposes with required distributing facilities and meter.

2. Pay the cost of all electrical energy used on this part of the project until completion of the contract. If partial occupancy by the Owner occurs prior to completion, the Owner will pay proportional share of electrical energy used.

3. Provide light bulbs required for all temporary construction lighting and replace when necessary.

4. Use no temporary service material in permanent system without written approval of the Owner. When temporary electrical lines are no longer required, remove them

and restore any parts of buildings or grounds damaged by such removal to original condition.

5. Provide and maintain temporary lighting at barricades as required for safety.

6. Provide any heating required by these specifications.

B. Telephone:

1. Provide and pay all charges for telephone service.

C. Water:

1. Provide, protect, and maintain an adequate water supply for use on the project for construction purposes, either by means of the permanent water supply line or by installing a temporary waterline as may be required.

2. Install, valve, maintain, and protect such water supply lines as may be required.

3. Remove temporary lines when they are no longer required. Restore to original condition any part of grounds or buildings damaged by removal.

4. Pay the cost of all water used on this portion of the project until final completion of the contract.

D. Toilets:

1. Provide and maintain suitable, weather tight, painted sanitary toilet facilities for all workers during construction period. When toilet facilities are no longer required, promptly remove from site. Disinfect, clean or treat the area as required.

2. Provide and maintain facilities in accordance with requirements of applicable local and state health authorities and OSHA.

3. Keep all toilet facilities clean and supplied with toilet paper at all time.

1.04 OPERATION AND STORAGE AREAS:

A. All operations of the Contractor (including storage of materials) upon premises shall be confined to areas authorized or approved by the DNR.

B. Premises adjacent to the construction will be made available for use by the Contractor without costs whenever such use will not interfere with other uses or purposes.

C. Do not enter on or occupy with personnel, tools, equipment, or material any ground outside the DNR's property without the written consent of the owner of such ground.

D. Other contractors and employees or agents of the DNR may for all necessary purposes enter upon the work and premises used by the Contractor, and the Contractor shall conduct

his work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

E. Provide and maintain weather tight storage sheds for own use.

F. Provide storage sheds with substantial floors raised a minimum of six (6) inches above the ground.

G. Locate all storage sheds as approved by the DNR Construction Inspector.

H. Completely remove from site after completion of work.

1.05 PROTECTION AND RESTORATION:

A. General: Protect all structures, including walks, pipelines, trees, shrubbery, and lawns during the progress of the work; remove from the site all debris and unused materials; and, upon completion of the work, restore the site as nearly as possible to its original condition, including the replacement, at the Contractor's sole expense, of any facility or landscaping which has been damaged.

1.06 ACCESS ROADS:

A. Temporary Roads and Storage Areas:

1. Construct and maintain all temporary access roads and storage areas required. Locate and construct all roads, ramps, mats, storage areas, and similar items in a manner approved by the Owner and provide overall management of available site areas.

B. Laws and Regulations:

1. Observe all laws and regulations of the local, county, and state authorities in the use of all public roads and highways for the transportation of materials and equipment in connection with work on the project. Observe all overhead construction, bridges, cables, and the like. Repair damage to roads, highways, overhead construction and similar off-site items, resulting from operations in connection with this project.

1.07 WATER CONTROL:

A. Carry on construction work in a manner that will direct surface water away from the structures and away from adjoining property.

B. Provide own means of pumping, well pointing or otherwise maintaining excavations free from ground water encountered. Provide means of properly conveying such water off the construction site.

1.08 PARKING:

A. Make necessary provisions for parking of all employees on the project within the site limits. Include necessary access roads and maintenance of all roads and parking areas during construction period.

B. Park vehicles to avoid interference with normal construction activities and to avoid interference with Owner's operation.

1.10 SAFETY:

A. Provide at least one non-freezing-type fire extinguisher in each workshop and shed used for storage of materials on the premises. Place in readily accessible location.

B. Provide and maintain a basic first aid kit.

1. Provide first aid supply commensurate with size of project with items necessary for first aid treatment of all injuries.

2. Advise workers of the location of first aid supplies.

3. Post telephone numbers of nearest hospital or ambulance service and fire station in conspicuous location. Advise all workers of location of telephone numbers.

END OF SECTION 01500

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: The work consists of furnishing all labor, material and equipment for the control and prevention of environmental pollution and damage as the result of construction operations under this Contract and for those measures set described herein, as indicated on the Drawings, specified herein, and as required for the construction of all work of this contract.

1. Scope: The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

2. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract.

a. Confine activities to areas defined by the Drawings and Specifications.

B. Related Sections: Drawings and General Provisions of the Contracts, including the General Covenants and Provisions, Supplementary Covenant and Provisions and General Requirements.

1.02 REFERENCES:

A. Provide protection of Air Resources in accordance with the following state and local codes and rules: Iowa Department of Environmental Quality Act, Oh. 455B of the 1977 Code of Iowa; Iowa Department Rules, 1973 I.D.R. 267 et seq.

1.03 DEFINITIONS:

A. Environmental pollution and damage: For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes.

1.04 QUALITY ASSURANCE:

A. Quality Control: Establish and maintain quality control for environmental protection of all items set forth herein.

1. Record on daily reports any problems in complying with laws, regulations and ordinances and corrective action taken.

2. Assure compliance of subcontractors with this section.

B. Regulatory Requirements:

1. Notification: The Project Engineer/DNR Construction Inspector will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, state or local laws, or regulations, permits and other elements of the Contractor's environmental protection plan.

2. After receipt of such notice, inform the Project Engineer/DNR Construction Inspector of proposed corrective action and take such action as may be approved.

3. If the Contractor fails to comply promptly, the Project Engineer/DNR Construction Inspector may issue an order stopping all or part of the work until satisfactory corrective action has been taken.

a. No time extensions shall be granted such suspension.

C. National Pollutant Discharge Elimination System (NPDES): Contractor to provide a Notice of Intent (Form 1415) for application of a General Permit for Storm Water Discharge, file all necessary Forms and Drawings with the applicable Bureau of the DNR, and pay necessary application fees.(Required for sites of one acre or more)

1. For Storm Water General Permit Assistance: Contact (515)281-7017 or (515)281-8693 for information.

D. Pollution Control Training: Train personnel in all phases of environmental protection.

1. Include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to insure adequate and continuous environmental pollution control.

1.05 PROJECT/SITE CONDITIONS:

A. Environmental Requirements:

1. Protection of Land Resources: Prior to beginning construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area.

1.06 MAINTENANCE OF POLLUTION CONTROL FACILITIES:

A. Maintain all constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

PART 2 - PRODUCTS

2.01 MATERIAL AND EQUIPMENT:

A. Provide and maintain material and equipment necessary to perform the specified work.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verification of Conditions: Prior to beginning construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area.

B. Limits of Work Area:

1. Mark the areas that are not required to accomplish work to be performed under this contract.

2. Mark or fence isolated areas within the general work area which are to be saved and protected.

3.02 PROTECTION OF LAND RESOURCES:

A. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Authority.

B. Do not fasten nor attach ropes, cables, or guys to any trees for anchorage unless specifically authorized.

C. Where such special emergency use is permitted, provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

3.03 PROTECTION OF MONUMENTS AND MARKERS:

A. Protect monuments and markers before and during construction operations.

B. Where construction operations are to be conducted during darkness, the markers shall be visible.

C. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary object.

3.04 PROTECTION OF LANDSCAPE:

A. Clearly identify trees, shrubs, vines, grasses land forms and other landscape features to be preserved by marking, fencing, or wrapping with boards, or any other approved techniques.

3.05 LOCATION OF FIELD OFFICES, STORAGE AND OTHER CONTRACTOR FACILITIES:

A. Place field offices, staging areas, stockpile storage, and temporary buildings in areas approved by the Project Engineer/DNR Construction Inspector.

B. Do not temporarily move or relocate Contractor facilities unless approved by the Engineer/DNR Construction Inspector.

3.06 DISPOSAL OF SOLID WASTES:

A. Place solid wastes in containers to be emptied on a regular schedule.

1. Conduct handling and disposal to prevent contamination.

2. Transport all solid waste off state property and dispose of in compliance with Federal, state, and local requirements for solid waste disposal.

3.07 DISPOSAL OF CHEMICAL WASTE:

A. Store chemical waste in corrosion resistant containers, remove from the work area and dispose of in accordance with Federal, state and local regulations.

3.08 DISPOSAL OF DISCARDED MATERIALS:

A. Handle discarded materials other than those which can be included in the solid waste category as directed by the Contracting Authority.

3.09 PRESERVATION AND RECOVERY OF HISTORICAL, ARCHEOLOGICAL AND CULTURAL RESOURCES:

A. Existing historical, archeological and cultural resources within the Contractor's work area will be so designated by the Department and precautions taken to preserve all such resources as they existed at the time they were pointed out to the Contractor.

B. Install protection and assume responsibility for the preservation of these resources as designated on the Drawings, or if not designated as necessary for their preservation.

C. Report any unusual items that might have historical or archeological value, found or observed during construction activities as soon as practicable to the DNR Construction Inspector.

3.10 PROTECTION OF WATER RESOURCES:

A. Keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters.

B. Implement applicable management techniques to control water pollution in accordance with the listed construction activities which are included in this contract.

C. Installation, maintenance and removal of water pollution control methods and materials to be incidental to other items of work on the project, unless a specific Bid Item for Erosion Control exists.

D. Comply with detailed Project Plans for temporary erosion control procedures to be performed on this project.

3.11 PROTECTION OF FISH AND WILDLIFE RESOURCES:

A. Keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife.

B. List species that require specific attention along with measures for their protection prior to beginning of construction operations.

3.12 PROTECTION OF AIR RESOURCES:

A. Keep construction activities under surveillance, management and control to minimize pollution of air resources. Perform or operate activities, equipment, processes, and work to accomplish the specified construction in strict accordance with the State of Iowa and all Federal emission and performance laws and standards.

B. Implement special management techniques as set out below to control air pollution by construction activities.

1. Control of Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities at all times, including weekends, holidays and hours when work is not in progress.

a. Maintain all work areas within or outside the project boundaries free from particulates which would cause the applicable air pollution standards to be exceeded or which would cause a hazard or a nuisance.

b. Sprinkling, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area.

c. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times, The Contractor must have sufficient competent equipment available to accomplish this task.

d. Perform control of particulates as the work proceeds and when ever a particulate nuisance or hazard occurs.

2. Control hydrocarbons and carbon monoxide emissions from equipment in accordance with Federal, State and local allowable limits at all times.

3. Control odors at all times for all construction activities.

4. Assume responsibility for monitoring of air quality throughout the entire areas affected by the construction activities.

3.13 PROTECTION OF SOUND INTRUSIONS:

A. Keep construction activities under surveillance and control to minimize damage to the environment by noise.

3.14 MOSQUITO CONTROL:

A. During dredging and due to large areas of shallow water in the disposal area, mosquito breeding must be controlled.

B. Deposit dredge material to minimize stagnant water pools.

C. Conduct non-aerial spraying or other methods of application of EPA approved chemicals to control mosquito breeding.

3.15 CLEANING:

A. Post Construction Clean Up: Cleanup all areas used for construction.

B. Restoration of Landscape Damage: Restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas, in accordance with the plan submitted for approval by the Contracting Authority.

END OF SECTION 01560

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 MATERIAL:

A. All materials, equipment, and other items incorporated in the work of this project must be new, and both materials and workmanship of best grade of their respective kinds.

B. To assure ready availability of materials, parts, or components for repair, replacement or future expansion purposes, all materials, equipment, and related components must be obtained from sources which maintain a regular, domestic stock.

C. Throughout all sections of these specifications, provide other material not specifically described but required to provide Owner with a complete and proper installation of all phases of the work of this contract. Select these materials subject to the approval of Project Engineer/DNR Construction Inspector.

1.03 ITEMS NOT IN CONTRACT:

A. All items indicated "N.I.C." on drawings or specifications are items not included in this contract.

B. Provide necessary provisions in the work of this project to permit proper installation of "N.I.C." items.

1.04 TRANSPORTATION AND HANDLING:

A. Provide protection against damage for all materials during delivery to and storage at the site.

B. Handling of all materials and equipment shall be such as will prevent damage to such material and/or equipment.

C. Replace or repair to the satisfaction of the DNR Construction Inspector, all items damaged because of Contractor's failure to properly protect during transportation and handling, when on or off the project site, at no additional cost to the Owner.

1.05 STORAGE AND PROTECTION:

A. Protect all materials, work, and equipment against damage at all times.

B. Refer to Section 01500 for requirements for storage sheds. Store all materials that might be damaged within storage sheds.

END OF SECTION 01600

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 CLEANING UP:

A. Keep premises free of accumulation of surplus materials and rubbish from contractor and subcontractor operations.

1. Remove all rubbish from premises.

B. Remove rubbish weekly and at other times as required by the DNR Construction Inspector. Keep interior of building free at all times of unattended combustible rubbish.

C. Immediately prior to final inspection:

1. Clean all surfaces to condition acceptable for immediate occupancy.

2. Remove all marks, stains, fingerprints, paint droppings, and other foreign matter from all finished items.

1.03 GUARANTEES, BONDS AND AFFIDAVITS:

A. Submit all written guarantees, bonds and affidavits required to the Owner prior to final payment.

B. Guarantees shall extend the full period of the required guarantee period after:

1. Replacement of work found defective during guarantee period.

2. Repair of inoperative items or adjustments to proper working conditions of items not operating properly at time of inspection at final completion.

1.04 RECORD DRAWINGS:

A. Required prior to final payment. Refer to Section 01300 of these specifications. Submit to DNR Construction Inspector.

1.05 SHOP DRAWINGS:

A. Refer to Section 01300 of these specifications.

1.06 TESTS:

A. Complete all tests required to prove actual operating performance of equipment and systems incorporated into the project. Refer to Section 01400 of these specifications.

B. Submit reports of all tests to the Owner prior to final payment.

1.07 MAINTENANCE AND OPERATING:

A. Refer to Section 01730 of these specifications, if applicable.

1.08 DAMAGE TO EXISTING STRUCTURES:

A. Prior to final acceptance by the Owner, repair or otherwise return to original condition any parts of the existing facilities which have been damaged during construction.

1.09 FINAL INSPECTION:

A. Request a final inspection in writing, at least ten days prior to the anticipated date of completion, from the DNR Construction Inspector.

B. Work will not be considered ready for final inspection until all the work has been completed and the Contractor has certified that all items are properly operating and in strict compliance with the contract documents.

C. The Contractor or his project supervisor shall be present at the job site during the final inspection.

1. The DNR Construction Inspector will present the Contractor, after the final inspection, a list of any items not meeting contract requirements. This list will be confirmed in writing and all items listed must be made acceptable before final payment will be made.

END OF SECTION 01700

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: To aid the instruction of operating and maintenance personnel, and to provide a source of information regarding the systems incorporated into the Work, furnish and deliver the data described in this section and in pertinent other sections of these specifications.

1. Additional data requirements may be described in individual sections.

B. Related Sections: Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

1.02 SUBMITTALS:

A. Comply with pertinent provisions of Section 01300.

B. Submit two copies of a preliminary draft of the proposed manual or manuals to the Engineer for review and comments.

C. Unless otherwise directed in other sections, or in writing by the Engineer, submit two copies of the final manual to the DNR Construction Inspector.

1.03 QUALITY ASSURANCE:

A. In preparing required data, use only personnel thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with this section's requirements, and sufficiently skilled in technical writing to communicate the essential data.

PART 2 - PRODUCTS

2.01 INSTRUCTION MANUALS:

A. Where instruction manuals are required to be submitted under other sections of these specifications, prepare in accordance with the provisions of this section.

B. Format:

1. Size: 8-1/2" x 11"

2. Paper: White bond, at least 20 lb. weight

3. Text: Neatly written or printed

4. Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the manual and provide a drawing pocket inside rear cover or bind in with text.

5. Flysheets: Separate each portion of the manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.

6. Binding: Use heavy-duty plastic or fiberboard covers with 3-ring binders. All binding is subject to the Owner's approval.

7. Measurements: Provide all measurements in U.S. standard units: feet-and-inches, lbs., and cfm.

C. Provide front and back covers for each manual, using durable Owner's approved material, clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS
(name and address of work)
(name of contractor)
(general subject of this manual)
(space for approval signature of)
(the owner and approval date)

D. Contents include at least the following:

1. Neatly typewritten index near the front of the manual, giving immediate information as to location within the manual of all emergency information regarding the installation.

2. Detailed list of subcontractors, including address, phone number and product or equipment installed.

3. Complete instructions regarding operation and maintenance of all equipment involved, including lubrication, disassembly, and reassembly.

4. Complete nomenclature of all parts of all equipment.

5. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.

6. Copy of all guarantees and warranties issued.

7. Manufacturers' bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.

8. Such other data as required in pertinent sections of these specifications.

PART 3 - EXECUTION

3.01 INSTRUCTION MANUALS:

A. Preliminary:

1. Prepare a preliminary draft of each proposed manual.

2. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.

3. Secure the Architect's approval prior to proceeding.

B. Final: Complete the manuals in strict accordance with the approved preliminary drafts and the Architect's review comments.

C. Revisions:

1. Following the instruction of operation and maintenance personnel, review all proposed revisions of the manual with the DNR Construction Inspector.

END OF SECTION 01730

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. The work consists of the removal of growth and vegetation, and related items necessary to complete the work indicated on the Drawings and as specified herein.

2. Also included are:

   a. Cutting, filling, fill compaction, rough grading, and related items as necessary for the placement of the riprap.

   b. Clearing, grubbing, removal of shoreline vegetation.

3. Deposit excess excavated material on site as directed by the DNR Constructor Inspector.

4. Spread material and grade to drain so as to avoid forming of ponding areas.

B. Related Sections: Drawings and General Provisions of the Contract, including the General Covenants and Provisions. Supplementary Covenants and Provisions and General Requirements as well as, but not limited to, the following:

Section 02200 - Earthwork

1.02 PROJECT/SITE CONDITIONS:

A. Existing Conditions:

1. Survey job conditions prior to commencing work.

2. Accept the site as found and remove all trash and rubbish prior to any cut and fill operation.

B. Protection of existing improvements: Provide protections to prevent damage to existing improvement remaining in place on owner's property as well as on adjoining properties, particularly but not limited to, the following:

1. Existing utilities or services.

2. Field drain tiles.

3. Repair or replace any improvement not designated to be removed which has been damaged at no cost to the owner.

C. Protection of existing trees and improvements:

1. Protect existing trees and other vegetation indicated or as directed by DNR Construction Inspector to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction material or excavated materials within drip line, excess foot traffic or vehicular traffic, or parking of vehicles within drip line.

2. Provide temporary guards to protect trees and vegetation to be left standing.

3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the DNR Construction Inspector.

1.03 SEQUENCING AND SCHEDULING:

A. Arrange for proper disposal of water and sewer during work involving temporary connection and stoppage of these utilities.

B. Assume responsibility for coordination with utility companies.

C. Obtain approval with the DNR Construction Inspector prior to starting removal of any improvement specified or not in the work of this section.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

A. Provide materials and equipment as required to perform work specified.

PART 3 - EXECUTION

3.01 SITE PREPARATION:

A. General: Remove vegetation, improvement, or obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated.

1. Removal includes digging out stumps, roots, and boulders.

B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than four inches.

1. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over two inches in diameter, and without weeds, roots, and other objectionable material.

C. Strip Topsoil: Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable materials.

D. Stockpiling: Stockpile topsoil in storage piles in areas shown or as directed by the DNR Construction Inspector. Cover storage piles if required to prevent wind-blown dust.

E. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except those indicated or directed to be left standing.

1. Remove trees designated to be removed.

2. Do not remove other trees without the authorization of the DNR Construction Inspector.

3. Remove trees or vegetation to facilitate access to the work at no cost to the owner.

4. Completely remove stumps, roots, boulders and other debris protruding through the ground.

    a. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

C. Drainage Channel Excavation: Excavate channel as shown on the Drawings, as specified herein or as indicated by the DNR Construction Inspector.

D. Pavement Removal: Remove pavement, as shown on the Drawings or as indicated by the DNR Construction Inspector, as specified herein:

1. Concrete: Cut with concrete saw down to a minimum of one inch and break slab as approved by the DNR Construction Inspector.

2. Brick or Pavers: Remove in uniform pattern and store as approved to reuse.

3. Asphalt: Cut edges neatly where indicated.

4. Sidewalk: Remove to nearest joint.

5. Trenching Through Pavement: Where trenching through pavement is approved for passage of utilities, cut pavement sidewalks, and curbs and gutter.

    a. Cut straight lines parallel to the centerline of the trench at a minimum of one foot from the edge of trench.

    b. Do not undercut.

E. Construction along or across highways and railroads.

1. Maintain traffic flow on highways and obtain work permit.

2. Obtain necessary work permit from authorized railroad official or highway authority before commencing construction.

3. Refer to plans for details of construction, traffic control and casing pipe specifications, if required.

4. Conform to additional construction requirements of railroad or highway authority as may be required by the permit.

5. Provide warning lights, signals, flagers, or other precautionary measures as required to protect work and traffic.

6. Before excavation on railroad property, check with railroad for location of all buried utilities or cables.

7. Officials of railroad will have right to inspect and regulate work.

8. Railroad will have right to stop work and correct any error with railroad forces at Contractor's expense in an emergency or if Contractor refuses to make timely repairs.

9. All railroad expenses for labor and material for removing and replacing tracks, or for inspectors, flagers, watchers, or protective devices or any other labor or material as specified, shall be reimbursed directly to the railroad by the owner.

   a. Work performed by the railroad at Contractor's option shall be reimbursed directly to the railroad by the Contractor.

F. Depressions: Fill depressions caused by clearing and grubbing operations with satisfactory soil materials, unless further excavation work is required or indicated.

G. Removal of Improvements: Remove above-grade and below-grade improvements necessary to permit construction, and other work as indicated.

H. Access to Streets and Highways: maintain suitable means of access for property owners' abutting streets and highways involved in construction.

1. Notify property owners 24 hours in advance of street closure.

2. Suitable access shall mean roadway of sufficient width, free from ruts, potholes and mud holes, and capable of carrying a passenger car without damage to car.

3. When access must be denied due to construction, provide suitable access within 24 hours after responsible construction is completed.

4. Whenever construction is stopped due to inclement weather, weekends, holidays or other reasons, provide suitable access for all property owners.

5. Maintain suitable means of access at all times to the park officer's residence and all other private residences which may be affected by the construction.

3.02 GRADING:

A. Grade all areas as part of the work of this section or disturbed by construction operators.

B. Grade to smooth uniformly slope surfaces, fill all depressions, and provide for positive drainage.

3.03 DISPOSAL OF WASTE MATERIAL:

A. Dispose of surface materials, construction debris and trees in accordance with local ordinances.

B. Burning on State Property: See Section 1107.07 of the General Covenants and Provisions.

C. Removal of Materials: See Section 1104.08 of the General Covenants and Provisions.

END OF SECTION 02100

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. The work consists of cutting, filling, rough grading, and related items necessary to complete the work indicated on the Drawings and as specified herein.

   a. This includes clearing and grubbing, removal of trees and stumps, building structures and foundations, stripping and stockpiling of topsoil, removal of underground obstructions and utilities, cutting, filling, fill compaction, and rough grading.

2. Deposit excess excavation material where directed by the DNR Construction Inspector. Spread material and grade to drain to avoid forming ponding areas.

3. Accept the site as found and remove all trash and rubbish prior to any cut and fill operation.

B. Related Sections: Drawings and General Provisions of the Contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not limited to, the following:

Section 02200 - Earthwork

1.02 PROTECTION OF EXISTING IMPROVEMENTS:

A. Provide protections necessary to prevent damage to existing improvements remaining in place.

B. Protect improvements on adjoining properties and on state of Iowa property.

C. Restore damaged improvements to their original conditions, as acceptable to parties having jurisdiction.

1.03 PROTECTION OF EXISTING TREES AND VEGETATION:

A. Protect existing trees and other vegetation indicated or as directed by DNR Construction Inspector to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot traffic or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

B. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the DNR Construction Inspector.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Provide materials as required to perform work specified.

2.02 EQUIPMENT:

A. Provide equipment as required to perform work specified.

PART 3 - EXECUTION

3.01 SITE CLEARING:

A. General: Remove vegetation, improvement, or obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated.

1. Removal includes digging out stumps, roots, and boulders.

B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than four inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over two inches in diameter, and without weeds, roots, and other objectionable material.

C. Strip Topsoil: Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable materials.

D. Stockpiling: Stockpile topsoil in storage piles in areas shown or as directed by the DNR Construction Inspector. Cover storage piles if required to prevent wind-blown dust.

E. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except those indicated or directed to be left standing.

F. Completely remove stumps, roots, boulders and other debris protruding through the ground. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

G. Depressions: Fill depressions caused by clearing and grubbing operations with satisfactory soil materials, unless further excavation work is required or indicated.

H. Removal of Improvements: Remove above-grade and below-grade improvements necessary to permit construction, and other work as indicated.

3.02 DISPOSAL OF WASTE MATERIALS:

A. Burning on State Property: See Section 1107.07 of the General Covenants and Provisions.

B. Removal of Materials: See Section 1104.08 of the General Covenants and Provisions.

END OF SECTION 02110

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: The work covered by this section consists of site clearing, grading, general and building excavation, disposal of debris and spoils, dewatering, preparation of subgrade, foundations, borrow, embankment, structural and general backfill, restoration, and cleanup necessary to construct the project, all as shown on the drawings and as specified herein.

B. Related Sections: Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

C. Method of measurement: The quantity of fill material acceptably placed in the embankment will be measured and computed in cubic yards by the average end area method, to the nearest cubic yard.

1. The soil preparation not otherwise included elsewhere will be inclusive.

D. Basis for payment:

1. Unit Price: If the work of this section is so designated to be paid, the Contractor will be paid the Contract Unit Price for the calculated quantity of material provided as shown on the Drawings and as specified herein.

a. Additional payments for increased quantities, labor or equipment usage will only be allowed if a change order is warranted due to a change in project scope or for unforeseen conditions, as determined by the Project Engineer, in accordance with the provisions of the General Conditions of the Contract.

1.02 QUALITY ASSURANCE:

A. Codes and Standards: Perform all excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Safety: All excavation work and methods of construction shall conform to the State of Iowa Bureau of Labor and all OSHA Standards.

1.03 JOB CONDITIONS:

A. Site information shown on the Drawings regarding existing conditions is of a general nature. Visit the site and be familiar with existing conditions.

B. Observe weather conditions. Attempt no work in frozen conditions without the approval of the DNR Construction Inspector.

1.04 PROTECTION OF PERSONS AND PROPERTY:

A. Protect from damage existing buildings, walks, paving, fencing, sod, and other items noted to remain. Maintain bench marks, monuments, property stakes, and other reference points.

B. Protect existing underground utilities to remain. Notify the DNR Construction Inspector of underground utilities or structures encountered but not indicated on drawings.

1. Contractor responsibilities: Correcting damage caused to existing construction, utilities, surfacing, and other items noted to remain at no additional expense to the Owner.

C. Barricade open excavations occurring as part of this work and provide warning lights.

1.05 EXPLOSIVES:

A. The use of explosives is not permitted.

PART 2 - PRODUCTS

2.01 GENERAL FILL AND EMBANKMENT MATERIAL:

A. Materials to be incorporated in the top 12 inches of earth embankment or general fill shall be earthy materials, free from stones larger than 2 inches, broken concrete, roots, or other materials that would significantly affect scarifying, compacting and finishing the subgrade. It is anticipated that the majority of excavation material from the required excavation will be acceptable for this use. Obtain approval of fill material prior to any placement from the DNR Construction Inspector.

2.02 STRUCTURAL BACKFILL MATERIAL:

A. Structural backfill material shall consist of a natural sand or a mixture of sand with gravel, crushed stone, or other broken fine material to fill all voids in coarser material. The maximum size of any gravel, stone, or broken or fragmented material shall be of such size that 100 percent passes a 6-inch sieve. The liquid limit of the material shall not be greater than 25 and the plasticity index shall not be more than 6. The portion of the material which passes a No. 4 sieve shall conform to the following requirements:

Sieve Size	Percentage By Weight Passing
No. 4	100
No. 40	Not more than 75
No. 100	Not more than 15
No. 200	Not more than 8

B. The material shall be capable of being compacted to 95 percent maximum density without undue weaving and heaving as defined by ASTM D698, Method D.

C. Obtain approval of fill material prior to any placement from the DNR Construction Inspector.

2.03 GRANULAR DRAINAGE FILL MATERIAL:

A. Granular drainage fill for use under concrete slabs and walks where shown on the Drawings shall consist of granular, free--draining material, consisting of clean bank run gravel or crushed stone of full range of sizes. Maximum size of aggregate shall be 3/4 inch. 15 to 50% of that portion of weight of fill shall pass the No. 4 sieve.

2.04 TOPSOIL:

A. Topsoil: Friable clay loam surface soil reasonably free of subsoil, clay lumps, stones and other objects over two inches in diameter, and without weeds, roots and other objectionable materials.

PART 3 - EXECUTION

3.01 SITE CLEARING:

A. General: Remove vegetation, improvements, or obstructions interfering with installation of new construction. Removal includes digging out of stumps, roots, boulders and any other necessary items, the removal of which is not covered in the work of another section.

B. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except those indicated or directed to be left standing.

1. Completely remove stumps, roots, boulders and other debris protruding through the ground. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

2. Depressions: Fill depressions caused by clearing and grubbing operations with satisfactory soil materials, unless further excavation work is required or indicated.

3.02 LAYING OUT WORK:

A. Unless otherwise noted, DNR surveyor will locate new construction, set slope and grade stakes, and otherwise fully lay out work. Contractor will provide intermediate staking to maintain proper grades and control, check existing grades at site against grades or contours indicated on Drawings, and report any differences to Project Engineer before beginning of grading.

B. Preserve stakes and markers. Replace at no cost to the Owner stakes or markers carelessly or willfully damaged by operations. Assume responsibility for accuracy of lines, grades, and dimensions.

3.03 STRIPPING AND SALVAGING OF TOPSOIL:

A. Preparation: Mow or otherwise remove weeds, grass and other vegetation on entire area expected to be disturbed by the work of this section.

B. Sod: Shred sod by shallow plowing, blading or disking throughout the entire area.

C. Excavation of topsoil: Excavate topsoil throughout the entire prepared area to a depth of 12 inches and stockpile where designated by DNR Construction Inspector.

3.04 DEWATERING:

A. Dewatering System: Provide, maintain and operate sufficient well points, headers, pumps, trenches, and sumps to keep all excavations for structures free from water at all times. Submit proposal to the DNR Construction Inspector for review prior to construction.

B. Surface Runoff: Grading shall be controlled around the excavation to prevent surface water from running into the excavations for the structure.

C. Saturated Foundations: Prior to placing any concrete for foundations, remove soils in footing excavation that have become saturated with surface water.

3.05 EXCAVATION - GENERAL:

A. General: General excavation consists of removal of materials of whatever nature, including boulders smaller than 1 cubic yard in volume, required for the construction of structures, roads, and walks. The method of excavating shall be at the Contractor's option, exercising great care to leave the final grade in an undisturbed condition. If final grade is disturbed, it shall be restored to requirements and to the satisfaction of the DNR Construction Inspector. Prior to placing any concrete for footings and foundation work, the Contractor shall notify the DNR Construction Inspector to inspect the excavation and shall obtain approval to proceed with the pour.

B. Frozen Ground: Provide frost protection for all structural excavation work. Do not place concrete for foundation work on frozen ground.

C. Protection of Existing Work: Protect existing work, including underground utilities and piping, from damage caused by excavation work. Repair any damage to existing work, utilities, or piping at Contractor's expense.

D. Storage of Fill Materials: Store excavated fill material away from excavations to avoid slides. Deposit excess earth on site, where directed by DNR Construction Inspector.

E. Removal of Unsuitable Materials: Cross-sectional dimensions and depths shown on Drawings shall be subject to such changes as may be found necessary by the DNR Construction Inspector to secure foundations free from soft, weathered, shattered and loose or other objectionable materials. Remove unsuitable material encountered and replace with granular materials from established pits satisfactory to the DNR Construction Inspector. Compact granular materials to at least 95 percent of maximum density.

1. When the excavation of unsuitable materials and replacement with granular fill material directed by the DNR Construction Inspector is found to be above normal expectations, it will be paid for at the unit prices listed in the Contractor's

submitted cost breakdown. What constitutes normal expectations will be determined by the Project Engineer. The Project Engineer's decision will be final.

F. Disposal of Excavated Materials: Materials free from sticks, roots, and other objectionable material may be used on site as directed by the DNR Construction Inspector.

1. Remove excavated materials not suitable for fill as directed by the DNR Construction Inspector.

3.06 PLACEMENT OF EMBANKMENT MATERIAL:

A. Deposit loose material in horizontal layers of not more than eight (8) inches in depth. Provide surface drainage of installed embankment material at all times during construction. Do not place embankment material on frozen ground nor use any frozen embankment material during construction.

B. Smooth out deposited material to a uniform depth using suitable motor patrol, bulldozer, or self-propelled, tamping-type roller with blade attachment. Continue the initial smoothing and leveling during compaction to provide a surface free of ruts and other irregularities.

C. Compaction: The desired compaction is to be obtained by the operation of an approved tamping type roller. Compaction will be considered in compliance with a minimum of one roller pass per inch depth of each lift, and continuing until the roller is supported on its tamping feet, as determined by the DNR Construction Inspector.

D. Should a moisture problem be encountered in compacting the material, the manipulation necessary to incorporate water or to dry the material shall be considered incidental to embankment construction.

3.07 STRUCTURAL EXCAVATION:

A. Excavate to elevations and dimensions indicated on the Drawings; allow additional space as required for construction operations and inspection.

B. Remove all existing construction encountered within the excavation to a depth of 6 inches below the indicated elevation of footings and subgrades to receive floor slabs, walks, and paving.

C. If suitable bearing is not encountered at depth indicated on the Drawings for foundations, immediately notify the DNR Construction Inspector and do not proceed until instructions are given and necessary measurements made for the purpose of establishing additional volume of excavation.

D. Excavate last 4 inches by hand, if machines are used for excavation.

E. Fill with concrete, at Contractor's expense, unauthorized excavation carried below bottom of foundation levels shown.

F. The DNR Construction Inspector will inspect and approve the bottoms of all excavations prior to concrete placement.

3.08 STRUCTURAL BACKFILL:

A. Start backfill around foundations not less than 24 hours nor more than seven (7) days after application of waterproofing. Backfill walls and piers to approximately the same elevation on each side to equalize pressure.

B. Compact structural backfill to same requirements as construction of embankments, Section 3.06.

3.09 PLACING BACKFILL ADJACENT TO WALLS AND FOOTINGS:

A. Deposit fill on each side of piers, walls and free standing structures simultaneously to approximately the same elevation. Protect below grade waterproofing, dampproofing and insulation with a single thickness of 1/2" fiberboard, 1/8" asphalt impregnated board or other approved means. Place fill in workable condition, free of clods, frost, or debris, in 8" lifts, and thoroughly compact each lift with mechanical tamper.

B. Do not operate heavy equipment for spreading and compacting backfill closer to any wall than a distance equal to the height of the backfill above the top of the footings. Backfill adjacent to walls shall be compacted to the same density as the adjacent fill with a small vibratory or hand tamping compactor.

3.10 PREPARATION OF EARTH SUBGRADE FOR CONCRETE:

A. When excavating for footings or bottom mat slabs to be cast on native soil, excavate to final grade in a manner so as to not disturb the existing soil. If the soil is disturbed, compact it to the satisfaction of the DNR Construction Inspector. If the soil is not capable of compaction to the satisfaction of the DNR Construction Inspector, remove the disturbed material, and replace it with thoroughly compacted structural backfill material. Do not place concrete on surfaces that are muddy, frozen or contain frost. If during the course of construction, bottom surfaces become muddy or saturated with water, remove the undesirable material and replace with compacted structural backfill as indicated above.

3.11 PLACING PIPE IN FILL:

A. When it is necessary to place pipe culverts, drain piping, or other appurtenances in general or structural backfill, bring the fill up to at least one foot above the top of the pipe or appurtenances. Do not leave areas of backfill depressed to allow for trenches. After the compacted fill is complete, excavate for the pipe or appurtenances. Backfill materials and compaction are to conform to the fill in which it is placed.

3.12 TRIMMING AND CLEAN UP:

A. Final trimming and cleaning up shall consist of work as follows:

1. Smooth out all irregularities , fill all washouts, make slopes uniform, slightly rounded at top and bottom, and compact the entire area of the fill to the required

lines, grades and cross sections, within one-tenth foot (0.1) above or below the established grade.

2. Where additional material is required, provide similar fill as the one used. Obtain such material from source approved by the DNR Construction Inspector.

3. When work is completed, remove and dispose of surplus material including stumps, trees and brush, and leave premises in a condition acceptable to the DNR Construction Inspector.

3.13 FINISH GRADING:

A. After completion of rough grading, scarify areas to receive topsoil to finish grade shown. Deposit topsoil to a minimum depth of 4", as directed by the DNR Construction Inspector. In areas with existing topsoil, no additional topsoil is required. Grade topsoil to eliminate water pockets or irregularities. Eliminate soil lumps and round off abrupt changes in slope. Spread excess earth on site as directed by DNR Construction Inspector. Topsoil removal, stockpiling, and deposit will be considered incidental to earthwork, and will not be paid for separately.

3.14 SITE RESTORATION:

A. All disturbed areas within the boundaries of this project (including borrow areas) not specifically receiving a finished surface are to be seeded in accordance with Section 02930.

END OF SECTION 02200

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: The work covered by this Section consists of furnishing all material, labor and equipment necessary or required to do the trenching, backfilling and compacting needed for the proper and complete installation of underground utilities as shown on the Drawings.

B. Related Sections: Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements.

Section 02200 - Earthwork

1.02 QUALITY ASSURANCE:

A. Qualifications: 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 performance of the work of this Section.

B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

C. Codes and Standards: Perform all work of this Section in compliance with applicable requirements of governing authorities having jurisdiction.

1. In addition to complying with the pertinent codes and regulations of other governing agencies, comply with applicable requirements of Section 2, Iowa Department of Natural Resources Authorized Technical Specifications for Water and Sewer Projects, latest edition.

D. Safety: All trenching, excavating and methods of construction shall conform to the state of Iowa Bureau of Labor and all OSHA standards.

E. Where conflicts arise between Contract Documents and Referenced Codes and Standards, the latter shall prevail, unless Contract Documents are more stringent.

1. Bring all conflicts to the attention of the DNR Construction Inspector.

1.03 PROJECT/SITE CONDITIONS:

A. Environmental Requirements:

1. Protect existing trees and other vegetation indicated or as directed by DNR Construction Inspector to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling

construction materials or excavated materials within drip line, excess foot traffic or vehicular traffic, or parking of vehicles within drip line.

2. Provide temporary guards to protect trees and vegetation to be left standing.

3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the DNR Construction Inspector.

B. Existing Conditions:

1. Site information indicated on the Drawings regarding existing conditions, is of a general nature.

a. Visit the site and become familiar with existing conditions.

2. Observe weather conditions.

a. Attempt no work in frozen conditions without the approval of the DNR Construction Inspector.

3. Underground conditions: Existing conditions are shown on the Drawing as they are known to exist.

a. The DNR and its representatives assume or accept no responsibility for actual location or failure to shown unknown underground utilities on the Drawings.

b. Contact utility companies or excavate to locate underground utilities before starting the actual Work of this Contract.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Classification of Excavated Material:

1. Earth: All material not otherwise classified including clay, silt, sand, gravel, hardpan, disintegrated shale and rock debris, junk, brick, loose stones and boulders less than 3/8 of a cubic yard in volume.

2. Rock: Buried boulders larger than 3/8 of a cubic yard in volume or solid deposit so firmly cemented together that they cannot be removed with a 3/8 cubic yard rated backhoe.

3. Rubble: Buried concrete foundations, beams, walls, and other material which require continuous use of pneumatic tools or blasting.

B. Bedding Material:

1. In addition to the soil types listed under the USCS Soil Classification System (FHA Bulletin No. 373), provide suitable processed material as specified herein.

2. Class I: Angular, 6 to 20-mm (1/4 to 3/4-in.) graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

3. Class II: Course sand particle size of 20-mm (3/4 in.), including variously graded sands and gravel, contain small percentages of fines, generally granular and non-cohesive, either wet or dry, as well as soil types GW, GP, SW, and SP.

4. Class III: Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures, as well as soil types GM, GC, SM, and SC.

5. Class IV: Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits, as well as soil types KH, ML, CH and CL.

    a. These materials are not recommended for bedding, haunching, or initial backfill.

6. Class V: This class includes the organic soils OL, OH, and PT as veil as soils containing frozen earth, debris, rocks larger than 20 mm (3/4 fn.) in diameter, and other foreign materials.

    a. These materials are not recommended for bedding, haunching, or initial backfill.

C. Fill and Backfill Materials:

1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension, and with not more than 15 percent of the rocks or lumps larger than 2-3/8" in their greatest dimension.

2. Fill material is subject to the approval of the DNR Construction Inspector, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, nonexpansive soil free from roots and other deleterious matter.

3. Do not permit rocks having a dimension greater than 1" in the upper 12" of fill.

4. Cohesionless Material Used for Backfill: Provide sand free from organic material and other foreign matter, and approved by the DNR Construction Inspector.

D. Piping for Augering, Boring, Drilling and Jacking Operation: Provide material conforming to the latest A.R.E.A. specifications unless exceeded herein.

1. Casing Pipes: Provide steel casing pipe of the minimum size and thickness as shown on the Drawings or if not shown as determined by the Project Engineer.

    a. Casing Pipe Joints: Provide watertight joints by continuous weld around the perimeter of the pipe, with a joint strength equal at a minimum to that of the casing pipe shell.

3. Carrier pipes for boring and jacking operations: ductile iron pipe (DIP) with mechanical joints, size and style as shown on drawings for each location or if not shown as determined by the Project Engineer.

D. Materials for Railroad/Highway/Street Crossing:

1. Casing pipe: Steel with a minimum yield strength of 35,000 psi and a wall thickness as follows:

Man. Thickness in Inches	Diameter of Pipe in Inches
0.188	Under 14
0.282	14 and 16
0.312	18
0.344	20
0.375	22
0.406	24
0.438	26
0.469	28 and 30
0.500	32
0.531	34 and 36
0.563	38, 40 and 42

E. Provide other materials, not specifically described but required for a complete and proper installation, selected by the Contractor subject to the approval of the Project Engineer.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Protection of Persons and Property:

1. Barricade open holes and depressions occurring as part of the work, and post warning lights on property adjacent to or with public access.

2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

B. Protection of Utilities:

1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to trenching.

a. If damaged, repair or replace at no additional cost to the Owner.

2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.

3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.

4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Project Engineer and secure instructions.

5. Do not proceed with permanent relocation of utilities until written instructions are received from the Project Engineer.

C. Dewatering:

1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.

a. Prevent surface water from flowing into excavation; remove water as it accumulates.

b. Divert stream flow away from areas of construction.

c. Do not pump water onto adjacent property without the Project Engineer's approval and the adjacent property Owner's.

d. Do not use sanitary sewers for disposal of trench water.

2. Obtain Project Engineer's approval of proposed methods of dewatering.

3. Keep trenches and site construction area free from water.

4. Provide for handling water encountered during construction.

5. Lay no pipe in, and pour no concrete on wet soil.

D. Dust Control: Use means necessary to prevent dust becoming a nuisance to the public, at neighbors, and to other work being performed on or near the site.

E. Maintain access to adjacent areas at all times.

3.02 TRENCHING:

A. General:

1. Keep side of trench as vertical as possible within the limits of excavating and safety codes.

a. Maintain vertical walls of excavation below top of pipe.

2. Excavate to full depth by machine.

3. Level bottom of trench to provide relatively smooth, free of rocks, continuous surface for the suitable uniform bearing of a full length of pipe.

4. Pad bottom of trench where ledge rock, hardpan or boulders are encountered, with sand and compacted fine grained soils.

5. If unsuitable material is found at the bottom of the trench, which in the opinion of the DNR Inspector warrants a change order to be issued for removal of such material, proceed as follows:

   a. Remove the unsuitable material to a depth as directed by the DNR Construction Inspector.

   b. Replace removed material with crushed stone or other approved material with 100 percent passing a 2 1/2" sieve and 85 to 95 percent passing the 1" sieve.

   c. Provide a minimum of 4" of bedding material, graded sufficiently coarse to prevent movement, on top of the stabilizing material to prevent point load.

   d. Excavate by hand under and around existing utilities, where overhead clearance prevent the use of machine, or under trees and shrubs.

B. Sheeting and Shoring and Bracing: Provide sheeting, shoring and bracing to hold walls of excavation to provide safety for workers and to protect existing utilities or structures as well as to permit construction in the trench to stay dry.

1. Prior to backfilling, remove all applicable sheeting.

2. Except as permitted below do not allow sheeting to remain in the trenches except when, in the opinion of the DNR Construction Inspector, field conditions or the type of sheeting or methods of construction such as use of concrete bedding are such as to make removal of sheeting impracticable.

   a. Leave in place the wood sheeting driven below level of pipe, to a level five feet below finish grade.

   b. In such cases, the Project Engineer, upon recommendation from the DNR Construction Inspector, may permit other portions of sheeting to be cut off and remain in the trench.

   c. Pull out steel sheeting except where shown on the Drawings.

3. Lift moveable trench shield used below spring line of pipe prior to any forward movement to avoid pipe displacement.

C. Open Cut: Unless otherwise indicated on the Drawings or designated by the Project Engineer, excavate in open cut under existing street, utilities and structures.

1. If conditions at the site prevent such open cut, and if approved by the Project Engineer, trenching may be used.

2. Short sections of a trench may be tunneled if, in the opinion of the Project Engineer, the conductor can be installed safely and backfill can be compacted properly into such tunnel.

3. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects as directed by the DNR Construction Inspector.

5. When the void is below the subgrade for the utility bedding, use suitable earth materials and compact to the relative density directed by the DNR Construction Inspector, but in no case less than 90 percent.

6. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or consolidated as approved by the DNR Construction Inspector, but in no case to a relative density less than 80 percent.

7. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the Owner.

8. Excavating for structures, appurtenances, and manholes:

   a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.

   b. Overdepth excavation below such appurtenances, unless directed, will be considered unauthorized.

   c. Fill unauthorized overdepth excavation with 3000 psi concrete or stabilizing material as directed by the DNR Construction Inspector, and at no additional cost to the Owner.

   d. When unstable material is encountered which will not provides suitable bearing of foundation, when instructed by the DNR Construction Inspector, fill with 3000 psi or stabilizing material.

D. Trench to the minimum width of 2'-0" at the bottom of trench to allow for proper installation of the utility, with sides as nearly vertical as possible.

1. Accurately grade the bottom to provide uniform bearing for the utility.

2. Do not allow the trench width to extend more than 12" each side of pipe.

E. Depressions:

1. Dig bell holes and depressions for joints after the trench has been graded.

   a. Provide uniform bearing for the pipe on prepared bottom of the trench.

2. Except where rock is encountered, do not excavate below the depth indicated or specified.

3. Where rock is encountered, excavate rock to a minimum overdepth of 4" below the trench depth indicated.

F. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, cover, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.

G. Where trenching occurs in existing lawns, remove turf in sections, keep damp and replace turf upon completion of the backfilling.

H. Where new construction crosses or closely parallels existing utilities or utility services, excavate in advance of pipe laying to determine location, crossing arrangements, and actual construction lines and grades.

I. Cover:

1. Unless otherwise indicated elsewhere, provide minimum trench depth indicated below to maintain a minimum cover over the top of the installed item below the finish grade or subgrade:

a. Areas subject to vehicular traffic:

(1) Sanitary sewers: 48"
(2) Storm drains: 36"

b. Areas not subject to vehicular traffic:

(1) Sanitary sewers: 30"
(2) Storm drains: 18"

c. All areas:

(1) Water lines: 60"
(2) Natural gas lines: 24"
(3) Electrical cables: 42"
(4) Electrical ducts: 36"

d. Concrete encased:

(1) Pipe sleeves for water and gas lines: 24"
(2) Sanitary sewers and storm drains: 12"
(3) Electrical ducts: 24:

2. Where utilities are under a concrete structure slab or pavement, the minimum depth need only be sufficient to completely encase the conduit or pipe sleeve, and electrical long-radius rigid metal conduit riser, provided it will not interfere with the structural integrity of the slab or pavement.

3. Where the minimum cover is not provided, encase the pipes in concrete as indicated.

a. Provide concrete with a minimum 28-day compressive strength of 3,000 psi.

3.03 ROCK AND RUBBLE EXCAVATION:

A. Use of explosives: When not alternatives are possible the Project Engineer, upon review, may approve the use of explosive for such excavation.

1. Submit detailed plan outlining all proposed blasting operations, location, methods and use of mats and other safety measures.

a. Obtain written approval from all agencies having jurisdiction before using explosives.

b. Provide special hazard Insurance covering liability for all blasting operations.

c. Use only experienced, licensed personnel.

B. Remove excavated rock not suitable for backfill to designated waste disposal area.

C. Provide 6" clearance around the water main to allow for bedding.

D. Replace overdepth with additional bedding at no additional cost to the Owner.

3.04 BEDDING:

A. Provide bedding as indicated on the Drawings and as specified herein.

B. Prior to pipe installation, carefully bring the bedding material to grade along the entire length of pipe to be installed as shown on the Drawings and as specified herein.

1. Class I Material:

a. Unless otherwise indicated, provide a depth of 4 to 6 in. (100 to 150 mm) of Class I material to provide uniform bedding.

b. Provide a depth of less than 4 to 6 in. (100 to 150 mm) of Class I material to provide uniform bedding in the case of unstable trench bottom.

c. Provide a depth of more than 4 to 6 in. (100 to 150 mm) of Class I material to provide uniform bedding in the case running water is found.

d. Use a flat shovel to work the surface of material to provide a level and uniform bedding.

e. Use class I material for haunching at least up to the spring line of the pipe to avoid lose of side support through migration of Class II or III haunching material into the bedding.

f. Ensure that sufficient Class I material has been worked under the haunch of the pipe to provide adequate side support.

g. Take precautions to prevent movement of the pipe during placing of the material under the pipe haunch.

2. Class II Material:

a. Excavate the bedding material or place to a point above the pipe bottom, determining such point by the depth of loose material resulting in preparation of the bedding and the amount of compaction that will be required to bring the material to grade.

b. Place Class II material to the spring line of the pipe and compact by hand or mechanical tamping

c. Ensure that sufficient Class I material has been worked under the haunch of the pipe to provide adequate side support.

d. Place initial backfill material in two stages; one to the top of the pipe and the other to a point at least 6 in. (150 mm) over the top of the pipe.

e. Compact each stage of haunching and initial backfill by hand or mechanical tamping to a minimum of 85 percent Standard Proctor Density.

f. If the remaining backfill material contains large particles which could damage the pipe from impact during placement, increase the second stage of initial backfill to a point at least 12 in. (300 mm) over the top of the pipe.

g. If the trench width is less than twice the diameter of the pipe where the moisture content at the pipeline grade is negligible and not subject to seasonal or local variations, Class XI material can be installed for pipe haunching in a dry state by hand placement with no compaction.

h. With similar trench moisture conditions, puddle or flood backfill materials to the spring line of pipe to achieve consolidation except during freezing weather.

i. Place the initial backfill to provide a 9-in. (225-mm) cover over the top of the pipe, then puddle or flood.

j. Allow time for the puddled or flooded mass in each layer to solidify until it will support the weight of a man.

k. Apply only enough water to give complete saturation of the haunching and backfill material.

l. Drain off excess water or it will retard the drying and consolidation of the haunching and backfill material.

m. Avoid saturation of Class II material, which could result in additional stability problems of the bedding.

n. Carefully bring the surface of the bedding to grade after compacting it.

3. Class III Material:

a. Provide uniform pipe bedding for Class III material in the same manner as outlined above, except use hand or mechanical tamping to compact the bedding material to a minimum of 90 percent Standard Proctor Density.

b. Place Class III material under the lower haunch area of the pipe, compact, and then place additional material to the spring line of the pipe.

c. If care has been taken to shape the bedding material to the curvature of the pipe, only one stage of placement will be required to bring the haunching material to the spring line of the pipe.

d. Take precautions to prevent movement of the pipe during placing of material under the pipe haunch.

e. Avoid excessive moisture.

4. Class IV Material:

a. Provide a uniform undisturbed trench bottom immediately following excavation.

3.05 BACKFILLING:

A. General:

1. Do not completely backfill trenches until required pressure and leakage tests have been performed, and until the utilities systems as installed conform to the requirements specified in the pertinent Section of these Specifications.

a. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, test, and approvals.

b. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work and, after approvals have been made, refill and compact as specified, all at no additional cost to the Owner.

3. Except as otherwise specified, or directed for special conditions, backfill trenches to the ground surface with selected material approved by the DNR Construction Inspector.

a. Terminate backfill at finish grade as shown on the Drawings and dispose of excess excavated material as directed by the DNR Construction Inspector.

b. Refill, compact, level off, and resurface if settlement above compacted or sand backfill occurs within period of guarantee and bond.

4. Re-open backfill which have been improperly backfilled, to a depth as required for proper compaction.

5. Construct the top 12 inches of backfill beneath all pavements of material similar to that initially excavated from the trench and compacted as specified herein.

B. Backfill of Structures

1. Perform backfilling of manholes and appurtenances as work progress.

2. Backfill only after Cast-in-Place concrete, or masonry has cured for five (5) days and has been inspected and approved by the DNR Construction Inspector

a. Backfill integral base precast structures immediately after inspection and approval by the DNR Construction Inspector.

4. Refill and compact as specified, or otherwise correct to the approval of the DNR Construction Inspector.

5. Backfill with material removed from excavation except where sand backfill is specified

a. Use no debris, frozen earth, large clods, stones nor other unsuitable material.

6. Backfill simultaneously on all sides of structures and prevent structure from damage at all times.

a. Compact backfill at structures to density not less than specified for adjacent trench.

8. Prepare backfill for surface restoration as specified for the adjacent trench.

B. General Trench Backfill: Unless otherwise directed by the DNR Construction Inspector, backfill trench immediately after the location of connections and appurtenance have been recorded.

1. General: Backfill with material removed from excavation except where sand backfill is specified.

2. Use no debris, frozen earth, large clods, stones nor other unsuitable material.

3. Backfill simultaneously on both sides of pipe to prevent displacement.

4. Place backfill into the trench at an angle so that impact on installed pipe is minimized.

5. Install cushion of four feet of backfill above pipe envelope before using heavy compacting equipment.

6. Unless otherwise specified elsewhere, provide backfill for the top 12 inches of trench with soil equivalent to adjacent topsoil.

C. Lower Portion of Trench: Unless otherwise indicated elsewhere, place backfill in pipe envelope as follows:

1. Deposit approved backfill and bedding material in layers of 6" maximum thickness, and compact with suitable tampers of the density of the adjacent soil, or grade as specified herein, until the specified cover is obtained.

2. Hand place and compact finely divided material over top of pipe at 90 percent maximum density

3. Take special care in backfilling and bedding operations not to damage pipe and pipe coatings.

4. Unless otherwise specified elsewhere, provide the same material in the pipe envelope as is specified in the remainder of the trench.

D. Remainder of Trench:

1. Ordinary backfill: Use ordinary backfill everywhere backfill is necessary unless otherwise shown on the Drawings.

a. Except for special materials for pavements, backfill the remainder of the trench with excavated material free from stones larger than 6" or 1/2 the layered thickness, whichever is smaller, in any dimension.

b. Deposit backfill material in layers not exceeding the thickness specified, and compact each layer to the minimum density directed by the DNR Construction Inspector.

c. Mound up or level off to original surface as directed by the DNR Construction Inspector.

2. Sand Backfill:

a. Backfill with sand up to bottom of specified surface restoration.

b. Compact to 95 percent maximum density under and within two feet of pavement and 90 percent maximum density in other areas.

3. Compacted Backfill: Use compacted backfill beneath the surfaces of sidewalks, bike trails, drainage ditches, diversion channels, parkings, and any other designated areas shown on the Drawings.

a. Backfill with excavated material up to bottom of specified surface restoration.

c. Moisten as necessary and compact to 95 percent maximum density under and within two feet of pavement, and 90 percent maximum density in other areas.

G. Adjacent to Buildings: Mechanically compact backfill within ten feet of buildings.

H. Consolidation of backfill by jetting with water may be permitted, when specifically approved by the DNR Construction Inspector, in areas other than building and pavement areas.

3.06 TUNNELING OPERATIONS:

A. Unless so or otherwise required, the Contractor is allowed the option to tunnel pipes into position using the following procedures upon approval by the Project Engineer/DNR Construction Inspector and the governmental agencies having jurisdiction.

B. Casing and Augering:

1. Auger and clean hole as work progresses to prevent displacement of adjacent soil, utilities and pavement surfaces.

2. Install pipe inside casing pipe as shown on Drawings.

3. Clean cue pipe upon completion of operation.

C. Casing or pipe jacking:

1. Clean out pipe as work progresses.

2. Use dry bore method.

D. Hand mining: Provide necessary supports to protect against collapse.

E. If voids occur above casing pipe, fill voids with sand.

F. Maintain correct vertical and horizontal alignment.

G. Maintain street or railroad for full use by traffic at all times.

H. Plug ends of casing pipe with masonry construction.

1. Fill annular space between casing and carrier pipe with sand when shown on the Drawings.

I. Where tunneling operations are used below or adjacent to buildings and structures or under paved surfaces, use applicable methods to prevent settlement of such structures or surfaces.

J. Install the pipe by augering under the roadway without a casing where shown on the Drawings.

K. Use only Class 22 cast iron pipe for augering under the roadway.

L. Clean out pipe upon completion of operation.

M. Fill voids with sand where voids occur.

N. Maintain proper vertical and horizontal alignment.

O. Maintain street or railroad for full use by traffic at all times.

P. Boring and Jacking Operations:

1. Conduct boring and jacking operations of steel casing pipes, as well as installation of sewer pipes in casing pipes included in this contract, as shown on drawings and as herein specified.

2. Use the installation methods for crossing under railroads, private rights-of-way, highways, arterial streets or other special cases as directed by the her.

3. Provide both casing pipe and carrier pipe in short enough lengths for proper handling and placement in the jacking pit.

4. Applicable Methods:

    a. Method 1: Push casing pipe into fill or earth simultaneously with boring auger, as it drills the earth.

    b. Method 2: Where ground conditions are especially favorable and when approved by the Project Engineer, drill hole trough the earth or fill, then push casing and carrying pipe into the hole after drill auger has completed bore.

5. Procedure: Open a trench to accommodate selected lengths of pipe sections to be jacked, eight feet wide and solidly sheeted, adjacent to slope of embankment or adjacent to bored or jacked section.

    a. Set and maintain guide timbers or rails, accurately at bottom of trench approach, to keep casing pipe on correct line and grade.

    b. Provide and install heavy timber backstop supports at rear of approach trench, sized to adequately handle the thrust of jacks without movement or distortion.

    c. Set rails, guides and jacks as shown on the Drawings or as approved by Project Engineer, so that casing pipe in final position is within acceptable limits of boring tolerance and jacking operation.

    d. Assemble joints adjacent to casing pipe and push the assembly through the casing pipe so that the carrier pipe will be on the uniform grade shown on Drawings.

    e. Provide adequate blocking, as required by conditions or as directed by the DNR Construction Inspector, where necessary to maintain the grades shown on Drawings.

    f. The annular space between carrier pipe and casing pipe may remain open.

    g. Provide bulkheads at all ends of the casing pipe, as shown on the Drawings.

    h. For best results, follow all applicable provisions for the jacking procedure, including approach trench, backstop, guides, equipment, working crew and operations described in the Drainage and Construction Products manufacturer's printed instructions as approved by the Project Engineer as applicable installation procedures.

Q. Railroad/Highway/Street Crossing: Install crossing for water main under railroad, highway or street as follows:

1. Cross by boring or jacking.

2. Cross by open cut, if approved by the Project Engineer, only for street crossings, as shown on the Drawings.

3. Installation: Slope casing pipe not less than 0.3 percent.

a. During placement of the carrier pipe with casing pipe, support the carrier pipe by four (4), steel-strap banded, wooden skids of sufficient thickness to provide two inches of clearance between the pipe bell and invert of casing pipe.

b. Place skids at 90° axis points along the full length of the pipe, excluding the areas at both ends of the pipe.

c. Round skid leading edges and cut notches for the steel strapping for a smooth assembled unit.

d. Fill the void area around the carrier pipe inside the casing pipe with clean, dry sand.

3.07 FIELD QUALITY CONTROL:

A. Inspection: The DNR Construction Inspector will inspect and approve open cuts and trenches before installation of utilities, and the following:

1. Assure that trenches are not backfilled until all tests have been completed.

2. Check backfilling for proper layer thickness and compaction.

3. Verify that test results conform to the specified requirements, and that sufficient tests are performed.

4. Assure that defective work is removed and properly replaced.

END OF SECTION 02225

SECTION 02230
HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Installation of pressure and gravity piping using the horizontal directional drilling (HDD) method.

1.02 RELATED SECTIONS

A. Section 02225 -Excavating, Backfilling and Compacting for Utilities

B. Section 02660 – Water Distribution System

1.03 FIELD MEASUREMENTS

A. Verify that survey bench mark, control point, and intended elevations for the Work are as shown on drawings.

1.04 COORDINATION

A. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

1.05 SCOPE

A. The Contractor shall furnish all labor, materials, tools, and equipment as necessary to drill horizontally and install the specified pipe in the locations as shown on the Drawings and described herein.

1.06 UTILITIES

A. Before work is started, Contractor shall locate utilities and other subsurface structures which may be affected by or interfere with the proposed construction.

1.07 SUBMITTALS

A. Shop Drawings are required for the following:

1 Instructions for installation of piping by applicable supplier.

2 Graph plotting in plan and profile of pilot drilling hole.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS

A. General: Backfill material shall be that material excavated from the trench, providing that the material does not contain any unacceptable material and can be effectively compacted by mechanical or pneumatic compaction equipment to the specified density.

B. Acceptable Backfill Materials:

1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 6 inches in greatest dimension, frozen materials, rubbish, or unsuitable materials.

2.02 MATERIALS

A. Excavation, fill, pipe and fittings, and concrete materials shall be as specified in Related Work Sections.

2.03 PIPE MATERIALS

A. Refer to Specifications Section 02730 – Sanitary Sewer Systems.

B. Refer to Specifications Section 02660 – Water Distribution System.

2.04 APPURTENANCES

A. Repair couplings (pressure applications):

1. Mechanical fittings meeting requirements of pressure application; bolted couplings, Smith-Blair 441LR, or approved equal.

a. Sleeve: Ductile iron ASTM A536.

b. Gaskets: Grade 30 compounded rubber of new materials.

c. Follower flanges: Ductile iron ASTM A536.

d. Bolts and Nuts: 304 stainless steel.

e. Coating: Shop coat enamel.

2. Sleeve fittings meeting pressure requirements of PVC pipe and designed to slide completely over pipe ends.

B. Flexible Couplings (non-pressure applications):

1. Flexible couplings designed to connect spigot ends of similar or dissimilar pipe and provide positive seal against infiltration and exfiltration; Fernco Flexible Coupling or equal.

a. Flexible elastomeric body conforming to applicable requirements of ASTM C443, C425, C564 and D1869; series 304 stainless steel bands and housings.

b. Furnish with shear rings designed to provide extra strength and rigidity to construction; series 304 stainless steel bolts, nuts and housing.

2. Sleeve fitting meeting pressure requirements of PVC pipe and designed to slide completely over pipe ends.

C. Service Saddles for directional drilled sewer:

1. Saddle tee or wye in compliance with ASTM F1336 with gasketed branch and rubber seal to main.

2. Mounting clamps series 304 stainless steel; adjustable compression type; 2 per saddle.

PART 3 - EXECUTION

3.01 GENERAL

A. The pipe shall be installed in the location to the line and grade designated on the Drawings by horizontal directional drilling.

B. All materials delivered to the project for work on the project shall be neatly piled. Excavated material which is not removed from the immediate site of the work shall be kept trimmed up so as to cause as little inconvenience to the owners of neighboring property and to the public, as

possible.

C. Excavated material, including but not limited to, pipe, pavement, concrete, and concrete rubble, and masonry units, which is unsuitable for backfill and all excavated material which has not been used for backfill shall, upon completion of the project, be removed from the site of the work by the Contractor at his own cost and expense.

D. The drill staging area shall be kept neat and orderly and disturb as little area as possible. The pipe staging area shall be set up on the opposite side of the crossing, disturbing as little area as needed to accommodate workers, equipment, and to string, join and inspect the pipe.

3.02 PRESSURE PIPE

A. Assemble and install pipe as specified herein, as shown on Standard Drawings and in accordance with the manufacturer's recommendations and guidelines.

B. Protect pipe and joints during handling against impact, shocks, freefall and gouging.

C. Make joints with equipment and methods recommended by pipe manufacturer.

1 Clean joint contact surfaces immediately prior to jointing; use lubricants, primers, cement or adhesives as recommended by pipe manufacturer.

2 Protect solvent weld joints from damage during cement cure; do not disturb pipe joint until fully cured; maintain joint at required temperature until fully cured.

D. Examine pipe for defects and specification compliance prior to installation; damaged or unsound pipe or pipes with defective joints will be rejected.

E. Remove debris from piping.

F. Prior to beginning each directional bore:

1 Inspect and calibrate steering control system and drill head field locator.

2 Verify that that there is adequate time, equipment, and materials necessary to complete the bore.

3 Review field staking of path and construction plans; provide additional staking of directional bore path at no additional cost to the Owner.

4 Verify location of all utilities; contact the Engineer before proceeding if directional bore path is in conflict with existing utilities or if specified separation distances will not be maintained.

5 Determine drilling fluid mixture to be used based on subsurface soil conditions; additional soil testing will be performed at no additional cost to the Owner.

G. Directional boring and installation of pipe:

1. Select ground entry and exit locations and angles needed to accommodate the installation of the pipe at the horizontal alignment, vertical profile, and to depths shown on the plans; do not exceed the allowable pipe bending limits established by the manufacturer; excavate bore pit as needed.

2. Locate and install pressure relief pits as needed to relieve excessive drilling fluid pressure.

3. Complete boring of pilot hole to alignment and depth necessary to assure that final location of pipe is in general compliance with plans; utilizing the drill head field locator collect and record horizontal alignment and depth of bury at 100 foot intervals.

4. Backream the pilot hole to a diameter between 125% (minimum) and 150% (maximum) of the maximum outside diameter of the pipe material to be installed; 'slugging' of pilot hole is prohibited; exercise care not to 'hump' ground surface or surface of roads, drives, or sidewalks.

5. Before installing pipe, verify all measurements at site; make necessary field measurements to accurately determine piping make-up length.

6. Pull assembled pipe and tracer wire into borehole during last pass by reamer; continuously monitor pullback forces during pullback; limit pull forces so as to prevent damage to pipe; pushing of pipe into borehole to aid with insertion is prohibited; Provide adequate support of pipe during installation; do not allow twisting or binding of pipe in excess of manufacturer's recommendations

7. Connect directionally bored pipe with pipe or appurtenance installed by conventional trench excavation.

8. Clean up and dispose of cuttings and excess drilling fluids in a manner consistent with local, State and Federal requirements.

9. Back-fill excavated bore pit as appropriate. ,

10. Repair damage to ground surface or surface of roads, drives, or sidewalks along path of bore at no additional cost to Owner; remove mounded soils and or surfacing and repair as specified.

11. Length of bore will be equal to pipe length installed between points of connection to appurtenances or to piping installed by other methods, including not more than 20 feet of open trench excavation per bore,

3.03 GRAVITY PIPE

A. Assemble and install pipe as specified herein, as shown on Standard Drawings and in accordance with the manufacturer's recommendations and guidelines.

B. Protect pipe and joints during handling against impact, shocks, freefall and gouging.

C. Make joints with equipment and methods recommended by pipe manufacturer.

1 Clean joint contact surfaces immediately prior to jointing; use lubricants, primers, cement or adhesives as recommended by pipe manufacturer.

2 Protect solvent weld joints from damage during cement cure; do not disturb pipe joint until fully cured; maintain joint at required temperature until fully cured.

D. Examine pipe for defects and specification compliance prior to installation; damaged or unsound pipe or pipes with defective joints will be rejected.

E. Remove debris from piping.

F. Prior to beginning each directional bore:

1. Inspect and calibrate steering control system and drill head field locator.

2. Verify that that there is adequate time, equipment, and materials necessary to complete the bore.

3. Review field staking of path and construction plans; provide additional staking of directional bore path at no additional cost to the Owner.

a. Update staking to reflect elevation of pilot hole that is needed to accomplish the

installation of piping at the flow line elevation shown on the plans.

4. Verify location of all utilities; contact the Engineer before proceeding if directional bore path is in conflict with existing utilities or if specified separation distances will not be maintained.

5. Determine drilling fluid mixture to be used based on subsurface soil conditions; additional soil testing will be performed at no additional cost to the Owner.

G. Directional boring and installation of pipe:

1. Select ground entry and exit locations and angles needed to accommodate the installation of the pipe at the horizontal alignment and vertical alignment shown on the plans; do not exceed the allowable pipe bending limits established by the manufacturer; excavate bore pit as needed.

2. Locate and install pressure relief pits as needed to relieve excessive drilling fluid pressure.

3. Complete boring of pilot hole to alignments and depth necessary to assure that final location of pipe is within allowable tolerance of compliance with plans; utilizing the drill head field locator and other methods, collect and record horizontal alignment and vertical alignment at 50 foot intervals.

4. Allowable tolerance of horizontal and vertical alignment deviation from piping system design as shown on .the plans:

a. Horizontal alignment of pilot hole shall be within +/-2 inches at 50 foot intervals.

b. Vertical alignment of pilot hole shall be within +/-0.1 feet at 50 foot intervals.

c. Retract and repeat directional drilling attempts, until horizontal and vertical alignments are within allowable tolerances, or install gravity sewer piping in accordance with Specification Section 02730.

5. Back-ream the pilot hole to a diameter between 125% (minimum) and 150% (maximum) of the maximum outside diameter of the pipe material to be installed; 'slugging' of pilot hole is prohibited; exercise care not to 'hump' ground surface or surface of roads, drives, or sidewalks.

6. Before installing pipe, verify all measurements at site; make necessary field measurements to accurately determine piping make-up length.

7. Pull assembled pipe into borehole during last pass by reamer; continuously monitor pullback forces during pullback; limit pull forces so as to prevent damage to pipe; pushing of pipe into borehole to aid with insertion is prohibited; provide adequate support of pipe during installation; do not allow twisting or binding of pipe in excess of manufacturer's recommendations.

8. Connect directionally bored pipe with pipe or appurtenance installed by conventional trench excavation.

9. Provide sufficient length of pipe to extend past termination point to allow connection to other pipe sections.

10. Allow minimum of 24 hours for stabilization after installing pipe before making connections to pipe.

11. Mark location and depth of bore with spray paint on paved surfaces, and wooden stakes on non-paved surfaces at each end bores and at 25-foot intervals along bore.

12. Backfill excavated bore pit as appropriate.

13. Clean up and dispose of cuttings and excess drilling fluids in a manner consistent with local, State and Federal requirements.

14. Repair damage to ground surface or surface of roads, drives, or sidewalks along path of bore at no additional cost to Owner; remove mounded soils and or surfacing and repair as specified.

15. Length of bore will be equal to pipe length installed measured from point of connection to piping or manholes, for each size of pipe and type of pipe material along centerline of pipe with no deductions for manholes.

3.04 SERVICE CONNECTIONS

A. Conform to details shown on Drawings.

B. Install saddle wyes; use standard saddle tee and riser in lieu of saddle wye where invert of sewer is 10' or more below ground surface; see Standard Drawing.

C. Place stopper in end of service pipe:

1 Provide weather tight joint on stopper to match that on pipe spigot; block plug to undisturbed earth with 2" x 4" strut.

2 Mark location of sewer service connection with magnetic tape; connect to end of service.

D. Install as recommended by manufacturer.

E. Backfill excavated area after recording exact location of service connection.

3.05 CONNECTIONS BETWEEN DISSIMILAR PIPE

A. Provide and install suitable couplings for joining dissimilar materials.

B. Install compacted granular bedding and backfill on stable trench for 12 inches either side of repair coupling.

3.06 PROTECTION OF WATER SUPPLIES

A. There shall be no physical connection between a public or private potable water supply system and a sewer, or appurtenances thereto, which would permit the passage of any wastewater of polluted water into the potable water supply.

B. Wells: Sewers constructed of standard sewer materials shall not be Iaid within 75 feet of a public well or 50 feet of a private well. Sewers constructed of water main materials may Jl~e laid within 75 feet of a public well and within 50 feet of a private well, but not closer than 25 feet to either.

1. Where above separation is not met, notify Engineer immediately; Engineer will authorize relocation of sewer as required.

C. Horizontal separation of gravity sewers from water mains:

1. Gravity sewer should be separated from water mains by a horizontal distance of at least 10 feet unless:

a. The top of sewer main is at least 18 inches below the bottom of water main and,

b. The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from water main.

2. Where required clearances between sewer and water main cannot be maintained: Use ductile iron pipe as specified for pressure pipe; pressure test and leakage test pipe as

specified herein.

D. Separation of sewer and water main crossovers:

1 Where new sewer crosses over water main or service where top .of sewer is within 18" of bottom of water main or service; provide 20' length of ductile iron pipe for sewer centered on the water main.

2 Support water and sewer pipes and backfill with low permeability soil.

E. Force mains shall be separated at least 4 feet horizontally from water main.

1. Where specified horizontal distance canaot be maintained; notify Engineer immediately; Engineer will authorize relocation of force main or water main as required.

F. Provide all necessary shut-down, repair and relocation of water mains, sanitary sewer or force main where conflicts occur; furnish labor, equipment, pipe and fittings; repair and relocation will be paid for as Extra Work; when broken due to carelessness of Contractor, repair is incidental to construction.

3.07 FIELD TESTS

A. Perform testing in compliance with requirements of Specifications Sections 02730 – Sanitary Sewer Systems and 15042 – Cleaning and Pressure Testing of Pipelines.

END OF SECTION 02230

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: Provisions for material, equipment and labor needed for the construction of a complete and proper water distribution system as shown on the drawings and as specified herein.

B. Related Sections: Drawings and General Provisions of the Contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not necessarily limited to, the following:

Section 02225 - Excavating, Backfilling and Compacting for Utilities
Section 02230 – Horizontal Directional Drilling

1.02 REFERENCES:

A. Furnish all equipment, apparatus and systems and installed in complete accordance with the latest edition or revision of the following applicable codes and standards.

ANSI - American National Standard Institute
ASME - American Society of Mechanical Engineers
ASTM - American Society of Testing Materials
AWWA - American Water Works Association
NBFU - National Bureau of Fire Underwriters
NEC - National Electric Code
NEMA - National Electric Manufacturers Association
UL - Underwriters Laboratories, Inc.
Iowa Code - Applicable State of Iowa Administrative Code
UPC - Uniform Plumbing Code

B. Where conflicts arise between the Contract Documents and code requirements, the latter shall prevail, unless the Contract Documents are more stringent.

1.03 SYSTEM DESCRIPTION:

A. Assume connection point to building service lines as being approximately five feet outside buildings and structures to which service is required, as shown on the Drawings.

1.04 SUBMITTALS:

A. Submit full information on all materials proposed for use on this part of the project 30 days prior to scheduled commencement of work. Include catalog data, dimension drawings, photographs and any such descriptive data as may be requested by the Project Engineer.

1.05 QUALITY ASSURANCE:

A. 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 performance of the work in this Section.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the work and materials of all other trades.

B. Provide only new material. Do not deliver any salvaged or used material with the intent to incorporate such items into the work of this section.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Project Engineer/DNR Construction Inspector and at no additional cost to the Owner.

1.07 PROJECT/SITE CONDITIONS:

A. Survey conditions prior to commencing work. Bring any discrepancies of existing work with the Drawings and Specifications to the attention of the Project Engineer/DNR Construction Inspector.

1. Verify sizes, dimensions, measurements, types and location of existing piping and appurtenances at points of connection.

2. Conduct all field measurements necessary to determine pipe-laying lengths so that pipe can be laid in place without forcing or springing.

3. Bring any discrepancies of existing work with the Drawings and Specifications to the attention of the Project Engineer/DNR Construction Inspector.

B. Observe weather conditions. Attempt no work in frozen conditions without written approval from the DNR Construction Inspector.

C. Make connections to existing mechanical facilities in accordance with the obvious intent of Drawings and Specifications. Claims for extra payments as a result of failure to examine existing conditions at the site will not be accepted.

D. Keep duration of water service interruptions to existing facilities as short as possible.

1.08 MAINTENANCE

A. Provide complete and detailed Operating Instructions, Service and repair sheets in a bound Maintenance Manual for pressure tanks, to cover initial start-up, operating procedures, maintenance and service procedures on all major components provided.

B. Arrange for shipment of Maintenance Manual to coincide with shipment of tanks.

PART 2 - PRODUCTS

2.01 MATERIAL:

A. Pipe and fitting materials 3" size and larger: Use cast iron, ductile iron or plastic unless otherwise indicated or approved in advance by the Project Engineer. Use HDPE pipe if the contractor opts for directional drilling the watermain.

B. Pipe material less than 3" size: Use plastic or galvanized steel.

2.02 PIPE:

A. Cast iron pipe (CIP): Provide ANSI A21.1 18/40,000 psi minimum thickness Class 22, with working pressure of not manufactured in accordance with ANSI A21.6 or ANSI A21.8, less than 150 psi, suitable for five foot cover with flat trench bottom and tamped backfill, unless otherwise shown or specified.

1. Class thickness subject to trench loading.

2. Pipe lining: Standard cement lining, coat inside and out with bituminous coating in compliance with ANSI A21.4.

B. Ductile iron pipe (DIP): Provide ANSI A21.50 manufactured in accordance with ANSI A21.51 and AWWA C151 standards.

1. Minimum standard ductile iron pipe shall be at least thickness Class 52 for 6” to 12” pipe and Class 51 for 16” and larger.

2. Pipe lining: Standard cement lining, coat inside and out with bituminous coating in compliance with ANSI A21.4.

C. Plastic pipes: Provide plastic pipes with a minimum Pressure Class of 160 psi and the outside dimensions of copper tubing.

1. For water piping less than 2" in diameter, use either polybutylene tubing (PB) - AWWA designation C902, ASTM D-2666, or polyethylene (PE) - AWWA designation C901, ASTM D-2737.

a. Polyethylene (PE): ASTM D 1248, high density, Type III, Class C, Standard Code Designation PE 3306, or high density, Type III, Grade P34, Class C, Standard Code Designation PE 3406.

Size and Pressure Class:

½” - DR 9.0 PC 160 psi
DR 7.3 PC 200 psi
¾” - DR 9.0 PC 160 psi
DR 7.3 PC 200 psi
1” - DR 9.0 PC 160 psi

DR 7.3 PC 200 psi

2. For water service 2" and over, use polyvinyl chloride pipe (PVC) - AWWA designation C900, SDR 21.

   a. Polybutylene (PB): ASTM D 2581, Type II, Grade I, Class B, or Type II, Grade I, Class C.
      Size and Pressure Class:

      ½" - DR 11 PC 200 psi
      ¾" - DR 13.5 PC 160 psi
      DR 11 PC 200 psi
      1" - DR 13.5 PC 160 psi
      DR 11 PC 200 psi

C. Copper Service Pipe: Provide copper water tube, Type K, soft temper, for underground service, conforming to ASTM B88 and B251, marked with manufacturer's name, trademark and indication of pipe type.

   1. The outside diameter of the pipe and the minimum weight per foot shall be no less than that listed in ASTM B251, table 11.

2.03 JOINTS AND FITTINGS:

A. Cast iron pipe joints and fittings: Use mechanical joints complying with ANSI A21.11, class 250 and fittings complying with ANSI A21.10.

   1. Water Main Pipe Fittings: Mechanical joints conforming to AWWA Standard C -101, C-104, C- 108, C -110, and C-111, class 22 thickness, coated inside and out with bituminous material in accordance with ANSI A21.4, in lengths of 16 feet or longer.

   2. Provide corrosion resistant steel ties with prime coat and with two coats of corrosion resistant paint and/or 3,000 lbs concrete trust blocks bearing on undisturbed dry soil, where joint separation can be expected at 150 psi pressure.

B. Ductile iron pipe joints and fittings: Use mechanical joints complying with ANSI A21.11, class 250 and fittings complying with ANSI A21.10.

   1. Water Main Pipe Fittings: Mechanical joints conforming to AWWA Standard C -100, C-104, C -110, C -111, C- 150 and C- 151, class 52, coated inside and out with bituminous material in accordance with ANSI A21.4, conforming to the applicable cast iron pipe specifications.

C. Polyvinyl chloride pipe joints and fittings: Use coupling and joining material meeting the requirements of AWWA standard C9OO for PVC pipe 4" through 12" in diameter, 1120 Pressure Pipe Class 12454 -C, or 12454 -B Material, or ASTM D2241 Type I Grade PVC 1120, SDR 26 minimum.

   1. All fittings for PVC piping 4" diameter and larger shall have cast iron mechanical joint.

2. Class Requirements: Do not permit the total system pressure of the water to exceed the Pressure Class listed below:

DR or SDR	Class (psi)	Rating (psi)
SDR 26	95	160
DR 25	100	100
SDR 21	120	200
DR 18	150	150
SDR 17	165	250
DR 14	200	200
SDR 13.5	215	315

3. Determine the pressure in accordance with Appendix A of AWWA C9OO if the anticipated instantaneous velocity change exceeds 2 fps.

4. Use rubber ring bell joints as integral and homogenous part of pipe for PVC pipe less than 4" in diameter.

5. Substitute a push- on or mechanical joint cast iron fitting for PVC pipe 2" through 3-1/2" when a fitting with integral, homogenous rubber 0- ring bell joint cannot be supplied.

6. Provide PVC pipe, coupling and jointing material outside of the range of 4" to 12" in accordance with ASTM Standard D2241 with a rated pressure class in accordance with Appendix A of AWWA C -900.

C. Polyethylene (PE) or polybutylene (PB) pipe joints and fittings: Use joining material meeting the requirement of the standard referenced above for plastic pipe less than 2" in diameter.

2.04 VALVES:

A. Gate valves: Use gate valves manufactured, in accordance with AWWA C -500, with non rising stems, 0 ring stem seal, 2" operating nut, bronze mounted iron body, opening counter-clockwise, as specified for pipe.

1. Valves smaller than 12": Provide units designed for 200 psi working pressure.
2. Valves 14" through 48": Provide units designed for 150 psi working pressure. Provide valves 2" and over in PVC water lines with duck- tipped transition gaskets.

2.05 CURB STOP WITH DRAIN:

A. Curb Stops with Drain: Mueller M -15210, Ford 222 -SW, A.Y. McDonald 4714, or approved equal.

B. Curb Stops without Drain: Mueller M- 15200, or approved equal.

2.06 CORPORATION STOPS:

A. Copper service thread connection outlet: Mueller H- 1500, A.Y. McDonald 4701, Ford F600.

B. For copper and plastic pipes: Mueller compression connection outlet, A.Y. McDonald 4714T, Ford F 1001, F 1002, or equal.

2.07 SERVICE SADDLES:

A. Rockwell, Mueller Company, A.Y. McDonald or approved equal.

2.08 SERVICE BOXES:

A. Mueller H- 10306, A.Y. McDonald 5601, Ford EAl-50-40-45R, or approved equal.

2.09 MARKING TAPE:

A. A visually and electronically detectable tape Type D Terra tape, Griffolyn Co., Houston, TX, or Line Guard 11, Line Guard Incorporated, Weaton, Illinois or equal.

2.l0 AIR RELEASE VALVES:

A. Provide shop tested, air release valves with a working pressure of 150 psi, as shown. Clow F-3076, APCO No. 400 or approved equal.

2.11 HYDRANTS:

A. Flushing Hydrants:

1. Anti-freezing Kupferle Model No. 77 blow-off hydrant or approved equal, with 2" FIP side inlet. The hydrant outlet shall be sized and of a configuration to prevent the attachment of fire hoses.

2. Provide lower hydrant barrel length suitable for six feet of trench depth.

3. Furnish two (2) operating wrenches for each project.

B. Yard hydrants:

1. Woodford Iowa Model Y2 freezeless yard hydrant or approved equal. Set for fove feet burying depth.

2.12 FOUNTAINS:

A. Factory-assembled handicapped accessible pedestal fountain with stainless steel receptor. Projector shall be vandal-resistant, two stream, mound building type. Separate self-closing pushbutton valve with automatic stream regulator. The manufacturer shall certify the unit to be lead-free as defined by the Safe Drinking Water Act. Fountain shall be Halsey Taylor Model 4590FR or an approved equal.

2.13 VALVE BOXES AND MANHOLES:

A. Valve Boxes: 5 1/4" inside diameter, cast Iron, slide type, with cast iron drop cover for valves 12" and smaller.

B. Valve Manholes: 48" precast concentric manholes for reinforce concrete pipe in accordance with ASTM C -478 for all valves larger than 12" diameter or as shown on the drawings.

1. Frame and cover: 2'-6" diameter, Neenah R-1743 or equal.

2.14 PRESSURE TANKS:

A. Pressure Tanks: Vertical, pre-pressurized, hydro-pneumatic, factory built, tank Model WX-451 as manufactured by AMTROL, Inc., West Warwick, R.I. 02893 or approved equal. Pressure tanks do not need to be ASME Certified.
B. Maximum working pressure of 150 psig and maximum operating temperature of 240°F.
C. The tank shall have steel shell and heavy-duty butyl replaceable diaphragm.
D. The tank shall be designed with operating pressure of 20/40 psig with arrangement for changeable operating pressures of 30/50 and 40/60 psig.
E. Provide tank with pressure gauge having a range of 0-100 psi.

2.15 WATER METER:

A. Stenner Water Meter JLP1500-1PPG with PCM, meeting AWWA C -700 Standards for cold type displacement. The

1. Meter should be Stenner or approved equivalent.

2. Provide copper unions on each side of register.

2.16 LIQUID CHEMICAL FEED PUMP & CONTROL:

A. The metering pumps shall be positive displacement peristaltic pumps. Pump materials of contruction shall be suitable for use with the liquids to be pumped. Pump manufacturer shall submit documentation indicating that all the materials selected are compatible with the liquid to be pumped. Materials of construction shall be provided for the pump head, valve body, valves valve seat, pump tubing, drive housing, and base.
B. Power supply will be 120 volt, 60 Hz, single phase. Metering pumps shall have a plug-in type electreical connection.
C. Metering pumps shall have a minimum suction lift of 25'.
D. Pump shall be provided with the following:
   a. Pump base as required for wall or shelf top mounting.
   b. Injection check valve.
   c. Weighted strainer
   d. 20' roll or suction/dishcharge tubing ¼" or 3/8" white.
   e. 1 Spare pump tube.
   f. Installation manual.
E. Pump shall be capable of delivering from 0.2 to 3.0 gpd against a pressure of 100 psi.
F. The pump shall be Stenner 45MPH2 or approved equal.

2.16 OTHER MATERIAL:

A. Provide other material, not specifically described herein but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer/DNR Construction Inspector.

PART 3 EXECUTION:

3.01 EXAMINATION:

A. Examine the area and conditions under which the work of this section will be performed.

B. Bring any conditions that are incomplete or unsatisfactory to the attention of the DNR construction inspector.

1. Correct conditions detrimental to timely and proper completion of the work.

2. Do not proceed until unsatisfactory conditions have been corrected.

C. Make necessary measurements in the field to assume precise fit of items in accordance with the approved design.

3.02 PREPARATION:

A. Conduct trenching and backfilling operations in accordance with Section 02225.

1. Uncover existing mains in sufficient time ahead of pipe laying to determine the extent of fittings for connection.

2. Provide any necessary special fittings to connect existing to new system.

B. Handle pipe accessories so as to ensure delivery to the trench in sound, undamaged condition:

1. Carry pipe into position; do not drag.

2. Use pinch bars or tongs for aligning or turning the pipe only on the bare end of the pipe.

C. Thoroughly clean interior of pipe and accessories before lowering pipe into trench.

1. Keep clean during laying operations by plugging or other method approved by the DNR Construction Inspector.

D. Before installation, inspect each piece of pipe and each fitting for defects:

1. Replace material found to be defective before or after laying, with sound material

meeting the specified requirements, and without additional cost to the Owner.

2. Visually inspect for cracks or defects and reject any damaged or unsound pipe.

E. Rubber gaskets: Store in a cool, dark place until just prior to time of installation.

F. Locate water pipe at least ten feet away, horizontally, from sewer pipes.

1. Where bottom of the water pipe will be at least 12" above top of the sewer pipe, locate water pipe at least six feet away, horizontally, from the sewer pipe.

G. Where water lines cross under gravity-flow sewer lines, fully encase the sewer pipe in concrete for a distance of at least ten feet each side of the crossing, or provide pressure pipe with no joint located within 36" of the crossing.

1. Cross water lines in cases above sewage force mains or inverted siphons at least 24" above the sewer line.

2. Encase in concrete those joints in the sewer main closer, horizontally, than 36" to the crossing.

3. Verify with and obtain approval for water/sewer conflict resolution from the DNR Construction Inspector.

H. Do not place water lines in the same trench with sewer lines or electric wiring.

3.03 PIPE INSTALLATION:

A. General:

1. Install all pipe in strict accordance with drawings and/or specifications, AWWA Standard C -600, manufacturer's recommendations, and in the best commercial trade practice.

a. Supply and properly use any special tools required for laying, jointing, cutting, etc.

b. Clean all pipe before laying and keep it clean until accepted in the completed work.

c. Lay pipe conforming accurately to the lines and grades given.

d. Keep the trench free of water at all times during pipe laying operations.

e. Do not use hooks to install or move pipe.

2. Lay bell and spigot pipe with the bells upgrade.

a. Lay all types of piping, fitted together so that, when complete, the pipe will have a smooth and uniform invert.

b. Swab each length of pipe laid to remove all foreign material before the next length is laid.

c. Inspect each pipe for defects before it is lowered into the trench.

3. Install all piping for which no location dimensions are in a neat and workmanlike manner in accordance with the best trade practice.

a. Wherever possible, group runs and rises kept parallel.

b. Properly lay out all piping to clear obstructions such as equipment, larger-sized pipes, etc.

4. Do not, under any conditions, let the pipe be laid against the walls of trench.

a. Allow a minimum distance of 12" from exterior of pipe to each trench wall.

b. Take additional precautions to prevent rocks or other large objects from lodging against the pipe during backfill.

5. Install all equipment in strict accordance with the Drawings and the manufacturer's specifications.

6. Inspect all pipe, fittings, couplings, apparatus and equipment for defects or obstructions.

a. Remove all defective material from the site.

7. Use a water- tight plug to prevent ingress of water and other foreign material into open ends of water pipe.

a. Retain the plug in position during any period, such as overnight, longer than one- half hour when pipe laying is not in progress.

b. Retain the plug in position until the bottom of trench is pumped dry.

c. Plug or cap and block pipe ends and fittings left for future connection.

8. Terminate service lines to facilities to be constructed by others, at the location indicated on the Drawings.

a. Cap the termination point if the service line between the facility and the termination point is not in place.

B. Pipe cutting:

1. Cut pipe neatly and without damage to the pipe.

3. Unless otherwise recommended by the pipe manufacturer and authorized by the Project Engineer, only cut pipe with authorized mechanical cutter.

a. Use wheel cutter when practicable.

b. Cut plastic pipe square and remove all burrs.

C. Pipe laying:

1. Lower pipe and accessories into trench using ropes, derrick, belt slings or other equipment approved by the Project Engineer.

2. Do not dump or drop any of the materials of this Section into the trench.

3. Except where necessary in making connections to other lines, lay pipe with the bells facing in the direction of laying.

4. Rest the full length of each section of pipe solidly on the pipe bed, with recesses excavated to accommodate bells, couplings and joints.

5. Take up and relay pipe that has the grade or joint disturbed after laying.

6. Do not lay pipe in water, or when trench conditions are unsuitable for the work; keep water out of the trench until joining is complete.

7. Securely close open ends of pipe, fittings and valves when work is not in progress.

8. Where any part of coating or lining is damaged, repair to the approval of the Project Engineer and at no additional cost to the Owner.

D. Plastic pipe laying:

1. Position pipe and fittings in trench in a manner that identifying markings will be readily visible for inspection.

2. Cutting and joining:

a. Protect against abrasion from holding devices.

b. Remove burrs and glosses from surfaces to be jointed. Use abrasive paper, file or steel wool.

c. Remove dirt, dust and moisture by wiping clean with chemical cleaner or dry cloth.

d. Using a pure bristle paint brush, apply an even coat of the specified solvent cement in the fitting socket and on the surface of the pipe to be joined.

e. Promptly insert pipe into bottom of the fitting socket; turn the pipe slightly to assure an even distribution of cement.

f. Remove excess solvent cement from exterior of the joint.

g. Should cement begin to dry before the joint is made, reapply cement before assembling.

h. Allow at least one hour for the joint to gain strength before handling or installing the pipe.

3. Do not thread plastic pipe; make connections only with the solvent cement or with special adapter fittings designed for this purpose.

4. Align pipe system components without strain.

5. Support piping at intervals of not more than four feet, at ends, branch fittings, and change of direction or elevation.

6. Support plastic pipe in trenches with a 3" layer of sand.
7. Allow no rocks, debris or potentially damaging substances within 6" of plastic pipe in trenches.

8. Install PVC pipe in accordance with manufacture's recommendations

E. Connections: Use specials and fittings to suit the actual conditions where connections are made between new work and existing mains.

1. Use only those specials and fittings approved by the utility having jurisdiction.

F. Sleeves:

1. Where pipe passes through walls of valve pits or structures, provide cast iron wall sleeves.

2. Fill annular space between walls and sleeves with rich cement mortar.

3. Fill annular space between pipe and sleeves with mastic.

G. River and lake crossing: Provide for river and lake crossings as shown on the drawings.

1. Install pipe in trench with a minimum of 6'-0" of cover over the top of the pipe.

2. Place excavated material over the pipe to a depth of 2'-0" over the pipe.

3. Place stone riprap in the remaining 4'-0" of depth above the pipe.

a. Unless otherwise indicated on the Drawings or specified elsewhere provide riprap consisting of crushed limestone, dolomite, or quartzite with 90 to 100 percent passing a four-inch sieve and 0 to 10 percent passing a one- half inch sieve.

4. Dispose of excess excavated material at a waste disposal site shown on the Drawings, or if not shown, selected by the DNR Construction Inspector.

H. Water Main Pipe on steep slopes:

1. Unless otherwise indicated on the Drawings, install PVC pipe on steep slopes with anchors at each joint.

2. Unless otherwise shown on the Drawings, provide a 2'-0" square by l'-0" thick concrete anchor poured over the top of pipe.

3. At "the Contractor's option, class 22 cast iron pipe with restraining fittings (Clow F-1058 or equal) may be use instead of PVC pipe with anchors, at no additional cost to the owner.

I. PVC Water Main: Support continuously and uniformly over the entire length on firm and stable material.

1. Install with one foot additional cover, as indicated on the Drawings.

2. Do not use blocking for intermittent support across excavated sections or to change pipe grade.

J. Detectable tape: Install detectable tape one (1) foot below the ground surface during backfilling or by plowing at a latter date.

1. Install 2" wide detectable tape in trench over PVC main at a depth of l'-0" to 2'-0" below ground surface.

3.04 JOINTING:

A. Cast iron pipe, ductile iron pipe, mechanical joints, and push- on type joints: Install in accordance with AWWA C600, modified as necessary by the recommendation of the manufacturer to provide for special requirements of ductile iron pipe.

B. Make connection between different types of pipe and accessories with transition fittings.

C. Rubber gaskets: Handle, lubricate where necessary, and install in strict accordance with the recommendations of the manufacturer.

3.05 SETTING VALVES, VALVE BOXES AND HYDRANTS:

A. General:

1. Center valve boxes on the valves, setting plumb.

2. Tamp earth fill around valve box to a distance of four feet on all sides, or to the undisturbed trench face if less than four feet.

3. Tighten stuffing boxes, and fully open and close each valve to assure that all parts are in working condition.

B. Valves:

1. Install with stems vertical and centered in manhole or box.

2. Check and tighten valve bolts when up to operating pressure.

3. Support valves in manholes as necessary.

4. Inspect valves in open and closed position to verify proper operating condition.

5. Provide valve box or manhole for each valve.

C. Service boxes:

1. Where water lines are located below paved streets having curbs, install boxes directly back of the curbs.

2. Where no curbing exists, install boxes in accessible locations beyond limits of street surfacing, walks and driveways.

D. Hydrants:

1. Install Hydrants in accordance with the Drawings and manufacturer's recommended installation procedure.

3.06 PRESSURE TANKS:

A. Install pressure tanks in accordance with manufacturer's recommended installation procedure.

3.07 THRUST BLOCKS:

A. General:

1. Provide thrust blocks, metal tie rods and clamps, lugs, on plugs, caps, tees and bends deflecting 22- 1/2 degrees or more either vertically or horizontally, and on water lines 6" in diameter or larger.

2. Provide concrete thrust blocking with a compressive strength of 2500 psi in 28 days.

B. Installation:

1. Locate thrust blocking between solid ground and the fitting to be anchored.

2. Unless otherwise shown or directed by the Project Engineer, place the base and thrust bearing sides of thrust blocking directly against undisturbed earth.

3. Sides of thrust blocking not subject to thrust may be placed against forms.

4. Place thrust blocking so the fitting joints will be accessible for repair.

5. Protect steel rods and clamps by galvanizing or by coating with bituminous paint.

3.08 FIELD QUALITY CONTROL:

A. Closing uninspected work: Do not allow or cause any of the work of this Section to be covered up or enclosed until after it has been completely inspected and tested, and has been approved by the DNR Construction Inspector.

B. Hydrostatic tests:

1. Where any section of a water line is provided with concrete thrust blocking for fittings, do not make hydrostatic tests until at least five days after installation of the concrete thrust blocking, unless otherwise directed by the Project Engineer.

2. Flush out main before test to remove air, insert taps to release trapped air and plug after test.

3. Test at 150 percent of maximum operating pressure for one (1) hour. Allowable pressure drop during test period shall be 10 percent of test pressure.

4. Devise a method for disposal of waste water from hydrostatic tests, and for disinfection, as approved in advance by the DNR Construction Inspector.

C. Pressure tests:

1. After the pipe is laid, the joints completed, fire hydrants permanently installed, and the trench partially backfilled leaving the joints exposed for examination, subject the newly laid piping and valved sections of water distribution and service piping to a hydrostatic pressure of 100 psi.

2. Open and close each valve several times during the test.

3. Carefully examine pipe, joints, fittings and valves.

4. Replace or remake joints showing visible leakage.

   a. Remote cracked pipe, defective pipe, and cracked or defective joints, fittings and valves.

   b. Replace with sound material and repeat the test until results are satisfactory.

   c. Make repair and replacement without additional cost to the Owner.

D. Leakage test:

1. Conduct leakage test after the pressure test has been completed satisfactorily.

2. Duration of each leakage test: At least two hours.

3. During the test, subject water lines to a pressure of 100 psi.

4. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

a. No piping installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula:

$$\frac{ND \times \text{SQ. ROOT OF } P}{3{,}700} = L$$

b. L = allowable leakage in gallons per hour;

c. N = number of joints in length of pipe under test;

d. D = nominal diameter of pipe in inches; and

e. P = average test pressure in lbs per sq. inch.

f. Should any test of pipe disclose leakage greater than that specified, locate and repair the defective joint or joints until the leakage is within the specified allowance, and at no additional cost to the Owner.

5. Verify the allowable leakage per 1000 it of pipe in gallon per hour for any specific test pressure above 100 with the DNR Construction Inspector.

E. Time for making test:

1. Except for joint material setting, or w ere concrete reaction backing necessitates a five-day delay, pipelines jointed with rubber gaskets, mechanical, or push- on joints or couplings may be subjected to hydrostatic pressure, inspected and tested for leakage at any time after partial completion of backfill.

3.09 DISINFECTION:

A. Before acceptance of the potable water system, disinfect each unit of completed water supply, distribution, and service line in accordance with AWWA C601.

1. Perform all such tests and disinfection in a manner approved by governmental agencies having jurisdiction.

2. Furnish two copies of a Certificate of Disinfection to the Project Engineer.

B. Arrange with Owner to notify customers in affected areas that service will be discontinued or water will be unpalatable during disinfection period.

C. Disinfecting: Provide a minimum residual chlorine content of 50 ppm in water main; allow system to stand full of solution for 24 hours, by use of one of the following methods:

1. Inject a solution of calcium hypochlorite and water at a slow rate into water main.

a. Use chlorine tablets securely fastened to pipe in accordance with manufacturer's recommendations followed by slowly filling voter main in such a manner as to not dislodge the tablets from the wall of the pipe.

D. Chlorination Requirement: Before being placed into service, chlorinate all new mains and repaired portions of or extensions to, existing mains so that a chlorine residual of not less than twenty- five (25) mg/1 remains in the water after standing twenty- four (24) hours in the pipe.

l. Chlorine dosage shall be at least 5O mg/1 initially.

E. Method of Application: Apply chlorine by one of the following methods, subject to approval by the Engineer.

1. Liquid Chlorine: Use a solution- feed chlorinating device to apply a chlorine gas-water mixture, or feed the dry gas directly through proper devices to regulate the rate of flow and provide an effective diffusion of the gas into the water within the pipe being treated.

   a. Chlorinating devices for feeding solutions .of the chlorine gas, or the gas itself, must be able to prevent the back- flow of water into the chlorine.

2. Chlorine- Bearing Compounds in Water: Substitute a mixture of water and high- test calcium hypochlorite (65- 70% Cl) for the chlorine gas water mixture.

   a. Mix the dry powder first as a paste and then add water to obtain a one (1) percent solution for a total quantity of seven and five tenths (7.5) gallons of water per pound of dry powder.

   b. Inject this solution in one end of the section of main to be disinfected while filling the main with water as shown in the following table:

Chlorine Requirements to Produce 50MG/L Concentration in 100 Feet of Pipe - by Diameter

Pipe Size Inches	100% Chlorine, Lb.	1% Chlorine Solution, Gals.
4	0.027	0.33
6	0.061	0.13
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

3. Tablet Disinfection: Use this method for short extensions (up to 2,500 feet) and smaller diameter mains (up to 12 inch).

   a. Utilized only when scrupulous cleanliness has been used in construction since preliminary flushing must be eliminated.

   b. Do not use this method if trench water or foreign material has entered the main or if the water is below 41°F.

   c. Place tablets in each section of pipe, hydrants, hydrant branches, and other appurtenances, attached at the top of the main by an adhesive, such as Permatex No.1 or equal as approved by the Engineer.

d. Crush and place tablets in joints between pipe sections, hydrants, hydrant branches, or appurtenances inside the annular space, or rubbed like chalk in butt ends to coat sections if the type of assembly does not permit crushing.

e. In filling a section of piping with water when using the tablet method, water velocity shall be less than one (1) foot per second.

F. Flushing: Flush sections of pipe to be disinfected to remove any solids or contaminated material which may have become lodged in the pipe.

1. Provide a tap large enough to develop a velocity of at least two and five-tenths (2.5) feet per second, if no hydrant is installed at the end of the main.

a. Two and one-half (2.5) inch hydrant openings will, under normal pressures, provide this velocity in pipe sizes up to and including twelve (12) inch.

b. Provide taps 2" size and smaller required for chlorination or flushing purposes, or for temporary or permanent release of air, as a part of the construction of water mains.

c. Taps larger than 2" shall be paid for as a bid item or as an extra.

G. Minimum free chlorine residual at pipe extremities: 10 ppm at end of test period; if requirement is not met, repeat disinfection procedure.

H. Operate all valves and hydrants in new main to assure full disinfection and repeat test procedure if necessary.

I. Thoroughly flush main after test until extremities indicate same chlorine residual as supply water.

J. After completion of disinfection and flushing, collect bacteriological samples and submit for laboratory testing.

1. Sample must test "safe" before Owner will accept the work.

3.10 PROTECTION:

A. Paint valves, pipe and vents in accordance with the provisions of Section 09900.

END OF SECTION 02660

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: Seedbed preparation and application of seed mixtures and fertilizer to all areas designated on the Drawings or all areas within the boundaries of this project having been disturbed by works of this project and not receiving finished surfacing, as determined by the DNR Construction Inspector and as specified herein.

B. Related Sections: Drawings and General Provisions of the Contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not necessarily limited to, the following:

Section 02200 - Earthwork

1.02 REFERENCES:

A. Standards of materials and construction shall conform with the Standard Specifications for Highway and Bridge Construction, 2009 Series of the Iowa Department of Transportation.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Perform all work of this section in accordance with the requirements of the "Standard Specifications" 2009 I.D.O.T. Section 2601.

1.04 PROJECT/SITE CONDITIONS:

A. Environmental Requirement:

1. Weather conditions shall be observed. Seeding shall be performed only during normal application periods, optimum temperature, moisture and climatic condition to promote germination and plan growth. Normal application periods are between March 1 and May 31 and between August 10 and September 30.

B. Existing Conditions: Survey job conditions prior to commencing work. Bring any discrepancies between existing work and the Drawings and Specifications to the attention of the Project Engineer/DNR Construction Inspector.

1.05 SEQUENCING AND SCHEDULING:

A. Properly coordinate the work of this section with all other trades.

B. Do not start the work of this section until the work of all other trades has been completed unless otherwise approved by the DNR Construction Inspector.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. All topsoil used for seedbed shall be in accordance with Section 02200.

B. All seeds shall be "redtag" quality or better supplied from the latest available crop, free of noxious weed seed and supplied in the following varieties and percentages of weight.

C. Provide mixture of types and quantities as specified herein for seeding of areas designated by the Project Engineer, the DNR Construction Inspector as indicated on the Drawings, and as specified herein.

1. Class "A" Mixture: For areas to remain in semi-natural state where mowing is required only as a temporary control measure.

Fescue, Kentucky 31	25 lbs. per acre
Switchgrass (Blackwell)	8 lbs. per acre
Alfalfa (Northern Grown)	5 lbs. per acre
Birdfoot Trefoil (Empire)	4 lbs. per acre
Alsike Clover	4 lbs. per acre

2. Class "B" Mixture: For same situation as where Class "A" mixture is used but where a lighter mix is preferable.

Fescue, Kentucky 31	20 lbs. per acre
Switchgrass (Blackwell)	3 lbs. per acre
Alfalfa (Northern Grown)	4 lbs. per acre
Birdfoot Trefoil (Empire)	4 lbs. per acre
Alsike Clover	4 lbs. per acre

3. Class "C" Mixture: For area designated as fine seeded, lawns or other mowed grass areas.

Bluegrass, Kentucky	70%
Ryegrass, Perennial, Fineleaf	10%
Fescue Creeping Red	20%

4. Class "D" Mixture: For all areas, unless otherwise specified, where a prairie grass in natural state is required.

Big Bluestem	30 lbs. per acre
Switchgrass (Blackwell)	5 lbs. per acre
Sideoats Grama	5 lbs. per acre
Little Bluestem	5 lbs. per acre

D. Seed is to be delivered on site in separate packaging for each individual type of seed within each mixture and mixed in the presence of the DNR Construction Inspector if required. Commercial mixture in the quantities as specified will be acceptable at the discretion of the DNR Construction Inspector, if these quantities are verifiable.

E. Seed mixture for this project to be Class "A" mixture.

2.02 FUNGICIDE:

A. All seeds for permanent seeding shall be treated with a non-mercurial fungicide (75% concentration or equivalent) at the rate of 5-1/2 ounces per 100 pounds of seed.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 SEEDBED PREPARATION:

A. The area to be seeded shall be raked or graded to fill washes or gullies. Pick up and dispose of all debris, including stones, boulders, logs, stumps, or other foreign material that will interfere with the seeding operation.

3.03 FERTILIZER APPLICATION:

A. Spread fertilizer over the area at the rate of 750 pounds per acre of 15-15-15 (or equivalent).

B. Unless otherwise indicated, spread all fertilizer with a mechanical spreader which will secure a uniform rate of application.

C. Spread fertilizer after the preliminary preparation of seedbed and prior to the sowing of any seeds.

D. Disk the fertilizer and roll the area prior to seeding.

E. On area inaccessible to field machinery, spread fertilizer after preparation of the seedbed and thoroughly rake into the soil.

F. Application of fertilizer in combination with seeding by hydraulic seeder as specified in I.D.O.T. Section 2601.04H will be acceptable at the discretion of the DNR Construction Inspector.

3.04 SEED APPLICATION:

A. Preparation: Mix all seeds specified for this project thoroughly at the project site prior to placing in spreading equipment.

B. On all areas accessible to field machinery, all grass seeds may be sown with a gravity, cyclone or hydraulic seeder as specified herein. On areas inaccessible to field machinery, the use of hand-cyclone seeder will be permitted.

C. Apply seed mixture at a rate of four pounds per 1,000 square feet, unless otherwise indicated, during fair, calm weather. One half of the seed mixture shall be sown in one direction and the remainder at right angles to the first sowing.

3.05 SEED APPLICATION IN MAINTAINED LAWNS:

A. For maintained lawns to be seeded as part of this project, apply fertilizer prior to preparation of the seedbed.

B. A rotary tiller will be required for preparation of the seedbed. The seedbed after tilling will be raked firm, smooth and free of clods, rocks and other debris.

C. Roll the seedbed shall both before and after the application of seeds. Apply seeds over damp soil by broadcast seeding.

D. Roll, seed, and fertilize by hand or with hand operated equipment in areas inaccessible to field equipment.

3.06 SPRING OVERSEEDING:

A. Seedbed preparation will not be required provided the overseeding is applied when the ground is free from frost action after March 1 and before April 1 or as directed by the DNR Construction Inspector.

3.07 MOWING:

A. When requested by the DNR Construction Inspector, mowing may be required prior to permanent seeding or anytime during the growing season.

3.08 MULCHING:

A. All seeded areas are to be mulched unless otherwise designated in the contract documents.

B. All areas requiring mulch are to be mulched as soon as seed is sown and final rolling is completed.

C. Mulch is to be evenly and uniformly distributed and anchored into the soil. The application rate for reasonably dry material shall be approximately 1-1/2 tons of dry cereal straw, 2 tons of wood excelsior, or 2 tons of prairie hay per acre, or other approved material, depending on the type of material furnished.

1. All accessible mulched areas are to have mulch consolidated into the soil with a mulch stabilizer, and slope areas are to be tucked on the contour.

2. Crawler type or dual wheel tractors are to be used for the mulching operation. Equipment is to be operated in a manner to minimize displacement of the soil and disturbances of the design cross section.

END OF SECTION 02930

For Demolition of structures please refer to Division 10, Section 10,010 of Iowa SUDAS standard specification

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. Furnishing all labor, materials, and equipment for a complete and satisfactory installation of systems shown on the Drawings and as specified herein, including, but not limited to the following:

   a. Floor Drains
   e. Pipe, Fittings, Valves, and Gates
   f. Hangers, Sleeves, and Inserts
   g. Insulation and Pipe Covering
   h. Water Service and Meter Installation
   m. Cutting and Patching
   n. Flashing and Sealing
   o. Excavation and Backfilling
   p. All items shown or scheduled on the Drawings related to plumbing work.

2. The omission of direct reference to an essential part, the necessity of use of which is reasonably implied shall not release the Contractor from providing the same.

B. Related Sections: Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not necessarily limited to, the following:

Section 02200 Earthwork
Section 26600 Water Distribution System

1.02 REFERENCES:

A. All equipment, apparatus and systems shall be furnished and installed in complete accordance with the latest edition or revision of the following applicable codes and standards.

1. ASME American Society of Mechanical Engineers
2. ASTM American Society of Testing Materials
3. AWWA American Water Works Association
4. NBFU National Bureau of Fire Underwriters
5. NEC National Electrical Code
6. NEMA National Electric Manufacturers Assoc.
7. UL Underwriters Laboratories, Inc.
8. NPC National Plumbing Code
9. CIPRACast Iron Pipe Research Association
10. Iowa Code Applicable State of Iowa Administrative Code

B. Where conflicts arise between the plans and code requirements, the latter shall prevail, unless the plans are more stringent.

1.03 SUBMITTALS:

A. Provide submittals in accordance with Division 1300.

B. Submit full information on all materials proposed for use on the project 30 days prior to scheduled commencement of work.

1. Include catalog data, dimension drawings, photographs and such descriptive data as may be requested by the Architect, all in accordance with the requirements of Supplementary General Covenants and Provision.

2. Do not purchase nor install material until they have been approved for use by the Architect.

C. Before final acceptance of the project, furnish to the Architect four copies each of operating manuals, maintenance manuals, and parts lists for each specific model of equipment furnished.

1.04 QUALITY ASSURANCE:

A. Workmanship: Work shall be performed by trained, skilled, experienced plumbers under the full-time supervision of a competent supervisor.

B. Materials: New and of grade and quality specified or scheduled.

C. Testing: Test building sewer system and building water system in accordance with Section 318 of the Uniform Plumbing Code (UPC).

1. Schedule with and conduct testing of systems in the presence of the DNR Construction Inspector.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.06 PROJECT/SITE CONDITIONS:

A. Survey of conditions prior to commencing work.

1. Report any discrepancies between existing work and the Contract Documents to the attention of the Architect/DNR Construction Inspector.

B. Observe weather conditions. Attempt no work in frozen conditions without written approval from the DNR Construction Inspector.

C. Make connections to existing mechanical facilities in accordance with the obvious intent of the Contract Documents.

1. Claims for extra payments as a result of failure to examine existing conditions at the site will not be accepted.

1.07 SEQUENCING AND SCHEDULING:

A. Contact other trade contractors and advise them of plumbing work that requires built-in anchors, mounting assemblies, or other attachments.

B. Furnish anchors, mounting assemblies, or other attachments to other trade contractors for setting.

C. Locate and size openings for other trade contractors.

D. Prior to commencement of any work, and before any equipment is purchased, check Contract Documents for every trade and job condition; check all interior and exterior sewers for interferences; verify that new sewers can be drained by gravity into present sewer connections or future sewer connections without trapping.

E. Report any discrepancies between work, Contract Documents, or job conditions immediately to the Engineer in writing. Position all fixtures, equipment, devices, piping, outlets, etc., to avoid interferences with and to assure proper coordination with the work of all other trades, cases, partitions, walls, cabinets, counters, wall, floor and ceiling patterns, architectural features, etc.

F. Coordinate recessed devices, fixtures, etc., with wall, floor, and ceiling patterns.

1.08 WARRANTY:

A. Provide equipment as specified under this section, covered by the manufacturer's standard warranty or guarantee on new equipment.

1. Guarantee equipment for a minimum of one year from the date of final acceptance of the project.

B. Guarantee the entire installation, including every part and every specialized system, from the standpoint of workmanship and material, for one year after formal acceptance by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Water Piping in Building:

1. Cold water, hot water, and tempered water circulating lines 1-1/2" and smaller shall be hard drawn copper Type-L.

2. Below grade and below slab water lines shall be Type-K copper.

3. Polybutylene tubing and fitting (PB) SDR11 in accordance with the latest edition of ASTM D3309.

4. Chlorinated Polyvinyl Chloride (CPVC): Tubing SDR11 in accordance with the latest edition of ASTM D 2846 or IPS pipe schedule 40 or 80 in accordance with ASTM F441.

5. Chlorinated Polyvinyl Chloride (CPVC) Fittings: For SDR 11 in accordance with ASTM D 2846, for IPS pipe schedule 40 in accordance with ASTM F438 and for IPS pipe schedule 80 with ASTM F439.

6. Solvent Cement: For chlorinated polyvinyl chloride (CPVC) tubing and pipes in accordance with ASTM F 493.

B. Water Piping Outside Building:

1. Cast Iron Pipe: Comply with ANSI A21.6 or ANSI A21.8, with working pressure of not less than 150 PSI unless otherwise shown or specified.

2. Ductile Iron Pipe: Comply with ANSI A21.51 and AWWA C151 standards. Minimum standard ductile iron pipe shall be at least thickness class 50.

3. Plastic Pipes:

a. For water piping less than 2" in diameter, use either polybutylene tubing (PB)-AWWA Designation C902, ASTM D-2666, or polyethylene (PE)-AWWA Designation C901, ASTM D-2737, with a pressure class of 160 PSI and outside dimensions of copper tubing.

b. For water service 2" and over, use polyvinyl chloride pipe (PVC)-AWWA Designation C900, SDR 21.

4. Cast Iron or Ductile Iron Pipe Joints and Fittings: Use mechanical joints and fittings complying with ANSI A21.11 as modified by ANSI A21.51 for ductile iron pipe, with push-on joints complying with ANSI A21.11 for cast iron and ANSI A21.51 for ductile iron.

5. Polyvinyl Chloride Pipe Joints and Fittings:

a. Use coupling and joining material meeting the requirements of AWWA standard C900 for PVC pipe 4" through 12" in diameter, all fittings for PVC piping 4" diameter and larger shall be cast iron mechanical joint.

b. Use rubber ring bell joints as integral and homogenous part of pipe for PVC pipe less than 4" in diameter.

c. Substitute a push-on or mechanical joint cast iron fitting for PVC pipe 2" through 3-1/2" when a fitting with integral, homogenous rubber O-ring bell joint cannot be supplied.

6. Polyethylene (PE) or Polybutylene (PB) Pipe Joints and Fittings: Use joining material meeting the requirement of the standard referenced above for plastic pipe less than 2" in diameter.

C. Pipe Wrapping: Scotchrap 0.020" thick tape.

2.02 COMPONENTS:

A. Corporation Stops:

1. Copper Service Thread Connection Outlet: Mueller H-1500, A. Y. McDonald 4701, Ford F 600.

2. For Copper and Plastic Pipes: Mueller compression connection outlet, A. Y. McDonald 4714T, Ford F 1001, F 1002, or approved equal.

B. Service Saddles: Rockwell, Mueller Company, A. Y. McDonald or approved equal.

C. Service Boxes: Mueller H-10306, A. Y. McDonald 5601 Ford EA1-50-40-4SR, or approved equal.

D. Curb Stop with Drain:

1. For Copper Pipes Both End: Mueller M-15210, Ford Z22-SW, A. Y. McDonald 4714, or approved equal.

2. For Copper and Plastic Pipes: Mueller 110 compression connection, A. Y. McDonald 4714-T, Ford or approved equal.

E. Valves:

1. Gate valves 3" and smaller, 125 SWP, Nibco, Inc., Series 113 or approved equal.

2. Globe valves 3" and smaller, 125 SWP, Nibco, Inc., Series 211 or approved equal.

3. Check valve 3" and smaller, 125 SWP, Nibco, Inc., Series 413 or approved equal.

4. Gas cock 2" and smaller, 125 PSI, Crane, Series 1228 or approved equal.

5. P&T relief valve, Watts Regulator ANSI 221.22 or approved equal.

F. Water Meter:

Stenner Water Meter JLP1500-1PPG with PCM, meeting AWWA C -700 Standards for cold type displacement. The

1. Meter should be Stenner or approved equivalent.

2. Provide copper unions on each side of register.

G. Floor Cleanout: Jay R. Smith Co. No. 4020 or equal.

H. Grade Cleanout: Jay R. Smith Co. No. 4591, or equal.

I. Wall Cleanout: Jay R. Smith Co. No. 4515 or equal.

J. Floor Drains: Jay R. Smith Company 2040 Series with round grate nickel-bronze or equal.

2.03 ACCESSORIES:

A. Isolation: Isolating Dielectic Unions: EPCO, or approved equal.

B. Pipe Insulation:

1. Cold water piping concealed in wall or ceiling 1" thick snap on type with integral all service cover as manufactured by Certainteed Corp., Gustin-Bacon, Johns-Manville Sales Corp., or approved equal.

2. Hot water and tempered water lines 1" thick snap on type with integral all service cover by Certainteed Corp., Gustin-Bacon, Johns-Manville Sales Corp., or approved equal.

C. Marking Tape: A visually and electronically detectable tape: Type D Terra tape, Griffolyn Co., Houston, Texas, or Line Guard Type 11 detectable, Line Guard Incorporated, Wheaton, Illinois or approved equal.

D. Flow Controls: Unless otherwise specified, flow controls shall limit water to 3 GPM for showers, 0.5 GPM for lavatories in public restrooms, and 2 GPM for lavatories in all other buildings as manufactured by Symmons Industries, Chicago Faucet Company or Speakman Company.

E. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

2.04 WATER TREATMENT SYSTEM:

A. Provide liquid chlorine feed system for iron removal including 20-gal. solution tank with 30 GPD metering pump, and Triplex Progressive Flow HGF-36 Cullsorb Iron Filtration System complete with accessories for a working system to remove 16 ppm of iron. (See Attachment II for water analyses report)

B. Provide water softening system. Duplex Alternating Culligan Systems Hi-Flo 3e Softener HCE-300-2 HWB G, including Brine System and other accessories for a complete system (see Attachment II for water analyses).

C. PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine the substrate surfaces, conditions, and embedded attachments that plumbing work will be applied or attached to.

B. Any conditions that are incomplete or unsatisfactory shall be brought to the attention of the Engineer or DNR Construction Inspector.

C. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION:

A. Verify layout, check clearances, sleeves, openings, proposed supports and substrates for installation of plumbing work.

B. Furnish anchors and support equipment that is to be cast-in-place or set-in-place, to other trades for installation. Coordinate location and installation requirements with other trades.

C. All pipe scheduled for underground installation shall be placed as early as possible.

D. Trenching:

1. Excavate trenches straight and true with uniform grade at bottom, free of rock projections and with a pipe cushion consisting of natural undisturbed soil or compacted sand.

2. Provide trench width minimum 16" for main drainage and soil pipe, and cover below finish grade as indicated in Section 02220 or as directed by agencies having jurisdiction.

3. Where conditions require variance from these minimums, obtain Engineer prior approval before proceeding with work.

a. Any variances approved by the Engineer shall be at no additional cost to the Owner.

E. Backfilling:

1. Backfill as soon as pipeline has been completed, inspected, and approved by Engineer/DNR Construction Inspector.

2. Use backfill materials free of rocks, large clods, roots, debris and any foreign matter, and compact in 6" layers to 95 percent compaction.

3.03 INSTALLATION:

A. General:

1. Install all pipe in accordance with manufacturer's recommendations, the Contract Documents and in the best commercial trade practices.

    a. Supply and properly use any special tools required for laying, jointing, cutting, etc..

    b. Clean pipe thoroughly before laying and keep clean until accepted in the completed work and lay conforming accurately to the lines and grades given.

    c. The trench free of water at all times during pipe laying operations.

2. Lay bell and spigot pipe with the bells upgrade. Lay and fit all types of piping together so that, when complete, the pipe will have a smooth and uniform invert.

    a. Thoroughly swab each length of pipe laid to remove all foreign material before the next length is laid.

    b. Inspect each pipe for defects before it is lowered into the trench.

3. Install all piping for which no location dimensions are shown in accordance with the best trade practice.

    a. Wherever possible, group runs and rises and keep parallel.

    b. Properly lay out all piping to clear obstructions such as equipment, larger sized pipes, etc.

4. Do not lay pipe against wall of trench.

    a. Allow a minimum distance for exterior of pipe to trench wall of 12 inches.

    b. Take additional precautions to prevent rocks or other large objects from lodging against the pipe during backfill.

5. Installed all equipment in strict accordance with manufacturer's specifications and as shown on the Drawings.

6. Install all horizontal waste and soil piping within the building with uniform pitch of 1/4" per foot.

7. Pitch all vents for adequate drainage.

8. Inspect all pipe, fittings, couplings, apparatus, and equipment for defects or obstructions.

9. Remove all defective material from the site.

B. Water System:

1. Install water piping system as indicated on the Drawings.

a. Exact layout of system shall be determined at the job site for accurate alignment and so as not to conflict with other work.

b. Size pipe as indicated on Drawings.

2. Pitch all water piping lines to accessible drainage points such as plugged tees or other approved means provided to drain down the system.

3. Install ground joint or flange union at all connection to meters, tanks, and other equipment and as required for proper assembly of system.

4. Wrap pipes built into concrete or masonry walls with tar paper or burlap to prevent bonding.

5. Do not locate pipes in outside walls or other location where freezing is likely to occur.

a. Attach or isolate pipes attached or in contact with structural members, so as not to cause transmission of noise into the structure.

b. Block end of all runs securely to prevent movement due to water hammer.

E. Joints and Connections:

1. Plastic Pipe:

a. Provide a smooth interior free of all projections, burrs, or sharp edges.

b. Install fittings with sealing materials recommended by pipe manufacturer without projection of sealing material into interior of pipe.

2. Copper Pipe: Cut pipe squarely and to accurate length for full penetration into fitting sockets.

a. Deburr pipe ends.

b. Soldering surface should be thoroughly cleaned, fluxed, and assembled immediately before oxidation of the polished surface can occur.

c. Use an approved noncorrosive flux and 50/50 solder.

d. Use significant heat to assure complete penetration of the solder and wipe excess flux after joint is made.

e. Use dielectric unions as connections between copper pipe and iron pipe on equipment with iron fittings.

3. Cast Iron Mechanical Joints:

a. Install cast iron piping and joints using recommended procedures outlined in "Handbook of Cast Iron Pipe" as published by Cast Iron Pipe Research Association.

4. Threaded Joints: Neatly cut threads with sharp tools, and joint in accordance with the best trade practices.

   a. Remove scale from pipe before jointing.

   b. Ream after cutting.

   c. Apply an approved pipe compound to all make threads and screw in place.

   d. Do not back off the pipe or reclean all and apply new compound.

   e. Apply compound neatly and wipe compound and dirt thoroughly off the outside of every joint.

   f. Install unions in all threaded joint piping to facilitate the removal of sections for maintenance and repair in accordance with the best trade practice.

   g. Connect pipes of dissimilar metals with insulating unions (Dielectric), including cast iron valve connections to adapters for copper pipe.

   h. Include such unions in the bid price whether unions are shown on the Drawings or not.

F. Plumbing Vents:

1. Provide plumbing vents as indicated on the Drawings and as required by Code.

2. Use applicable drainage pattern fittings. Provide cast iron increasers as extension of vents through the roof, beginning at least 12" under the roof and extending to height at least greater than the highest possible water level on the roof, but in no case less than 8".

3. Size increasers as follows:

Vent Size	Increase To
1" and 1"	2" minimum
2" and 2"	4" minimum
3"	5"
4"	6"

4. Install vents in practical alignment, adequately supported and with a constant pitch drainage back to the sewer system from finished spaces unless indicated otherwise on Drawings or as directed by Engineer or DNR Construction Inspector.

G. Floor Drains: Install floor drains of sizes and at locations indicated on Drawings.

1. Obtain exact finish floor levels (allow for slope to drains) from Contractor and set top rims accurately to proper levels.

2. Use Iowa Code floor drains with trap and cleanout where indicated.

H. Hangers, Support, and Anchors:

1. Install hangers, supports, and anchors for all piping, equipment, and materials.

   a. Attach hangers, supports, and anchors to walls, ceilings, and floor with galvanized bolts.

2. Protect pipe insulation at point of contact with saddles.

`3. Spacing shall not exceed the following spacing:

Type of Pipe	Spacing
a. Cast Iron	5'-0" o.c.
b. Copper or Steel, 1-1/2" or smaller	6'-0" o.c.
c. Copper or Steel, 2" or larger	10'-0" o.c.

4. Anchor all equipment securely to building construction.

3.04 APPLICATION:

A. Application of Insulation and Pipe Covering:

1. Insulate all domestic cold water lines, except under floor.

2. Insulate all cold water lines, except exposed chrome plated supplies, bottoms of roof drains and horizontal runs of downspouts with 1" fiberglass having a dual temperature jacket with a self-sealing lap.

3. Insulate all fittings with mitered segments of pipe insulation, oversized pipe insulation or molded fittings.

4. Coat each fitting with two 1/2" coats of approved vapor barrier mastic reinforced with glass fabric extending 2" onto adjacent pipe insulation and them apply preformed vinyl jacket.

3.05 FIELD QUALITY CONTROL:

A. Furnish all labor, material, and equipment necessary to perform pressure tests on all building piping systems.

B. Contact DNR Construction Inspector five days prior to conducting any tests.

C. Test water and sewer systems in accordance with Section 318 of the Uniform Plumbing Code (UPC).

3.06 CLEANING:

A. Completely purge domestic water system.

1. After purging, chlorinate enter water system in accordance with the latest methods of the American Water Works Association, for flushing and disinfecting water mains, and in accordance with the Iowa Department of Health requirements.

B. Chlorinate system only when bonding is unoccupied.

C. Thoroughly flush entire water system after sterilization process is complete.

D. Arrange with appropriate authorities for tests on water system.

E. Certificate of completion of chlorination and tests results to the Engineer/DNR Construction Inspector.

END OF SECTION 15400

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes: Providing all material, tools, equipment, and labor necessary to complete the following:

1. Provide complete and functioning electrical power transmission, services and systems as shown on the Drawings, as specified herein, and as required for a complete and proper installation of a campground electrical system including, but not limited to:

   a. Electrical service, complete, of size, voltage and type indicated or required to point of connection with utility company's equipment; all conductors shall be copper.

   b. Service entrance with metering equipment and feed switches or breakers.

   c. Main distribution panels and distribution panels or boards as needed.

   d. Complete feeder system, underground, from the main distribution panels to individual campsite power outlets and branch panels.

   e. Complete branch circuit wiring for receptacles, junction boxes, area lighting, and similar uses.

   f. Exterior lighting fixtures, lamps and poles, terminal and splice boxes, campsite power outlets, switches, receptacles, controls, and motors, motor starters, detectable tape, and similar items.

   g. Hangers, anchors, sleeves, bushings, conduits, conduit risers and elbows, supports for fixtures, equipment mounting structures, transformer pads and other electrical materials and equipment in association therewith.

   h. Trenching and backfilling for underground electrical installation not specified elsewhere.

   i. Connections to distribution panels in Buildings or existing utility company equipment, as shown on the Drawings.

2. The omission of direct reference to an essential part, the necessity or use of which is reasonably implied shall not release the Contractor from providing the same.

3. Inspect the site as necessary to become familiar with all existing conditions affecting the performance of the work under this Contract. Extras will not be allowed for failure to do so.

B. Related Sections: Drawings and General Provisions of the contract, including the General Covenants and Provisions, Supplementary Covenants and Provisions and General Requirements as well as, but not necessarily limited to, the following:

Section 02220 Trenching, Backfilling and Compacting

C. Certain material may be provided by others to be installed under this contract. Coordinate with DNR Construction Inspector, utility company and other slated to provide material to be installed as part of this contract.

1.02 REFERENCES:

A. Codes, Ordinances, and Standards: Comply with all applicable codes and regulations of the following:

1. National Electric Code, latest edition;

2. Local Utility Company Regulations;

3. Underwriter's Laboratories.

1.03 SYSTEM DESCRIPTION:

A. Power system shall be a 120/240 volt, 60 cycle, single phase 3-wire solid neutral, underground system.

1. Ground circuits at the transformer/main distribution panel with a No.6 AWG continuous copper grounding conductor type THW routed with the circuit conductors.

B. Verify the exact location of primary service, secondary service, and transformers at the job site.

C. Underground Service Entrance: Unless otherwise specified elsewhere conductors will be continuous direct burial cable, USE or UF neoprene jacket insulated and moisture resistant non-metallic outer covering.

1. Minimum burial depth 24 inches.

2. Furnish and install number and size of conductors shown or as required by N.E.C.

a. All conductors shall be copper.

1.04 SUBMITTALS:

A. Submit shop drawings, diagrams, and product information, material lists and manufacturer's specifications to Project Engineer before obtaining material, including but not necessarily limited to the following:

1. Panelboards, power outlets, and equipment.

2. Each specialized installation or system, including assembly or coordination Drawings.

C. Product Data, Submit:

1. Materials list of items proposed to be provided under this section;

2. Manufacturers' specifications and other data needed to prove compliance with the specified requirements;

3. Manufacturers' recommended installation procedures which, when approved by the Project Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.

D. Manual: Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Project Engineer two copies of an operation and maintenance manual, which shall include:

1. Copy of the approved Record Documents for this portion of the work;

a. Shop drawings, diagrams, material lists, and product information.

b. As-built drawings showing any changes in construction, additions and/or deletions from the Project Engineer's Drawings.

2. Copies of all circuit directories;

3. Copies of all warranties and guarantees.

1.05 QUALITY ASSURANCE:

A. Qualification of Installers: For the actual fabrication, installation, and testing of the work in this section, use only thoroughly trained, licensed, experienced workers completely familiar with the items required and with the manufacturer recommended methods of installation.

1. In acceptance or rejection of installed work, no allowance will be made for lack of skill on part of workers.

B. Provide only new materials of grade and quality specified. Unless otherwise approved or specified, provide only materials, equipment, devices, fittings, etc., of U.S. manufacture.

C. Except as otherwise indicated, comply with the provisions of NEC and the standards by NEMA for electrical components.

1. Provide UL listed and labeled products where applicable.

1.06 DELIVERY, STORAGE, AND HANDLING:

A. Protection: Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Project Engineer/DNR Construction Inspector and at no additional cost to the Owner.

1.07 SEQUENCING AND SCHEDULING:

A. Coordination of Work: Plan all work so that it proceeds with a minimum of interference with the work of other trades.

1. Coordinate all openings, special frames and sleeves required in the building construction for electrical work with the construction work of others both within and outside of this Contract.

B. Cooperation with Other Trades: Coordinate the work to be performed in compliance with the requirements of other trades and afford other trades reasonable opportunity for the execution of their work.

1. Coordinate this work shall with the work of other trades at such time and in such a manner as not to delay or interfere with their work.

2. Examine the Contract Documents to determine the requirements of other similar trades.

1.08 WARRANTY:

A. Guarantee the entire installation, including every part and every specialized system, with the exception of lamps, from the standpoint of workmanship and material for one year after formal acceptance by the Project Engineer.

B. Correct any defects becoming apparent during the guarantee period at no cost to the Owner.

C. Do not construe this guarantee requirement as obligating the Contractor to make repair or replacements for equipment failure as a result of improper operation or maintenance by the Owner.

1.09 MAINTENANCE STOCKS:

A. Provide 5 percent excess over the required amount of spring-loaded nuts, washers, conduit clamps, and other specialized fasteners for mounting electrical equipment.

1. Store where directed by the DNR Construction Inspector.

B. Prior to the acceptance of the equipment with plug-in receptacles and ground fault interrupters, provide two GFI testers as per Section 2.03(K) of this specification, to be used by the DNR for testing. (To remain the property of the DNR thereafter)

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Subject to compliance with requirements, manufacturer offering electrical material and components which may be incorporated in the work include, but are not limited to, the following:

1. Square D
2. General Electric
3. ITE
4. Westinghouse
5. Hubbell
6. Bryant
7. Arrow-Hart

2.02 MATERIALS:

A. Provide only materials that are new, of the type and quality specified.

1. Where Underwriter's Laboratories, Inc. have established standards for such materials, provide only materials bearing the UL label.

B. Provide only copper conductors as part of permanent installation within this project, from connection with the power company's equipment to connection to fixtures, receptacles or other devices or appliance as specified herein.

1. The Project Engineer will not approve others for use anywhere within this project at any location.

2. Remove any wire or cable used on this project which does not meet this requirement and replace at no cost to the Owner.

C. Temporary Power:

1. In addition to providing temporary power, provide and pay the costs for installing permanent electrical meter or meters as required;

2. When permanent metering is in place and connected, the Owner will pay the costs for electrical power charged against the meter or meters.

2.03 COMPONENTS:

A. Distribution Panels:

1. Circuit breaker type with single main disconnect, solid neutral with voltage and main bus rating equal to or exceeding rating on panel schedule.

2. Boxes: Code gauge steel, galvanized, with surface cover.

3. Trim: Code gauge steel with gray enamel finish and door, complete with directory of circuits and key locked.

4. Branch circuit breakers: Plug-in or bolt-in, of rating and poles indicated, with thermal-magnetic tripping mechanism at each pole, with quick-make and quick-break action, toggle type operating mechanism.

a. Provide multiple pole breakers with a common trip.

b. Provide breakers with ground fault protection for outlets as required by Code, except for outlets requiring ground fault interruption as indicated on the Drawings for which separate and individual ground fault protection and reset features will be provided integral to the outlet.

5. Provide panels, for 200-Amp or less and 120/240 volt service, with amperage indicated, as manufactured by, but not limited to, one of the following:

a. Square D
b. General Electric
c. ITE
d. Westinghouse

6. Provide main distribution panels: For 225-Amp, 400-Amp, or 600-Amp, and 120/240 volt service, as shown on the Drawings, provide main distribution panels with solid neutral and equipment ground bar installed, dead-front enclosed board assembly, NEMA type 3R rain-proof cabinet with concealed door hinge, gasketed door, 3-point vault-type locking mechanism with chrome finish padlock handle, with rust inhibiting primer and a finish coat of standard gray baked enamel, as manufactured by, but not limited to one of the following:

a. Square D
b. General Electric
c. Others as approved by the Project Engineer

7. U.L. approved and N.E.C. rated.

B. Wiring Devices:

1. Receptacles: Specification grade, duplex, 3-pole grounding type, amperage as shown, 125 V AC as manufactured by, but not limited to, one of the following:

   a. Hubbell
   b. Bryant
   c. Leviton

C. Fittings, Boxes, Etc.:

1. All outlet boxes, junction boxes, and switch boxes shall be code gauge galvanized steel.

2. Boxes shall be square, rectangular, or octagonal of a suitable and ample size.

D. Raceways and Fittings:

1. Conduit shall be rigid galvanized steel conduit with compression or tap-on type fittings.

2. Conduit installed in concrete slab or underground shall be rigid galvanized coated with asphaltum paint.

3. All conduit and fittings shall be U.L. approved and N.E.C. rated.

4. No conduit smaller than 3/4" shall be used.

5. Roadway conduit: Unless otherwise noted on the Drawings or elsewhere in the specifications, provide 2-1/2" diameter, schedule 80 PVC, U.L. listed at 90 degrees, UV resistant electrical conduit for the installation of conductors beneath roadways.

6. Provide rigid galvanized steel electrical conduits, threaded at the top to accept rain-tight cap, for mounting of distribution of panels and equipment.

   a. Rain-tight cap: galvanized steel, threaded fitting suitable for capping open end of rigid steel electrical conduit.

7. Corrugated flexible PVC Conduit: Where direct burial cable is not used provide unspliced, high tensile PVC corrugated flexible conduit to IPS dimensions, suitable for underground secondary distribution and under roadway application for protection of type TW, THW, RHW, or XHHW conductors used underground.

   a. Provide IPS dimensions, schedule 430 PVC accessories including, but not necessarily limited to, couplings, adapters, end bells and plugs, and PVC solvent cement suited for watertight joints.

   b. Provide Corrugate flexible PVC conduit and accessories manufactured by Carlon, Cleveland, Oh., or approved equals.

E. Interior Conductors and Conductors Installed in Watertight Underground Conduits:

1. Wire and cable shall be 600 V insulated N.E.C. standard type TW, THW, RHW, or XHHW, and color coded.

2. All wiring shall be copper and No.12 AWG or larger, wires No.8 and larger shall be stranded.

F. Direct Burial Conductors:

1. Wire and Cable: 600 V insulated, NEC standard, type USE or UF, as shown on the Drawings

2. All wiring shall be copper and No.12 AWG or larger, wires No.8 and larger shall be stranded.

G. Grounding devices:

1. Grounding Electrodes: 5/8" diameter, minimum 10 feet long unless otherwise shown, "Copperweld" ground rods.

2. Electrode Conductor: Copper, no.6 AWG or larger, and type THW. Use clamp suitable for burial to fasten grounding conductor to rod.

H. Safety Switches:

1. Provide heavy duty, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking, fusible or non-fusible as shown on the Drawings.

   a. Equip with field or factory installed solid neutral assembly and service grounding kit.

2. Provide enclosure clearly marked for maximum voltage and horsepower rating, and:

   a. Indoor: NEMA type 1.

   b. Outdoor: NEMA type 3R, rain tight.

3. For dual rated switches, provide rating indicated on a metal plate riveted or otherwise permanently fastened to the enclosure.

4. Provide safety switches for 120/240 volt service, amperage as indicated as manufactured by, but not limited to one of the following:

   a. Square D
   b. General Electric
   c. ITE
   d. Westinghouse

5. Safety switches shall be UL approved and NEC rated.

I. Campsite Power Outlets:

1. The following are the only approved receptacle to be provided for recreational vehicle use on campsites:

   a. 5-20-R2, 20 AMP duplex, 125 volts, in accordance with ANSI C73.12, 1972, for tent and pickup camper.

   b. R-32-U, 30 AMP duplex, 125 volts, in accordance with ANSI C73.13, 1972, for travel trailer.

2. Provide individual recreational vehicle site service entrance equipment, as shown on the Drawings, U.L. listed and labeled "Suitable for Recreational Vehicle Service Equipment", as

manufactured by Midwest Electrical Products, Inc. P.O. Box 910, Manketo, Minnesota, Tel No. 507/625-4414, or approved equal.

3. Metallic R.V. Equipment: Unless otherwise noted on the Drawings, power outlets shall contain the circuit breaker and receptacles as specified herein.

   a. Single unit Midwest model No.U042GP6, or approved equal.

   b. Double unit Midwest model No.U042GB6, or approved equal

   c. Protect 20 AMP and 30 AMP receptacles with 20 AMPS and 30 AMP thermal magnetic circuit breakers with a 30 amp Ground Fault Interrupter main breaker.

   d. Provide NEMA 3R, light gray baked enamel, uni-post mounted power outlets, completely factory wired and assembled, with loop-feed lugs to accept specified wire size. Power outlet box to be 14-gauge galvanized steel. Post to be 12-Gauge galvanized steel.

   e. Install stabilizer foot and post extension on pedestal as a footing base unless otherwise shown on the Drawings, or an alternate stabilization method is approved.

4. Nonmetallic R.V. Equipment: Injection Molded, thermoplastic enclosure with Corrosion resistant internal components, factory wired power receptacles in 20 and 30 AMP configuration, protected by a 30 AMP ground fault interrupter main breaker, a hinged cover to protect R.V. plugs. Midwest model No. U71 "Parkmate" or approved equal.

   a. Terminal lugs will accept 1/0 copper cables.

   b. The power center will be rated 100 AMP maximum, 120/240 volts, single phase, 3 wire with ground.

   c. Power to be factory mounted on 12 gauge galvanized steel, gray baked on enamel, vented post for underground services, with loop-feed twin 2-300 MCM terminal per phase lugs.

   d. Install stabilizer foot and post extension on pedestal as a footing base unless otherwise shown on the Drawings, or an alternate stabilization method is approved.

   e. Provide a seven watt fluorescent light protected by an in-line fuse circuit protection and molded polycarbonate light cover.

   f. Provide additional options as shown on the Drawings. Other options may include a light with manual switch or photo electric sensor, single service cable TV jack for type RG-59 coax cable, single service telephone jack type PH6596.

J. Detectable Warning Tape: 3-inch wide electronically detectable tape with markings: "Caution - Electrical Power Lines Below" provided by, but not necessarily limited to, one of the following:

1. Terra Tape D, Reef Industries, Inc., Houston, Texas

2. Dectatape, Allen Systems, Houston, Texas

3. Detectable Marking Tape III, Lineguard, Inc., Weaton, Illinois

K. GFCI Testers: Provide GFCI testers capable of indicating wiring errors and faulty GFI equipment.

1. Unitest GFI model No. 5708 manufactured by Beha Corporation, Clearwater, Fl. or approved equals.

L. Mounting Channels and accessories: Provide 1-5/8" series, galvanized steel channels and accessories for mounting distribution panels, meters, and safety switches, including conduit clamps and spring-loaded nuts, provided by, but not necessarily limited to, one of the following:

1. Unistrut, GTE Products Corp., Wayne, MI.

2. Power-Strut, Elcen Metal Product Co., Franklin Park, IL.

M. Terminal and Splice Boxes: NEMA type 3R rain proof code approved cabinets, with removable door with stay-open position, provision for padlocking, concentric knockouts, and heavy zinc-coated finish, of sufficient voltages.

1. Include field or factory installed grounding kit.

2. Provide boxes for 120/240 service, U.L. approved and NEC rated, of amperage indicated, as manufactured by, but not limited to, one of the following:

a. Square D
b. Midwest Electric Products, Inc.

N. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Project Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine the areas and conditions under which the work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

B. Verify location and configuration of existing facilities in relation to the work of this section before preparing bid.

C. Verify depths and locations of all existing underground utilities.

3.02 PREPARATION:

A. Coordination: Coordinate installation of electrical items with the schedules for other work, to prevent unnecessary delays in the total work.

B. Where electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide all required supports and wiring to clear the encroachment.

C. Accuracy of Data: The data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not guaranteed.

1. Exact locations, distances, levels, and other conditions will be governed by actual construction.

2. Use the Drawings and these Specifications for guidance, and secure the DNR Construction Inspector's approval of all changes in locations.

D. Measurements: Verify all measurements at the site.

1. No extra compensation will be made because of differences between locations shown on the Drawings and measurements at the site, except as provided In the General Covenants and Provisions.

E. Circuiting: The branch circuits have been designed for maximum economy consistent with sizes for voltage drop and other considerations.

1. Circuits and wire sizes shall be in accordance with the N.E.C. Install circuits as shown on the Drawings unless otherwise approved by The Project Engineer.

F. Electrical circuit drawings are diagrammatic in nature but are to be followed as closely as made possible by the actual construction and interface with the work of other trade in this or other contracts.

1. Where deviations are approved to conform with actual construction and the work of other trades, make such deviation without additional costs to the Owner, except as provided elsewhere in the Contract Documents.

G. Trenching and backfilling is required for installation of the work of this section. Perform all such trenching and backfilling in strict accordance with the provisions of Section 02200 of these Specifications.

3.03 INSTALLATION:

A. Conduits:

1. Where conduit is installed in concrete slabs, on the ground, underground, or exposed to the weather, make all joints liquidtight and gastight.

a. Bury all underground conduit to a depth of 2'0" below finished grade unless otherwise shown on the Drawings.

b. Install necessary sleeves, chases, bushings, and approved sealants where conduits pass through slabs, floors, walls and other structures.

c. Make necessary openings and spaces while keeping cutting and patching of work by other to an acceptable minimum.

2. Install bushing at conduit ends, to protect wires from abrasions, where conduit enters box or other fittings.

3. No conduit smaller than 3/4" shall be used for a branch circuit in this project.

a. Unless otherwise specified, provide code-size conduit for number and size of wire required by Code.

4. Where conduit is exposed, run parallel to or at right angle with lines of the building.

a. Make bends free from dents and flattening with standard conduit elbows or conduit bent to not less than the same radius.

B. Roadway Crossing Electrical conduit:

1. Install specified conduit at location indicated on the Drawings by boring, jacking into place, or trenching, when permitted by the DNR Construction Inspector, into unpaved roadways.

2. Identify roadway crossing location by placing two 2" P-K nails, one inch apart, six inches from each side of pavement.

a. In addition install a 12-inch long reinforcing rod or a 24-inch long treated wood stake at each end of conduit.

3. Cap each end of conduit placed beneath roadway for future circuit installation.

a. Sand fill around each end to aid future location and installation.

4. Install conduit for primary circuits below the location of conduit for secondary circuits where they are indicated on the Drawings to cross at the same location.

C. Installation of Conductors:

1. All conductors used for branch circuits will be minimum number 12 protected by 20 ampere circuit breakers.

a. Install larger wires where necessary to limit voltage drop or as required by NEC.

2. Conductors will be installed continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes.

3. No underground splice will be permitted.

a. Conductors will run continuously from the main distribution panel to the terminal bar located in the first R.V. site service entrance equipment post on the circuit and continuously thereafter from terminal bar to terminal bar.

4. Balance the campsite loads between the two phase conductors by connecting the loads to alternate sides of each 120/240 volt, three wire circuit.

a. Follow NEC requirements to provide for coding convention to consistently identify conductors throughout the project.

3. No more than three circuits will be permitted in one raceway.

a. A common neutral may be used as permitted by the National Electric Code.

4. Terminals and Splices: Stranded conductors shall be terminated with approved copper connecting lugs, accommodating the full diameter of the bare conductor.

a. Mains and feeders shall run their entire lengths in continuous sections without joints or splices.

5. Splices will be permitted only at outlet or junction boxes.

a. Splices shall be thoroughly cleaned, mechanically and electrically secured without solder, then soldered.

b. After soldering, wrap rubber and friction tape.

c. Vinyl plastic tape will be acceptable subject to the approval of local inspection authorities.

d. Scotch lock type S, M, L, and D connectors will be approved as equal to soldering.

D. Installation of main distribution panels:

1. Mount main distribution panels using specified conduit support posts and mounting channels, clamps and accessories as shown on the Drawings.

a. Install the rain-tight cap on top of support posts.

2. Unless otherwise specified, install copper studs and spade type bushings in utility company transformer, and install secondary connections between transformer and the main distribution panel.

a. Seek approval of utility company representative prior, during and after installation.

3. Install meter where indicated on The Drawings or as instructed by the utility company.

a. Installation subject to approval of utility company.

b. Provide utility company approved meter if so instructed by utility company.

4. Directories: Mount a typewritten directory behind glass or plastic on the inside of each panel door.

a. Show circuit numbers and circuit description for all outlets in each circuit.

5. Mounting Heights: To center of box above finished floor for the below-named items, shall be as follows, unless otherwise shown or indicated.

a. Flush toggle switches: 48".

b. Convenience outlets and similar: 12" - finished areas (unless noted otherwise).

c. Convenience outlets and power outlets: 48".

d. Safety switches: 54" to operator.

e. Motor controllers: 54" or top even with safety switch.

f. Panelboards: 72" to top.

g. Other mounting heights are indicated on the Drawings by detail or by a plus dimension shown adjacent to the symbol.

E. Grounding System: Ground all equipment including panelboards, transformers, conduits systems, junction and splice boxes, RV site service equipment, motors and other apparatus, by conduit or

conductor to grounding electrode as shown on the Drawings, using grounding clamps suitable to direct burial.

1. Locate grounding electrode in location which will receive ground water regularly, and drive rod to depth of at least 8 feet.

2. Test to measure ground resistance, and provide not more than 5 ohms resistance, adding ground rods as required to achieve that level.

3.04 FIELD QUALITY CONTROL:

A. Testing: At the conclusion of the work, test each and every circuit to establish the proper operation of electric equipment and freedom from improper ground and to ascertain the insulation values which shall not be lower than those required by the National Electrical Code.

1. Test of equipment grounding conductors will show a resistance of no more than 25 ohms at any point on the circuit, except for grounding electrode which will show a resistance of no more than 5 ohms.

B. Carry out final test in the presence of the Project Engineer/DNR Construction Inspector, as well as other required certifications noted in the Iowa Code.

C. Correct all work not meeting code requirements, and all circuits which fail testing, at no additional cost to the Owner.

3.05 CLEANING:

A. Exposed conduits, panel boards, fixtures, switches, hangers, and equipment exposed shall be thoroughly cleaned.

B. Fixture glass and shields shall be cleaned and washed.

C. Keep premises free from unnecessary accumulation of rubbish and debris resulting from the work of this section.

D. Dispose of all debris resulting from the work of this contract at no additional cost to the Owner.

3.06 INSPECTION:

A. Contractor will be required to apply and pay for permits and inspections that are required for all electrical installations initiated on or after February 1, 2009, as per Chapter 552 of the Code of Iowa. Applications will be considered incidental to the work of this project and will not be paid for separately.

B. All new electrical installations for commercial or industrial applications, including installation both inside and outside buildings, and for public use buildings and facilities and any other installation at the request of the Owner.

C. Any installation which is subject to inspection and is on property owned by the state or an agency of the state shall be inspected by the state electrical inspection program.

D. The Web site to obtain, complete and submit a Request for Permit form is **https://iowaelectrical.gov/index.php/pages/home**. Payment of the permit and inspection fees shall be submitted with the form in accordance with the instructions on the Web site address shown above.

END OF SECTION 16000

1. GENERAL INFORMATION

A. Scope of Work

The work to be done under this contract includes the furnishing of all labor, materials, transportation, tools, supplies, plant, equipment, and appurtenances required and necessary for the complete and satisfactory construction, and testing of water well.

B. Permits, Certificates, Laws, and Ordinances

The Owner has applied for the Iowa Department of Natural Resources construction permit and water withdrawal permit. The Contractor shall, at his own expense, procure all other permits, certificates and licenses required by law for the execution of his work. He shall comply with all federal, state, or local laws, ordinances or rules and regulations relating to the performance of the work.

C. Location

The general location of the well will be as shown on the sketch. The specific location of the well will be staked by the Engineer.

The owner shall provide land or right-of-way for the work specified in this contract and make suitable provisions for egress and ingress, and the Contractor shall not enter on or occupy with men, tools, equipment, or material, any ground outside the property of the Owner without the written consent of the Owner of such ground. Other contractors and employees or agents of the Owner may for all necessary purposes, enter upon the work and premises used by this Contractor and this Contractor shall conduct his work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

D. Subsurface Data

An abbreviated log of the formation description underlying the well site is as follows:

Name	Depth to Top	Depth to Bottom
Fine Sand (Tan)	0’	15’
Fine Sand (Grey)	15’	20’
Fine Sand	20’	40’
Fine Sand to Gravel	40’	60’
Fine to Course Sand	60’	70’
Clay with Gravel	70’	75’
Coarse Sand to Gravel	75’	90’
Coarse Sand	90’	95’

The information given above regarding subsurface conditions in the vicinity of the proposed well is intended to assist the Contractor in preparing the bid. However, the Owner does not guarantee its accuracy,

nor that it is necessarily indicative of conditions prevailing or to be encountered in sinking the well to be constructed hereunder, and the Contractor shall satisfy himself regarding all local conditions affecting his work by personal investigation and neither the information contained in this section nor that derived from maps, drawings, or plans from the Owner or his agents or employees shall act to relieve the contractor from any responsibility hereunder or from fulfilling any and all of the terms and requirements of his contract with the Owner.

E. Protection of Site

Except as otherwise provided herein, the Contractor shall protect all structures, walks, pipelines, trees, power lines, shrubbery, lawns, and agricultural crops during the progress of his work; shall remove from the sites all cuttings, drillings, debris, and unused materials; and shall upon completion of the work, restore the sites as nearly as possible to their original condition, including the replacement, at the Contractor's sole expense, of any facility or landscaping which has been damaged beyond restoration to its original condition or which has been destroyed. Water pumped from the well shall be conducted by temporary pipelines or wood or metal flumes approved by the Engineer.

F. General Description of Well

The completed production well shall consist of the following principal items:

1. Drill 12 inches exploratory hole through the soil to an estimated 20’ depth.

2. Furnish and install an estimated 21’ of 10” temporary surface casing & remove upon completion of the grouting.

3. Drill 12” diameter hole from 20’ to an estimated 100’ depth.

4. Furnish and install an estimated 80' of 6.625" O.D. x .0.316” SDR 21 PVC well casing. The casing will meet ASTM F480 and ANSI/NSF Standard 61. The casing shall be grouted in place using a mixture of not more than 6 gallons of water per 94 lb bag of Portland cement. Grout shall be installed using a grout shoe attached to the end of the 6" casing. Grout shoe shall be equipped with a check valve. Grout shoe cost shall be included in Bid.

5. Furnish and install NSF approved 6”X 20’ schedule 40 PVC well screen with fittings, gravel-pack and borehole seal.

6. Develop the well using an air compressor and air lift the well until such time as no sand is present in a quart jar of water. Contractor shall develop the well for a period of 8 hours if necessary. At such time if sand is still present, contractor shall advise the Project Engineer/Construction Inspector before additional air lifting is done.

7. Test pumping will be done by the pump contractor.

8. Disinfect well

9. Clean up site as directed by Construction Inspector.

10. Furnish and install pitless unit.

11. Any chlorinated water being pumped to waste will be neutralized with a reducing agent before being wasted.

2. MATERIALS

A. Casing Pipe

The casing pipe shall conform to ASTM F480 and ANSI/NSF Standard 6 and shall consist of 6.625 inch OD SDR 21 PVC pipe.

B. Drop Pipe

The hang pipe shall be 2" Sch. 120 PVC

C. Grouting Materials

Sealing mixture shall be Portland cement grout in accordance with ASTM ClSO- 11.

3. DESCRIPTION OF WELL CONSTRUCTION WORK

A. General

The well shall be drilled with either direct air or mud rotary equipment. All phases of design and construction shall be in accordance with and approved by the Water Supply Division of the Iowa Department of Natural Resources (DNR),

B. Drilling and Sampling Procedure

The Contractor shall obtain the data and samples described below.

The Contractor shall take accurate material samples from each succeeding formation encountered at every 5 foot interval in the water bearing formation to determine the nature and extent of the formation. The Engineer shall be furnished with two (2) copies each of the driller's logs. One sample from the sampling points, referred to above, properly tagged and identified shall be forwarded by the Contractor to the State Geological Survey, Iowa City, Iowa. Further, one copy of well construction log, yield and drawdown test results, and water quality sample results shall be forwarded to DNR and also to Iowa Geological & Water Survey.

C. Casing Installation, Plumbness and Alignment

Furnish and install the required length of 6.625 inch OD PVC casing pipe to the finished casing elevation required for the well.

The well head shall be fitted with pitless unit, well cap, air vent, and appurtenances.

All sections of the casing shall be centered in the drill hole with suitable centering guides. During the installation of the casing, the weight of the entire assembly shall be supported from the drilling rig.

Plumbness and alignment shall be 1n accordance with AWWA AlOO, Section 1- 6, except that the clearance between the test pipe or dummy shall ≤ ½ an inch than the inside diameter of that part of the casing or hole being tested.

D. Portland Cement Seal

The annular space in the well between the top of the well below the existing ground surface shall then be sealed with Portland cement grout placed in accordance with AWWA AlOO, 1 -5.2. Grout shall consist of not more than 6 gallons of water per 94 lb bag of Portland cement. A mixture of five, 50 lb sacks of 200

mesh bentonite shall be circulated through the grout shoe and into the annular space prior to grouting to insure proper functioning of the grout shoe and to seal minor crevices in the limerock. After the fifth sack of bentonite has been pumped, the Contractor is to notify the Construction Inspector if circulation was achieved or not. Prior to pumping of the cement grout the Construction Inspector is to be notified, and will advise the Contractor if he wishes to be present during the grouting procedure.

E. Development of Well

The Contractor shall furnish all necessary pumps, compressors, high pressure jets, plungers, or other needed equipment and shall develop the wells by such approved methods as shall be necessary to give the maximum yield of water per foot of drawdown. The process shall be continued until the water from the well runs clear and continues to run clear after periods of stopping and starting of the development pumping equipment while pumping the well at a rate of 15 gallons per minute. In the event that chemical additives. such as polyphosphates, are required to aid in development of the well through dissolving drilling muds, silts or clays which may have sealed or partially sealed the outer surfaces of the bore hole in the water bearing portion of the aquifer, the Contractor shall furnish and apply same at no additional cost to the Owner.

The methods of developing to be used shall be submitted to and approved by the Engineer. The minimum development time considered acceptable for the well is 6 hours. The Contractor shall provide such additional development time as required for the well at no additional cost to the Owner to meet the efficiency requirements specified below.

The completed well shall have an actual efficiency of not less than 60 percent of the theoretical efficiency, based on the pumping test specified in Section 5 hereof.

Failure by the Contractor to construct well. with an efficiency of 60 percent or higher, as defined above, will be considered negligence on the part of the Contractor and will result in refusal to accept the well by the Owner.

4. TESTING FOR YIELD AND DRAWDOWN

A. Scope

The Contractor shall furnish all labor, Materials, equipment and appurtenant items required to conduct and complete the pumping test described for the well.

B. General

The pumping test in the well will consist of a 24- hour drawdown test followed by a 6- hour recovery observation period, with drawdown observations made in accordance with the schedule set out below.

After the well has been completely constructed, developed and cleaned out and the depth of the well accurately measured, the Contractor shall notify the Engineer to that effect and shall make the necessary arrangements for conducting the pumping test. Beside this final test ,the Engineer may order the Contractor to make such additional pumping tests during and after construction as he deems necessary. All tests shall be run with similar equipment and in a similar manner to that hereinafter described.

C. Test Pump

The Contractor shall furnish and install necessary pumping equipment required for the pumping of the well. The pump shall be capable of pumping to the required point of discharge up to 50 gallons per minute but

with satisfactory throttling devices so that the discharge may be reduced to 20 gallons per minute ,if so directed by the Engineer.

The pumping unit shall be complete with prime mover of ample power, controls, and appurtenances including all drives, gears and universal shafts and shaIl be capable of being operated without interruption and at a uniform rate for a period of 24 hours. The permanent well pumps shall not be used for test pumping purposes.

D. Auxiliary Equipment

The Contractor shall furnish all necessary discharge piping for the pumping unit, which shall be of sufficient size and length to conduct the water being pumped to the point of discharge specified. He shall also furnish, install, and maintain equipment of approved size and type for accurately measuring the flow of water; such equipment to be a weir box, orifice or water meter. The Contractor shall furnish the necessary devices to be used in measuring water levels in the well during the pumping test.

E. Pumping and Recovery Tests

Prior to the start of each pumping test, the Contractor shall calibrate his test pump so that he knows precisely the rate of flow to be expected throughout the duration of the pumping test. This flow rate shall be held absolutely constant throughout the entire 24 -hour test pumping period in the well. The pump shall, after calibration, be shut off and not started again until the beginning of the pumping test.

The Contractor shall furnish sufficient competent personnel to make the necessary observations. The water level in the well shall be recorded immediately prior to the start of the pumping test. The schedule of observations shall be as shown below:

Producing Well (During Pumping & Recovery Period)

Each 1/2 minute for first' 5 minutes.
Each 5 minutes for next 55 minutes.
Each 15 minutes for the next 60 minutes.
Each 30 minutes for the next 2 hours
Each 60 minutes for the remainder of pump and recovery test.

Each observer shall record the time of each observation as well as the drawndown at each time on an approved log sheet. One copy of each log sheet shall be delivered to the Engineer upon completion of each test.

Failure of the pump during the test or neglect on the Contractor's part to observe drawndown levels at the proper times may invalidate the tests and, if in the Engineer's opinion it becomes necessary, the test shall be run over at the Contractor's expense.

5. DISINFECTION

A. Time of Disinfection

After the well is completely constructed, it shall be thoroughly cleaned of all foreign substances, including tools, timbers, rope, debris of any kind, cement, oil, grease, joint dope and scum. The casing pipe shall be thoroughly swabbed, using alkalies if necessary, to remove oil, grease, or joint dope. The well shall then be disinfected with a chlorine solution.

B. Chlorine Solution

The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that a concentration of at least 50 ppm of chlorine shall be obtained in all parts of the well. Chlorine solution shall be prepared and applied in accordance with the directions of, and to the satisfaction of, the Engineer, and shall remain in the well at least 24 hours prior to removal by pumping Following this, the Engineer shall obtain samples for analysis. If satisfactory results are not obtained, the Contractor shall re-disinfect the wells at his own expense until satisfactory results are obtained.

All chlorinated water produced from the well site will be neutralized with a reducing agent before the water is wasted.

C. Requirements for Disinfection of Pumping Equipment

In the event that the test pump is installed after the wells have been disinfected, all exterior parts of the pump and discharge piping coming in contact with the water shall be dusted with a chlorine compound as directed by the Engineer.

6. CHEMICAL ANALYSIS

Upon completion of the test pumping the Contractor shall take two samples of water from well and have them analyzed for complete mineral, metals, and radium analysis of the water. The water shall also be sampled for ammonia, nitrites, and nitrates. The analyses shall be submitted to the Engineer and Owner in writing on certified forms as furnished by the chemical laboratory.

7. PROTECTION OF QUALITY OF WATER

A. Precautions to be Taken

The Contractor shall take such precautions as are necessary or as may be required permanently to prevent contaminated water or water having undesirable physical or chemical characteristics from entering, through the opening made by the Contractor in drilling the well, the stratum from which the well is to draw the supply. He shall also take all necessary precautions during the construction period to prevent contaminated water, gasoline, etc., from entering the well either through the opening or by seepage through the ground surface.

B. Corrective Work

In the event that the well become contaminated or that water having undesirable physical or chemical characteristics does enter the well due to the neglect of the Contractor, he shall, at his own expense, perform such work or supply such casings, seals, sterilizing agents or other material as may be necessary to eliminate the contamination or shut off the undesirable water.

C. Temporary Capping

At all times during the progress of the work, the Contractor shall protect the well in such manner as effectively to prevent either tampering with the, well or the entrance of foreign matter into it, and, upon its completion, he shall provide and set a substantial screwed, flanged or welded cap satisfactory to the Engineer on the well which shall remain in place until the permanent pump has been installed.

D. Abandonment of Well

In the event that Contractor shall fail to sink the well to the depth specified or to such depth as ordered by the Engineer, or if water of acceptable quality especially the water free from hydrogen sulphide gas is not produced from the well or should he abandon the well because of loss of tools, negligence, or for any other cause, he shall, if required and as directed by the Engineer, and at his own expense, fill the abandoned hole with clay or clay and bentonite and remove any casing and materials installed therein. Salvaged material furnished by the Contractor shall remain his property.

Abandonment of well shall be in accordance with AWWA AlOO section A1 -13 and the clay used for filling the holes shall be disinfected clay.

8. MISCELLANEOUS

Each well shall be provided with a casing vent to the atmosphere through a minimum one and one -half inch opening, covered with 24 mesh corrosion resistant screen. The vent shall terminate in a downturned position at least 24 inches above final ground elevation.

The tip of pitless unit must terminate at least 18 inches above the final ground elevation. The pitless unit must be threaded or welded to casing and must have access to disinfect the well. Further, there shall be a sealed entrance connection on the pitless unit for electrical cable. The pitless unit shall be of material, weight and inside diameter equivalent to the casing, and is to be furnished as a "7' bury unit". The payment for this contract includes a11 necessary electrical work for this project, including control panel on service pole etc.

A. Grouting

Cement grout shall consist of a mixture of portland cement complying with ASTM C150-77 Standards, and water in a proportion of not more than six gallons of clean water per bag of cement (94 pounds).

Concrete grout shall consist of a mixture of portland cement complying with ASTM C150-77 standards, coarse aggregate not greater than one -half inch in size, and water in proportion of at least five bags of cement per cubic yard of concrete and not more than six gallons of clean water per bag of cement (94 pounds).

When annular opening is less than four inches, grout shall be of neat cement and placed by means of positive pressure from the bottom of annular opening upward in one continuous operation.

The use of bentonite, aquajel, or similar admixtures to increase fluidity, or reduce shrinkage of the concrete or cement grout shall comply with ASTM C494-77 standards and shall not exceed five percent of the grout mixture by weight.

The grout shall be allowed to properly cure before further work is begun on the well (a minimum 72 hours for Type I portland cement and a minimum 36 hours for Type III portland cement).

B. Testing and Records

Microbiological Quality:

After disinfection and pumping of the chlorinated well water to waste, one or more water samples shall be collected and submitted to a certified bacteriology laboratory for bacteriological analysis in accordance with the analytical procedure defined in sub paragraph 567 - 43.3(7)”c”(2) of the Iowa Administrative Code. Satisfactory results shall be obtained and reported to the Department of Natural Resources

Physical and Chemical Quality:

Water samples shall be collected and examined for contaminants as set forth in sub paragraph 567 - 43.3(7)”c”(2) and as specified in 567-Chapter 41 of Iowa Administrative Code.

Bacteriological monitoring must be conducted after disinfection of each new well and subsequent pumping of the chlorinated water to waste.

Water Samples shall also be analyzed for alkalinity , ammonia, pH, calcium, chloride, copper, hardness, iron, magnesium, manganese, nitrites, nitrates, potassium, silica specific conductance, sodium, sulfate, filterable and nonfilterable solids and zinc.

Samples shall be collected at the conclusion of the yield drawdown pumping procedure and examined by a certified laboratory as soon as possible.

Water samples shall be analyzed at the time of collection for pH and temperature. Field determinations should be made for carbon dioxide, hydrogen sulfide, and methane where these gases are suspected.

Reports of the analysis shall be submitted to the Iowa Department of Natural Resources, Water Quality Section.

C. Water Level Measurement

Equipment shall be provided for periodic measurement of static and pumping water levels in the well. The equipment shall be corrosion resistant and consist of a drawdown gauge calibrated in feet, air pump or other suitable device, watertight coupling for attaching the gauge to the casing, and corrosion resistant tubing firmly attached by durable brackets to the pump column or riser pipe at intervals of at least 20 feet.

9. COORDINATION OF WORK AND START UP

The well Contractor shall initiate and complete his work in the shortest practicable time so as to not delay work of the other Contractors. Contractor shall coordinate his work and work schedule with the other Contractors. The well Contractor or his representative will be present for the initial start up of the well pumps after the permanent electrical power and control systems have been installed.

10. MEASUREMENT AND PAYMENT

Payment for work performed by the Contractor under this Division of the specifications will be made at the approved contract unit price for each of the items listed in the Proposal. This price and payment shall constitute full compensation to the Contractor for all costs in connection with furnishing all labor, tools, equipment and materials necessary to complete the items in accordance with the drawings and specifications. All incidental work which may or may not have been shown on the drawings or specified, but which is essential to the completion of the project in a workmanlike manner, including clean up and disposal of surplus and waste materials, shall be accomplished by the Contractor without cost to the Owner.

The quantities listed in the Proposal are not guaranteed quantities and are listed only for convenience in comparing bids. Payment will be made for the quantities actually constructed or installed, be they more or less than the listed quantities.

The price bid in the Bid Schedule of Mobilization will be paid the Contractor as full compensation for bringing his equipment to the job and setting up and removing same from the job site after completion of the well. No separate payment will be made for intermediate knock-downs and set-ups required during the construction period of the well; the cost thereof shall be included in the lump sum for mobilization.

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section covers materials, testing, and work required for placing into operation the necessary submersible pumps. Contractor shall supply all necessary materials, equipment, tools, labor, and superintendence necessary for completion of the work. The pumps will operate in conjunction with Variable Frequency Controllers (VFDs). Those pumps and motors utilizing VFDs shall be designed to operate from 60% to 100% speed for extended periods of time.

1.02 REFERENCES:

A. ANSI B1.20.1: NPT American Tap Pipe Thread

B. ANSI B16.5: Pipe Flanges and Flanged Fittings.

C. ASTM D-1784: Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

D. ASTM D-2464: Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

E. ASTM D-2467: Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

F. AWWA A100: Standard for Water Wells.

G. Great Lakes – Upper Mississippi River Board of State Sanitary Engineers, Recommended Standards for Water Works.

H. Location Specific References:

1. Iowa Administrative Code 567 Chapter 43: Water Supplies – Design and Operation.

2. Iowa Administrative Code 567 Chapter 82: Well Contractor Certification.

3. Iowa Water Supply Facilities Design Standards, Chapter 3: Source Development.

1.03 SUBMITTALS:

A. Submit dimensional drawings, showing materials of construction by ASTM reference and grade.

B. Submit manufacturer's certified pump performance curves for review by the Engineer. Pumps will not be shipped prior to approval of the pump curves by the Engineer. Show pump total head, torque, brake horsepower, pump efficiency, and required NPSH with pump and system operating point plotted.

C. Submit data to indicate compliance with type of materials specified.

1.04 QUALITY CONTROL:

A. Owner and/or Owner's Representative will be on-site during the entire installation and testing of the first well pump. It is most likely that Owner and/or Owner's Representative will be on-site during installation and testing of remaining pumps.

1.05 MANUFACTURER'S SERVICES:

A. Equipment manufacturer's services at the jobsite shall not be required.

PART 2 - PRODUCTS

2.01 GENERAL:

A. All equipment for the pumps, including motors and installation appurtenances, shall be provided as a complete unit by the pump manufacturer, who shall assume full responsibility for the proper operation of the pumps and associated equipment. For pumps utilizing VFDs, coordinate with VFD manufacturer as necessary to assure proper pump, motor, and VFD operation.

2.02 MANUFACTURERS:

A. Pump selections were made based on Goulds Pumps. Other manufacturers may be acceptable provided the pump is to be supplied has an efficiency no lower than 5 percent from that specified for the primary design point. Flow at the secondary points shall be ±10% gpm, head shall be ±10 feet, and efficiency is no lower than 8 percent of those specified.

B. Other pre-approved manufacturers include Paco, Grundfos, Fairbanks, and Peerless. Other manufacturers must be approved by the Engineer a minimum of ten (10) days prior to bid opening to be considered. Submit pump curves with primary and secondary points indicated and list any exceptions to the specification that may be taken during submittals.

2.03 NAMEPLATE:

A. Corrosion resistant nameplate by W.H. Brady, or approved equal, securely fastened to pump with the following data engraved or stamped in black letters (1/2" high) on a light contrasting background:

1. Name of pump manufacturer
2. Pump serial number
3. Year built
4. Number of stages
5. Design head and discharge
6. Pump speed (rpm)

2.04 WELL PUMPS:

A. The Contractor shall furnish and install one (1) submersible well pump complete with pipe, cable and cable fittings for well. The hang pipe shall be 2" Sch. 120 PVC. The pump shall comply with ANSI B58.1- 1971 and as modified following.

B. Pump Conditions

Flow, U.S. gpm …… 65
5 HP Motor, vfd, 1 ph to 3 ph wiring, 2" column pipe, check valve.

The pump shall be vertical, multiple stage, water lubricated, well turbine pump directly connected to a totally enclosed submersible motor. The overall length (depth of setting) shall be measured from the face of the cast iron base plate to the face of pump inlet impeller and shall be listed in the foregoing table.

These specifications include furnishing and installing the pump with motor, column, couplings, anchor bolts, drawdown gage and line, and all miscellaneous and appurtenant parts required for operation of the unit. The column connections shall be coupled in such a manner that for maintenance or repair service, the units can be readily removed and reset and shall be interchangeable.

The units shall be of the vertical centrifugal turbine type, water lubricated, similar and equal to units manufactured by Franklin Electric, General, Goulds, Grundfos, or approved equal.

The well head shall be fitted with a pitless unit capable of supporting the submersible pump and column. The pitless unit shall be equipped with a check valve. The unit shall be similar and equal to units manufactured by Monitor, MAAS, or approved equal.

Pump bowls shall be of corrosion resistant material free from sand holes, blow boles or other detrimental defects, and shall be designed for maximum efficiency and long life. Pumps shall consist of conical strainer, suction nozzle, tail pipe, bowl assembly and adaptor for connecting directly to the discharge column pipe.

Impellers shall be thermoplastic, with non-overloading characteristics; all water passages shall have smooth surfaces; impellers shall be fastened to pump shaft by means of steel collets or stainless steel keys.

The column pipe shall be ASTM l A -53 prime steel pipe having threaded connections.

The pump shall be equipped with a polyethylene drawdown line, 1/4" diameter, attached securely every 20 feet, lower end at pump intake. Each motor shall be protected by installing the secondary lightning surge arrestor as close to well head as practicable.

The motor shall be vertical hollow shaft squirrel cage high thrust induction type, capable of continuous operation under water. The thrust bearing shall be of ample capacity to carry the weight of all rotating parts plus the hydraulic thrust.

The Contractor shall submit three (3) sets of characteristic curves and data describing the unit, for each type of pump, to the Engineer for written approval, before ordering pump equipment.

2.05 MISCELLANEOUS:

The well shall be provided with a casing vent to the atmosphere through a minimum one and one-half inch opening, covered with 24 mesh corrosion resistant screen. The vent shall terminate in a downturned position at least 24 inches above final ground elevation.

Electrical cable shall be firmly attached to the riser pipe at intervals of 20 feet or less.

The casing of the pitless unit must terminate at least 18 inches above the final ground elevation.

The pitless unit must be threaded or welded to casing and must have access to disinfect the well. Further, there shall be a sealed entrance connection on the pitless unit for electrical cable.

The pitless unit shall be of material, weight and inside diameter equivalent to the casing, and is to be furnished as a "7' bury unit". The payment for this contract includes a11 necessary electrical work for this project, including control panel in the proposed water storage/treatment building, etc.

2.06 GROUTING:

Cement grout shall consist of a mixture of portland cement complying with ASTM C150-77 Standards, and water in a proportion of not more than six gallons of clean water per bag of cement (94 pounds).

Concrete grout shall consist of a mixture of portland cement complying with ASTM C150-77 standards, coarse aggregate not greater than one -half inch in size, and water in proportion of at least five bags of cement per cubic yard of concrete and not more than six gallons of clean water per bag of cement (94 pounds).

When annular opening is less than four inches, grout shall be of neat cement and placed by means of positive pressure from the bottom of annular opening upward in one continuous operation.

The use of bentonite, aquajel, or similar admixtures to increase fluidity, or reduce shrinkage of the concrete or cement grout shall comply with ASTM C494-77 standards and shall not exceed five percent of the grout mixture by weight.

The grout shall be allowed to properly cure before further work is begun on the well (a minimum 72 hours for Type I portland cement and a minimum 36 hours for Type III portland cement).

2.07 TESTING AND RECORDS:

Microbiological Quality:

After disinfection and pumping of the chlorinated well water to waste, one or more water samples shall be collected and submitted to a certified bacteriology laboratory for bacteriological analysis in accordance with the analytical procedure defined in 400- -22.4(1) "a" of the Iowa Administrative Code. Satisfactory results shall be obtained and reported to the Department of Natural Resources

2.08 WATER LEVEL MEASUREMENT:

Equipment shall be provided for periodic measurement of static and pumping water levels in the well. The equipment shall be corrosion resistant and consist of a drawdown gauge calibrated in feet, air pump or other suitable device, watertight coupling for attaching the gauge to the casing, and corrosion resistant tubing firmly attached by durable brackets to the pump column or riser pipe at intervals of at least 20 feet.

2.09 ELECTRICAL:

The Contractor shall furnish and install three wire copper underground service from existing power supply to well site as directed by the Engineer. This shall also include all hookups and 40 ampere circuit breaker for each well to be installed on control panels.

2.10 COORDINATION OF WORK AND START UP:

The well Contractor shall initiate and complete his work in the shortest practicable time so as to not delay work of the other Contractors. Contractor shall coordinate his work and work schedule with the other Contractors. The well Contractor or his representative will be present for the initial start up of the well pumps after the permanent electrical power and control systems have been installed.

2.11 WATER SYSTEM CONNECTIONS:

The Contractor shall connect the well to the proposed water treatment/distribution system inside the new building.

2.12 MEASUREMENT AND PAYMENT:

Payment for work performed by the Contractor under this Division of the specifications will be made at the approved contract unit price for each of the items listed in the Proposal. This price and payment shall constitute full compensation to the Contractor for all costs in connection with furnishing all labor, tools, equipment and materials necessary to complete the items in accordance with the drawings and specifications. All incidental work which may or may not have been shown on the drawings or specified, but which is essential to the completion of the project in a workmanlike manner, including clean up and disposal of surplus and waste materials, shall be accomplished by the Contractor without cost to the Owner.

The quantities listed in the Proposal are not guaranteed quantities and are listed only for convenience in comparing bids. Payment will be made for the quantities actually constructed or installed, be they more or less than the listed quantities.

The price bid in the Bid Schedule of Mobilization will be paid the Contractor as full compensation for bringing his equipment to the job and setting up and removing same from the job site after completion of the well. No separate payment will be made for intermediate knock-downs and set-ups required during the construction period of the well; the cost thereof shall be included in the lump sum for mobilization.

2.13 DISINFECTION:

A. Time of Disinfection:

After the well is completely constructed, it shall be thoroughly cleaned of all foreign substances, including tools, timbers, rope, debris of any kind, cement, oil, grease, joint dope and scum. The casing pipe shall be thoroughly swabbed, using alkalies if necessary, to remove oil, grease, or joint dope. The well shall then be disinfected with a chlorine solution.

B. Chlorine Solution:

The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that a concentration of at least 50 ppm of chlorine shall be obtained in all parts of the well. Chlorine solution shall be prepared and applied in accordance with the directions of, and to the satisfaction of, the Engineer, and shall remain in the well at least 24 hours prior to removal by pumping Following this, the Engineer shall obtain samples for analysis. If satisfactory results are not obtained, the Contractor shall re- disinfect the wells at his own expense until satisfactory results are obtained.

PART 3 - EXECUTION

3.01 INSTALLATION :

A. Disinfect pump assembly immediately prior to setting the pump. Spray pump assembly with 200 mg/l chlorine solution.

B. Bump pump motors to ensure that rotation of motor and pump is correct.

C. Install column pipe to adapter, then install adapter to the pump discharge.

D. The column pipe shall be supported every 10 feet by flange or by column pipe centralizer.

E. If using plastic or flexible pipe for column pipe, compensate for stretching when establishing pump depth and attaching downhole conduit or cables to the column pipe. Contractor shall check with the column pipe manufacturer to determine pipe stretch compensation for accurate pump depth setting. Leave 3 to 4 inches of slack between downhole conduit or cable straps to allow for stretching.

F. Upon startup, measure head, flow and amperage to ensure that the pump is operating along the pump curve and the motor is not being overloaded.

3.02 PAINT :

A. Paint exposed portions of pitless unit with two coats Tnemec Series 66 or equal, top coat Tnemec Series 73 or equal. Surface preparation SSPC SP6.

END OF SECTION 02671

ATTACHMENT I

ASBESTOS INSPECTION REPORTS

water treatment plant
21914 Park Loop
Onawa,Ia.

Prepared for:
Iowa Department of Natural Resources
21914 Park Loop
Onawa,Ia. 51040
(712) 423-2829
Contact: John Mcandrews (712) 420-0846

Prepared by:
J&J and Co.,Ltd
1620 Ross St.
Sioux City,Ia. 51103
(712) 255-6613

Confirmation of Inspection

The suspect asbestos containing building materials found in the water treatment structures locat property known as 21914 Park Loop Onawa, Iowa were visually inspected and physically touched. physically touched.

Inspection date: 7/21/2015

Inspector: Jeff Wagner Jeffrey L Wagner

Iowa accreditation: 15-4252I

ASBESTOS CONTAINING BUILDING MATERIALS INSPECTION SUMMARY

Buildings: water treatment plant(21914 Park Loop Onawa,Ia.)

Inspector: Jeff Wagner **Date inspected:** 5/22/2015

The homogeneous materials listed on the following pages of this report are the suspect asbestos containing materials found in the accessible areas inspected. A reasonable effort was made to locate all suspect asbestos containing materials, however additional unsampled suspect asbestos containing materials might be found in concealed, inaccessible areas(between walls, under floors, above ceilings, under roofing panels, etc).

The locations and approximate quantities of the materials were determined during the visual and physical inspection of the building. Entities using this report for bidding purposes should verify quantities or establish their own estimations prior to bidding.

Samples from each suspect homogeneous material were collected and delivered to the facilities of Triangle Environmental Service Center, where they were analyzed by Polarized Light Microscopy procedures to determine the asbestos content of the materials.

The roofing patching compound(sample 21914-11, 5% Chrysotile) used on the base of the ve protruding through the roof was found to contain asbestos.

The roofing patching compound(sample 21914-13, 5% Chrysotile) used around the inspectio entry hatch and the vent on the exterior reservoir tank was found to contain asbestos.

No asbestos was detected in the samples collected from the other suspect materials found in the structures.

Chrysotile was the only asbestiform minerals found during the inspection.

The asbestos containing roofing compounds and are currently considered to be Category I materials.

Category I materials release fibers and become regulated materials when they become broken, crushed, crumbled, abraded, or pulverized. This may occur during demolition procedures.

Removal of the asbestos containing materials which may be disturbed during demolition, by an abatement contractor or trained personnel, is recommended to prevent conflicts with the EPA, the Iowa DNR, and Iowa OSHA, and to prevent exposure liabilities from surrounding property owners and residents, park occupants, onlookers, passers-bye, demolition contractor employees, and landfill employees.

MATERIAL,ASBESTOS CONTENT,SAMPLE,LOCATION, AND APPROXIMATE QUANTITY

water treatment plant(21914 Park Loop Onawa,Ia.)

M-4A(roofing compound)	5% Chrysotile	Sample 21914-11	
Roof(base of protruding vents)		8	Linear feet
M-4B(roofing compound)	5% Chrysotile	Sample 21914-13	
exterior reservoir tank(around hatch and vent)		8	Linear feet

Homogeneous Materials Codes

water treatment plant(21914 Park Loop Onawa,Ia.)

The following is the list of the codes assigned to each homogeneous material found during the visual inspection.

M-2A	Tar paper	Sample 21914-9(no asbestos detected)
M-4A	Patching tar	Sample 21914-11(5% Chrysotile)
M-4B	Patching tar	Sample 21914-13(5% Chrysotile)
M-8A	Shingles	Sample 21914-8(no asbestos detected)
M-11A	Gasket caulk	Sample 21914-3(no asbestos detected)
M-11B	Sealant caulk(window)	Sample 21914-6(no asbestos detected)
M-11C	Sealant caulk(doors)	Sample 21914-7(no asbestos detected)
M-11D	Sealant caulk(roof windows,vent)	Sample 21914-10(no asbestos detected)
M-13A	Window glazing caulk	Sample 21914-5(no asbestos detected)
M-25A	Gaskets	Sample 21914-4(no asbestos detected)
M-33A	Insulation board(ceiling panels)	Sample 21914-2(no asbestos detected)
M-60A	Roofing layers(ground debris)	Sample 21914-12(no asbestos detected)
S-1	Decorative texture	Sample 21914-1(no asbestos detected)

J&J and Co.,Ltd.

BUILDING INSPECTION OF SUSPECT ASBESTOS CONTAINING BUILDING MATERIALS

Client: Iowa DNR

Building: water treatment plant(21914 Park Loop Onaw

Sample Number	Room	Homogeneous Materials	Quantinity q.ft.,Ln.ft.,Cu.f	Comment
1	exterior storage room	S-1	20 sq.ft.	(sand finish,ceiling) decorative texture
	interior storage room	S-1	20 sq.ft.	(sand finish,ceiling) decorative texture
2	mechanical room	M-33A	600 sq.ft.	(ceiling) insulation board
3		M-11A	14 ln.ft.	(on rectangular bolted opening,above mixing tank) gasket caulk
4		M-25A	7 sq.ft.	(on fitting & pumps,14 gaskets) gaskets
5		M-13A	7 ln.ft.	(exterior storage/mechanical room window) window glazing caulk
6		M-11B	18 ln.ft.	(window,outer edges,both rooms) sealant caulk
7		M-11C	102 ln.ft.	(around door frames,on each side) sealant caulk
8	roof	M-8A	674 sq.ft.	shingles
9		M-2A	674 sq.ft.	(under shingles) tar paper
10		M-11D	42 ln.ft.	(window edges,vent seam patches) sealant caulk
11		M-4A	8 ln.ft.	(vent base) patching tar
12	exterior reservoir tank	M-60A	550 sq.ft.	(debris on perimeter grounds/residues on tank) roofing layers
13		M-4B	8 ln.ft.	(around inspection entry hatch & vent) patching tar

Date: 7/21/2015 Inspector: Jeffrey L Wagner

J&J and Co.,Ltd.

TESC LOGING NUMBER 150723R

TRIANGLE ENVIRONMENTAL SERVICE CENTER

13509 East Boundary Road, Suite B - Midlothian - VA 23112 (804)739-1751; fax:(804)739-1753

LABORATORY CHAIN OF CUSTODY

LAB CLIENT: J&J and Company, Ltd

ADDRESS: 1620 Ross Street

CITY, STATE, ZIP: Sioux City,Ia. 51103

PREFERRED CONTACT METHOD: [ ] Phone: (712) 255-6613 [ ] FAX: (712) 255-6613

[X] Email: jandjcompanyltd@cableone.net

DATE: 7/21/2015

CONTACT NAME: Jeff Wagner

SAMPLER NAME: Jeff Wagner

PROJECT: water treatment building

PO #: 21914 Park Loop Onawa,Ia.

TAT: [ ] Rush [X] 24hours [ ] 3-5 days

Sample Number	Sample Date	ASBESTOS									LEAD							Other Metals						Indoor/Outdoor Air Quality						
		Bulk Dry (PLM)	PCM Fiber count	PLM Point Count 1000	PLM Point Count 400	ARB 435 (CA only)	PLM Gravimetric	TEM AHERA Air	TEM Yamate	TEM Chatfield (bulk)	Air	Paint (ppm & %)	Soil (ppm)	STLC	TCLP	Wipe* (see note)	Water	RCRA 8	CAM 17	Soil: Cd, Cr, Zn, Cu, Pb, Ni	Air: Cd, Cr, Zn, Pb	STLC	TCLP	Biocassette	Slide	Surface Swab	Surface Tape	Bulk	Air Volume (L) OR Wipe Area (ft²) OR Scrape Area (cm²)	COMMENTS or LOCATION
21914-1	7/21/2015	X																												decorative texture
21914-2	7/21/2015	X																												ceiling panels
21914-3	7/21/2015	X																												gasket caulk
21914-4	7/21/2015	X																												gasket
21914-5	7/21/2015	X																												window glazing caulk
21914-6	7/21/2015	X																												caulk
21914-7	7/21/2015	X																												caulk
21914-8	7/21/2015	X																												shingles
21914-9	7/21/2015	X																												tar paper
21914-10	7/21/2015	X																												caulk

* Do wipe samples submitted meet ASTM E1792 requirements: [ ] YES [ ] NO

RELEASED BY:	SIGNATURE [signature]	DATE/TIME: 7-22-15
RECEIVED BY:	SIGNATURE [signature]	DATE/TIME: 7/23/15 1120
RELEASED BY:	SIGNATURE	DATE/TIME:

3-6-06 bk

TESC LOGING NUMBER 150723 R

TRIANGLE ENVIRONMENTAL SERVICE CENTER

13509 East Boundary Road, Suite B - Midlothian - VA 23112 (804)739-1751; fax:(804)739-1753

LABORATORY CHAIN OF CUSTODY

LAB CLIENT: J&J and Company, Ltd

ADDRESS: 1620 Ross Street

CITY, STATE, ZIP: Sioux City,Ia. 51103

PREFERRED CONTACT METHOD: [ ] Phone: (712) 255-6613 [ ] FAX: (712) 255-6613

[X] Email: jandjcompanyltd@cableone.net

DATE: 7/21/2015

CONTACT NAME: Jeff Wagner

SAMPLER NAME: Jeff Wagner

PROJECT: water treatment building

PO #: 21914 Park Loop Onawa,Ia.

TAT: [ ] Rush [X] 24hours [ ] 3-5 days

Sample Number	Sample Date	ASBESTOS									LEAD							*Other Metals						Indoor/Outdoor Air Quality							COMMENTS or LOCATION
		Bulk Dry (PLM)	PCM Fiber count	PLM Point Count 1000	PLM Point Count 400	ARB 435 (CA only)	PLM Gravimetric	TEM AHERA Air	TEM Yamate	TEM Chatfield (bulk)	Air	Paint (ppm & %)	Soil (ppm)	STLC	TCLP	Wipe* (see note)	Water	RCRA 8	CAM 17	Soil: Cd, Cr, Zn, Cu, Pb, Ni	Air: Cd, Cr, Zn, Pb	STLC	TCLP	Biocassette	Slide	Surface Swab	Surface Tape	Bulk	Air Volume (L) OR Wipe Area (ft²) OR Scrape Area (cm²)	
21914-11	7/21/2015	X																												patching tar
21914-12	7/21/2015	X																												roofing layers
21914-13	7/21/2015	X																												patching tar

* Do wipe samples submitted meet ASTM E1792 requirements: [ ] YES [ ] NO

RELEASED BY:	SIGNATURE	DATE/TIME: 7-22-15
RECEIVED BY:	SIGNATURE	DATE/TIME: 7/22/15 12:20
RELEASED BY:	SIGNATURE	DATE/TIME:

3-6-06 bk

TRIANGLE ENVIRONMENTAL SERVICE CENTER, INC.

13509 East Boundary Road, Suite B, Midlothian, VA 23112
804-739-1751 • fax: 804-739-1753

BULK ASBESTOS SAMPLE ANALYSIS SUMMARY

CLIENT: J & J and Company, LTD
1620 Ross St.
Sioux City, IA 51103

TESC LOGIN #: 150723R

DATE OF RECEIPT: 7/23/2015
DATE OF ANALYSIS: 7/23/2015
DATE OF REPORT: 7/24/2015

CLIENT JOB/ #: **21914 Park Loop Onawa, Ia.**

JOB SITE:

ANALYST: F. Jiang

TESC SAMPLE #	CLIENT SAMPLE ID & GROSS DESCRIPTION	ESTIMATED % ASBESTOS	NON ASBESTOS % FIBERS	NON FIBROUS % MATERIALS
1	21914-1 / White powder	**NAD**		100%
2	21914-2 / Brown fibers	**NAD**	98% Cellulose	2%
3	21914-3 / Brown adhesive	**NAD**		100%
4	21914-4 / Gray adhesive	**NAD**		100%
5	21914-5 / Gray adhesive	**NAD**		100%
6	21914-6 / White adhesive	**NAD**		100%
7	21914-7 / Gray adhesive	**NAD**		100%
8	21914-8 / Black tar-like	**NAD**	20% Fiberglass	80%
9	21914-9 / Black fibers	**NAD**	98% Cellulose	2%
10	21914-10 / Gray adhesive	**NAD**		100%

Samples are analyzed in accordance with "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, Dec. 1982 and "Method for the Determination of Asbestos in Bulk Building Materials", EPA 600/R-93/116, July 1993. None Detected: not detected at/or below the detected limit of method (Reporting limit: 1% Asbestos). Glass fiber is analyzed for quality control blank. TESC recommends by point count or Transmission Electron Microscopy (TEM), for materials regulated by the EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by Polarized Light Microscopy (PLM). Both services are available for an additional fee. This report shall not be reproduced, except in full written approval of Triangle Environmental Service Center, Inc. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. This test report relates only to the item(s) tested.

NVLAP Lab Code: 200794-0

[LEGEND NAD=No Asbestos Detected, Lino.=Linoleum, JC=Joint Compound]

Reviewed By Authorized Signatory: Yuedong Fang

Feng Jiang, MS Senior Geologist, Laboratory Director
Yuedong Fang, Senior Geologist

TRIANGLE ENVIRONMENTAL SERVICE CENTER, INC.

13509 East Boundary Road, Suite B, Midlothian, VA 23112
804-739-1751 • fax: 804-739-1753

BULK ASBESTOS SAMPLE ANALYSIS SUMMARY

CLIENT: J & J and Company, LTD
1620 Ross St.
Sioux City, IA 51103

TESC LOGIN #: 150723R

DATE OF RECEIPT: 7/23/2015
DATE OF ANALYSIS: 7/23/2015
DATE OF REPORT: 7/24/2015

CLIENT JOB/ #: **21914 Park Loop Onawa, Ia.**

JOB SITE:

ANALYST: F. Jiang

TESC SAMPLE #	CLIENT SAMPLE ID & GROSS DESCRIPTION	ESTIMATED % ASBESTOS	NON ASBESTOS % FIBERS	NON FIBROUS % MATERIALS
11	21914-11 / Black adhesive	**5% Chrysotile**		95%
12	21914-12 / Black tar-like, black fibers	**NAD**	30% Cellulose	70%
13	21914-13 / Black adhesive	**5% Chrysotile**		95%

Total Samples/Layers Analyzed: 13

Samples are analyzed in accordance with "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, Dec. 1982 and "Method for the Determination of Asbestos in Bulk Building Materials", EPA 600/R-93/116, July 1993. None Detected: not detected at/or below the detected limit of method (Reporting limit: 1% Asbestos). Glass fiber is analyzed for quality control blank. TESC recommends by point count or Transmission Electron Microscopy (TEM), for materials regulated by the EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by Polarized Light Microscopy (PLM). Both services are available for an additional fee. This report shall not be reproduced, except in full written approval of Triangle Environmental Service Center, Inc. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. This test report relates only to the item(s) tested.

NVLAP Lab Code: 200794-0

[LEGEND NAD=No Asbestos Detected, Lino.=Linoleum, JC=Joint Compound]

Reviewed By Authorized Signatory:

Yuedong Fang

Feng Jiang, MS Senior Geologist, Laboratory Director
Yuedong Fang, Senior Geologist

ATTACHMENT II

9399 W. Higgins Road Suite 1100
Rosemont, IL 60018

TELEPHONE 847/430-2800
FACSIMILE 847/430-2284

Report Date: 2/25/2015

CERTIFICATE OF ANALYSIS

ANALYSIS NUMBER: 1503755

Control Number: 66597

Hall's Culligan of Lincoln Inc
445 N. 66th Street
Lincoln, NE 68505

Customer: LEWIS AND CLARK PARK
21914 PARK LOOP
ONOWA IA

Zip Code: 51040

Account Number: 26180

Customer Account #:

Salesperson JIM LAUGHERY

cc: JLAUGHERY@HALLSWATER.COM

SAMPLE INFORMATION:

Analysis Type Requested: Standard A Analysis

Sampled: 2/17/2015 Supply/Source: PRIVATE WELL Condition:

Received: 2/19/2015 Sampling Point: Application:

ANALYSIS INFORMATION:

Turbidity(Method 180.1 R 2.	248.0 NTU	Turbidity after filtration	24.6
Conductivity(Method 120.1	990.0 MMHOS/CM	Est. TDS by Conductivity	625.1
Color(Method 2120C)	32.5	Color after Acidification	5.6
pH(Method 150.1 R 1982)	7.5	Tannins	<2

Concentrations reported as mg/L (PPM) unless otherwise indicated

CATIONS (Method 200.7)

	As Element	As CaCo3
Calcium (Ca)	150	375.0
Magnesium (Mg)	49.2	202.7
Sodium (Na)	42.2	92.0
Potassium (K)	7.7	9.9
Strontium (Sr)	1.42	1.8
Barium (Ba)	0.1332	
Iron (Fe)	16.57	
Manganese (Mn)	0.5	
Copper (Cu)	0.01	
Zinc (Zn)	0.07	

ANIONS (Method 300.0)

	As Element	As CaCo3
Chloride (Cl)	5.9	8.3
Nitrate As N (NO3)	1.8	6.5
Nitrite As N (NO2)	0.1	0.4
Sulfate (SO4)	75	78.0
Bicarbonate	659.7	540.7
Carbonate	N.M.	N.M.
Fluoride (F)	0.4	1.00
Silica (SiO2)	31.1	

	Mg/L	GPG		Mg/L	GPG		Mg/L	GPG
Cations (CaCO3)	679.6	39.74	Anions (CaCO3)	634.9	37.13	Hardness (CaCO3)	577	33.8

Additional Tests

PB by ICP	N.D.ug/L	As by ICP	20.310ug/L
Aluminum by ICP	<50ug/L		

*NA = Not Analyzed NM = Not Measured ND = Not Detected

This report can only be reproduced in its entirety. The results reported here are representative of the sample as received in the laboratory. Unless noted holding times for method 300 may not be followed.

Certifications: CA-01133A; IL-000213; NY-11756;MT-CERT0091; TX-TX269-2003A
IA-369: VT-VT02199; IL-IDPH 17598, NELAP Accredited

Richard Cook
Director of Laboratories

Consumer: LEWIS AND CLARK PARK

FEDERAL SAFE DRINKING WATER ACT

All tested parameters exceeding the maximum concentration levels (MCL) established under the "Federal Safe Drinking Water Act"

	Parameter	Found	MCL
PRIMARY:			
	Turbidity	248.00 ntu	0.50 ntu
	As by ICP	20.31 ug/l	10.00 ug/l
SECONDARY:	Manganese (Mn)	0.50 mg/l	0.05 mg/l
	Iron (Fe)	16.57 mg/l	0.30 mg/l
	Est TDS by Cond.	625.08 mg/l	500.00 mg/l
	Color	32.50	15.00

* MCL for Turbidity varies as follows:

1. Municipal Direct Filtration 0.5 NTU
2. Municipal Sand Filtration 1.0 NTU
3. Unfiltered Water Supply 5.0 NTU

TYPICAL POST RO DRINKING WATER UNITS

(Concentrations reported as mg/L (PPM) as the element)

Iron (Fe)	0.8	Magnesium (Mg)	1.0
Manganese (Mn)	0.0	Sodium (Na)	1.3
Zinc (Zn)	0.0	Potassium (K)	0.2
Copper (Cu)	0.0	Chloride (Cl)	0.2
Nitrate As N (NO3)	0.5	Nitrite As N (NO2)	0.0
Sulfate (SO4)	0.8	Fluoride (F)	0.0

These values are typical of new modules on water with a pH of 7-9 at 70-74 F with 500-3000 mg/L total salts operating with 40-70 PSI pressure across the module. Local conditions may yield different results.

DI CALCULATION FACTORS

			GPG	mg/L
Sodium	13.5%	Weak Base Fact X	5.5	93.6
Alkalinity	85.2%	Carbonic Acid	35.3	603.4
Chloride	8.9%	Cation Fact Y	39.7	679.4
Carbonic Acid	82.1%	Silica	1.5	25.80
Monovalent Ions	2.2%	Carbon Dioxide	1.8	31.3
Silica	4.5%	Strong Base Fact Z	40.7	696.3

Analysis Date:

Method	**Date**	**Method**	**Date**
120.1 R 1982	02/20/15	150.1 R 1982	02/20/15
180.1 R 2.0	02/20/15	200.7 R 4.4	02/23/15
2120C	02/23/15	300.0 R 2.1	02/20/15

---

pH – the acid strength of water on a scale of 0 to 14 (neutral = pH 7.0). Values from 7→0 are increasingly more acidic; values from 7→14 are increasingly more alkaline. The recommended range for drinking water under the U.S. regulations is 6.5 to 8.5.

Conductivity – the relative ability of water to carry an electrical current, used to estimate the total concentration of dissolved ions.

Turbidity – cloudiness in water caused by the dispersion of light by extremely tiny particles. Measured on an arbitrary scale of Nephelometric Turbidity Units (NTUs). The mandatory maximum under U.S. regulations is 0.5 NTU.

Color – the amount of brownish-yellow color from dissolved tannins from vegetation (like tea) and metals (like rust) and their combinations, measured on an arbitrary scale. The recommended maximum under U.S. regulations is 15 CU.

Silica, SiO_2 – a naturally occurring dissolved mineral, which produces a glassy scale in high temperature equipment but is more important in predicting the life of certain water treatment media.

Hydrogen Sulfide, H_2S – a toxic, noxious, corrosive gas that smells like rotten eggs. Bacteria acting on sulfate or organic sulfur-containing materials in the absence of oxygen produce it. Only "special" water analyses can determine hydrogen sulfide levels.

Total Hardness – the sum of all metal ions which react with soap to inhibit sudsing and form "scum" or "bathtub ring" – mostly Calcium and Magnesium. When heated or evaporated, hard water can cause lime scale that can deposit on sink and shower fixtures and walls and result in loss in efficiency or fuel waste in water heaters, boilers, and cooling systems.

Total Alkalinity – the sum of hydroxide (OH^-), carbonate (CO_3^{-2}), and bicarbonate (HCO_3^-) ions, which can combine with both acids and bases, which act to buffer water and prevent sudden uncontrolled changes in pH.

Cations – ions (atoms or molecules with an electrical charge) with a positive (+) electrical charge, so named because they go toward the cathode in an electric field. Besides the hardness ions, the main cations in water are sodium, Na^+, and potassium, K^+.

Anions – ions (atoms or molecules with an electrical charge) with a negative (-) electrical charge, so named because they go toward the anode in an electric field. The main anions in water are hydroxide (OH^-), carbonate (CO_3^{-2}), bicarbonate (HCO_3^-) (which together comprise "alkalinity"), sulfate (SO_4^{-2}), nitrate (NO_3^-) and chloride (Cl^-).

Nitrate/Nitrite, NO_3^-/NO_2^- – important because of toxicity to infants, nitrate comes from fertilizers and animal wastes. Water supplies with high nitrate levels should also be screened for agricultural pesticides and bacterial contamination. The mandatory limit under U.S. regulations is 10 mg/L.

Sulfate, SO_4^{-2} – a common mineral component, only rarely occurring at excessive levels, which can cause a temporary diarrhea in visitors who have not become acclimated to it. Recommended U.S. limit, 250 mg/L.

Flouride, F^- – often added to water to inhibit tooth decay. Mandatory U.S. limits range from 4.0 mg/L in northern regions to 1.4 mg/L in southern regions (where more water in consumed).

Chloride, Cl^- – a common mineral component, can be found in elevated levels near seawater and other salt supplies, which can cause taste problems and can contribute to corrosion. Recommended U.S. limit, 250 mg/L.

Iron, Fe – cause of metallic taste, rust stains on laundry and porcelain fixtures, and clogging/fouling of equipment. The recommended U.S. limit is 0.3 mg/L.

Manganese, Mn – cause of metallic taste and black stains on laundry and porcelain. Often occurs in combination with iron. The recommended U.S. limit is 0.05 mg/L Mn or a total of 0.3 mg/L of Fe + Mn.

Copper, Cu – cause of green stains on porcelain and fittings, seldom naturally-occurring, usually due to corrosion. The mandatory U.S. "actions level" of 1.3 mg/L is tied to the regulation for lead contamination due to corrosion of plumbing materials.

Zinc, Zn – cause of metallic taste and upset stomach. Due to corrosion of galvanized plumbin g materials. Recommended U.S. limit, 5.0 mg/L.

Units of Concentration used in this Report

gpg-abbreviation for "grains per gallon" calculated in terms of calcium carbonate equivalents. Multiply by 17.12 to convert gpg into either ppm or mg/L.
ppm-abbreviation for "parts per million." Interchangeable with mg/L.
mg/L-abbreviation for "milligrams per liter." Interchangeable with ppm. (There are one million milligrams in a liter of pure water).
ppb-abbreviation for "parts per billion." Interchangeable with µg/L or micrograms per liter.
µg/L-abbreviation for "micrograms per liter." Interchangeable with ppb. (There are a billion micrograms in a liter).

1000 ppb = 1 ppm; 1000 µg/L = 1 mg/L

THIS ANALYSIS WILL NOT DETERMINE WHETHER A WATER IS SAFE FOR HUMAN CONSUMPTION

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Control 66597

SAMPLE SUBMITTED BY:

Account Number: 26180

Account Name: Halls Culligan

Phone Number: 402-657-4564

FAX Number: 402-476-3353

E-Mail: jlaughery@hallswater.com → Please email results

Person Taking Sample: Jim Laughery

Date Sample Taken: 2/17/15 Time Sample Taken: 10:20AM

CUSTOMER INFORMATION:

Customer Name: Lewis & Clark Park

Store Name:

Customer Account Number:

Address: 21914 Park Loop

City: Omaha State: IA Zip: 51040

Customer reported concern: Iron, Nitrates

SAMPLE INFORMATION:

Water Supply: Private X Municipal ____

Source: Surface ____ Well X Unknown ____

Condition: Treated ____ Untreated ____ Cloudy ____ Colored ____ Odor ____

Sample Point: Faucet ____ Equipment ____ Other ____

Application: Household ____ Commercial ____ National Account ____

Comments:

ANALYSIS REQUESTED:

Standard Analysis: X Standard w/TOC: ____ Scale Analysis: ____

Hemodialysis Basic: ____ Brine Analysis: ____

Hemodialysis Complete: ____ Depth Filter Analysis: ____

Resin Analysis: ____ Performed at Rockford Laboratories

Special Analysis: (List Analysis Requested): Nitrate - EPA Test 35352

For Questions or Special Analysis contact Rick Cook at (847) 430-1284

EQUIPMENT INVOLVED (IF ANY): Multi Media Filtration, Iron Removal & Chlorination

LAB USE ONLY:

Sample received in acceptable condition: Yes ____ No ____

Received by: ____ Date: ____ Time: ____

If not reason:

Disposition of sample:

Litigation samples are not accepted by the laboratory

Customer:

Please sign:

Please print your name:

Culligan International Company

By:

Its: